Appendix A
Scoping Report

PERMANENTE CREEK RESTORATION PROJECT

Scoping Report

File No. PLN17-2250

Prepared for
County of Santa Clara
Department of Planning and
Development

July 2021

PERMANENTE CREEK RESTORATION PROJECT

Scoping Report

File No. PLN17-2250

Prepared for
County of Santa Clara
Department of Planning and
Development

July 2021

787 The Alameda
Suite 250
San Jose, CA 95126
408.660.4000
www.esassoc.com

Bend	Orlando	San Jose
Camarillo	Pasadena	Santa Monica
Delray Beach	Petaluma	Sarasota
Destin	Portland	Seattle
Irvine	Sacramento	Tampa
Los Angeles	San Diego	
Oakland	San Francisco	

201801074

TABLE OF CONTENTS

Permanente Creek Restoration Project Scoping Report

Page

1. Introduction 1

2. Description of the Project 2
Project Summary 2
Project Location 2

3. Opportunities for Public Comment 4
Notification 4
Public Scoping Meeting 4

4. Summary of Scoping Comments 5
Air Quality 5
Biological Resources 5
Cultural and Tribal Cultural Resources 6
Hydrology and Water Quality 7
Mineral Resources 7
Other Topics 8

Exhibits

A. Notice of Preparation and Mailing List A-1
B. Electronic Access B-1
C. Newspaper Notification C-1
D. Public Scoping Meeting Presentation D-1
E. Scoping Comment Letters E-1

List of Figures

Figure 1 Project Overview 3

List of Tables

Table 1 Parties Submitting Comments During the Permanente Creek Restoration Project SEIR Scoping Process 5

This page intentionally left blank

SCOPING REPORT
Permanente Creek Restoration Project

1. Introduction

This report provides an overview of the comments received by the Santa Clara County Planning Department (County) during the public scoping period for the Supplemental Environmental Impact Report (SEIR) to the 2012 Lehigh Permanente Quarry Reclamation Plan Amendment EIR that the County is preparing for the Permanente Creek Restoration Plan (PCRP), File No PLN17-2250.[1]

CEQA Guidelines Section 15083 provides that a "Lead Agency may…consult directly with any person… it believes will be concerned with the environmental effects of the project." Scoping is the process of early consultation with affected agencies and the public prior to completion of a Draft EIR. Section 15083(a) states that scoping can be "helpful to agencies in identifying the range of actions, alternatives, mitigation measures, and significant effects to be analyzed in depth in an EIR and in eliminating from detailed study issues found not to be important." Scoping is an effective way to bring together and consider the concerns of affected State, regional, and local agencies, the project proponent, and other interested persons (CEQA Guidelines §15083(b)). Scoping is not conducted to resolve differences concerning the merits of a project or to anticipate the ultimate decision on a proposal. Rather, the purpose of scoping is to determine the scope of information and analysis to be included in an EIR and, thereby, to ensure that an appropriately comprehensive and focused EIR will be prepared that provides a firm basis for informed decision-making. Comments not within the scope of CEQA will not be addressed through the CEQA process.

This report is intended for use by the County in preparing the SEIR as formal documentation of initial input received from governmental agencies, the public, and other stakeholders regarding the range of actions, alternatives, mitigation measures, and significant effects to be analyzed in depth in the SEIR. It also provides access for other agencies and members of the public to review comments received during the scoping period.

[1] The County of Santa Clara Planning Office is the lead agency pursuant to the California Environmental Quality Act (CEQA) for the preparation of an SEIR for the Project.

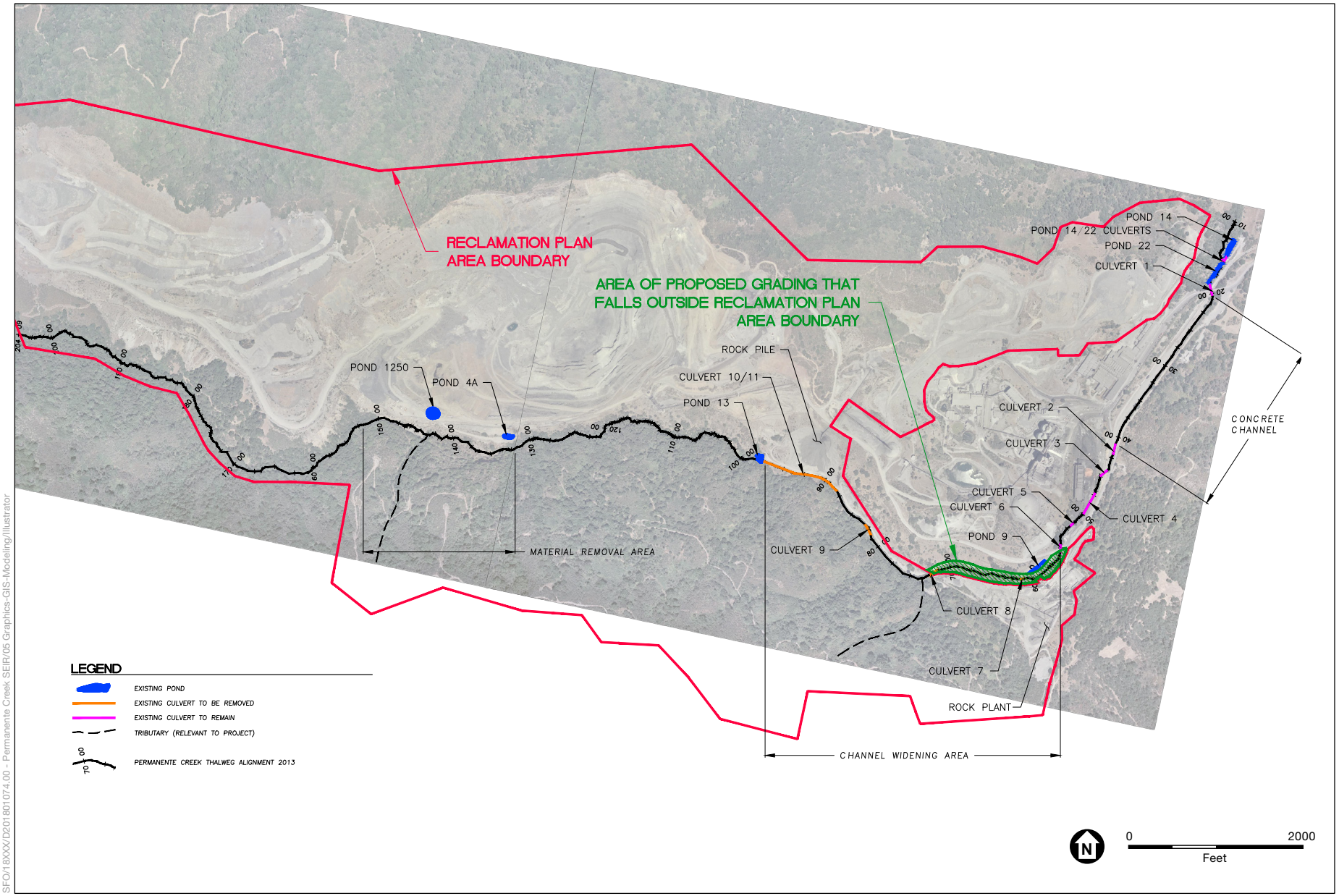
2. Description of the Project

Project Summary

The PCRP would restore and modify specific segments of Permanente Creek located within and outside of the existing reclamation plan boundary for the Lehigh Permanente Quarry. In accordance with a Cleanup and Abatement Order issued by the San Francisco Bay Regional Water Quality Control Board (RWQCB) (RWQCB Order No. 99-018), RWQCB and Lehigh spent a number of years developing the scope of a Permanente Creek restoration plan. Ultimately, the agreed upon terms of the Permanente Creek restoration plan were included in an Amended Consent Decree (Consent Decree) between the Sierra Club and Lehigh, entered by the U.S. District Court, Northern District, on May 11, 2016. The Consent Decree identified reach-specific and site-specific restoration recommendations, identified optional restoration design alternatives, contained implementation schedules, and updated prior reports submitted to the RWQCB based on more recent field reconnaissance. It focused on the long-term removal of structures in and adjacent to the creek and the restoration of the creek's riparian zone. Some of the activities that would occur under the Consent Decree overlapped with the activities analyzed in the 2012 Lehigh Permanente Quarry Reclamation Plan Amendment EIR; others would occur outside the existing reclamation plan boundary.

Project Location

The Lehigh Southwest Cement Company (Lehigh) owns and operates two adjacent facilities located in the Santa Clara County foothills west of the City of Cupertino in an unincorporated area of Santa Clara County: Permanente Quarry and the Lehigh Cement Plant. These facilities are located along the east branch of Permanente Creek within the Permanente Creek watershed (**Figure 1**). Permanente Creek's main channel is approximately 13.1 miles long, with its headwaters rising on the southeast side of Black Mountain approximately 0.6-mile west of the western boundary of Lehigh's property. Approximately 4.2 miles of Permanente Creek traverse Lehigh's property, and includes portions of the creek that have been re-aligned into a straight channel or placed in underground culverts through the cities of Los Altos and Mountain View and discharges into the San Francisco Bay through the Mountain View Slough or Stevens Creek and the Whisman Slough via the Permanente Creek Diversion Channel. The area evaluated in the 2012 EIR included a 49.2-acre area of disturbance along Permanente Creek and the adjacent hillsides that had been affected by mining activities, erosion events, and activities to control erosion in that area. The PCRP would restore the streambed, banks, and floodplain along an approximately 3.7-mile extent of the portion of Permanente Creek within Lehigh's ownership, partly within and partly outside of the area analyzed in the 2012 EIR.



SFO/18XXX/D2018010174.00 - Permanente Creek SEIR/05 Graphics-GIS-Modeling/Illustrator

SOURCE: Waterways Consulting, Inc., Permanente Creek Restoration Plan 90% Level Submittal Design Basis Technical Memorandum, October 31, 2019.

Permanente Creek Restoration Project Grading Approval Notice of Preparation

Figure 1
Project Overview

ESA

3. Opportunities for Public Comment

Notification

On April 13, 2021, the County published and distributed a Notice of Preparation (NOP) to advise interested local, regional, state, and federal agencies, as well as the public, that an SEIR would be prepared for the project. The NOP also was emailed to recipients on the "Lehigh interested parties" list. The NOP, a copy of the email notification, and the email list are provided in **Exhibit A**, *Notice of Preparation*.

Additionally, an electronic copy of the NOP was posted on the County's website at: https://www.sccgov.org/sites/dpd/Programs/SMARA/PermanenteQuarry/Pages/PermanenteCreekRestoration.aspx. The NOP solicited comments on the scope and content of the SEIR. Agencies and members of the public were encouraged to submit their comments to the County by U.S. mail or e-mail. Screenshots of the County's website showing the NOP are provided in **Exhibit B**, *Electronic Access*.

In addition to the NOP, the County notified the public about the public scoping meeting through a newspaper legal advertisement published in the Cupertino Courier on April 23, 2021. The legal notice is provided in **Exhibit C**, *Newspaper Notification*. The notification provided basic project information, the date, time, and participation information for a virtual public scoping meeting, and a brief explanation of the public scoping process.

Public Scoping Meeting

The County conducted a virtual public scoping meeting on Thursday, April 29, 2021, that was scheduled from 6 p.m. to 8 p.m. The presentation (**Exhibit D**) included an overview of the project, the environmental review process, and public participation instructions.

A total of 24 people participated in or attended the scoping meeting. Panelists included: Robert Salisbury and Manira Sandhir of Santa Clara County Department of Planning and Development; Claudia Garcia of Ascent Environmental, planning consultant to the County; and Janna Scott of Environmental Science Associates (ESA), CEQA consultant to the County. Erika Guerra of Lehigh Southwest Cement Company presented an overview of the project. Three members of the public and a representative from the Midpeninsula Regional Open Space District spoke at the scoping meeting. A summary of the comments and related discussion is included in Exhibit D. Briefly, commenters had questions regarding the interaction of the proposed project with the Yaeger Yard area; biological resources relating to changes since the 2012 EIR; and the potential for air quality and associated health impacts.

4. Summary of Scoping Comments

All scoping comments received on or before end of the scoping period are documented in this Scoping Report and will be considered in the SEIR. Nine comment letters were received during the scoping period. Table 1 lists the names of commenting parties in the order in which the comments were received. The County has reviewed and relied upon the full text of the comment letters in preparing the SEIR; summaries of the environmental issues raised are provided below for ease in review by other agencies and members of the public. The letters are provided in **Exhibit E**, *Scoping Letters*.

TABLE 1
PARTIES SUBMITTING COMMENTS DURING
THE PERMANENTE CREEK RESTORATION PROJECT SEIR SCOPING PROCESS

Name	Organization/Affiliation	Letter ID	Date
Written Comments			
Susan Murphy	None	A	April 13, 2021
Nancy Gonzalez-Lopez, Cultural Resources Analyst	Native American Heritage Commission	B	April 14, 2021
Jeremy Loh, Assistant Planner	Town of Los Altos Hills	C	May 6, 2021
Carol E. Atkins, Manager, Environmental Services Unit	California Department of Conservation, Division of Mine Reclamation	D	May 7, 2021
Libby Lucas	None	E	May 10, 2021
Aaron Hebert, Senior Resource Management Specialist	Midpeninsula Regional Open Space District	F	May 10, 2021
Katja Irvin	Sierra Club	G	May 10, 2021
Gregg Erickson, Regional Manager, Bay Delta Region	California Department of Fish and Wildlife	H	May 13, 2021
Shree Dharasker, Associate Engineer	Santa Clara Valley Water District	I	May 14, 2021

Scoping input received by the County identifies potential impacts in the areas summarized below:

Air Quality

Input regarding the project's potential impact on air quality was submitted by the Town of Los Altos Hills (Letter C) and by a member of the public (Letter A). Emissions from both trucks serving the project site and the facility itself were described as contributing to asthma and other health concerns, especially for children.

Biological Resources

Letter H, from the California Department of Fish and Wildlife (CDFW), states that CDFW engineering staff provided comments on the revised 90% engineering designs and determined that implementation of the project could potentially result in post-construction instability of the creek bed and bank, which could result in impacts to the sensitive riparian community and special-

status species habitat. A long-term post-construction monitoring and adaptive management plan should be developed and described in the SEIR.

CDFW recommends that analysis of riparian vegetation impacts include trees less than 12-inches in diameter, or based on area calculations for seedlings, saplings, and understory vegetation, as smaller trees are important to riparian vegetation structural complexity and habitat succession. Removal of approximately 30 larger trees as indicated in the 90% design plans also could impact special-status and sensitive bat species (e.g., Pallid bat and Hoary bat).

Other input provided suggests that the SEIR should discuss design modifications or alternate outfall sites (specifically in regard to Pond 1250) to ensure the project does not adversely impact aquatic and riparian habitats or special-status species (e.g., California giant salamander and California red-legged frog) resulting from direct or indirect changes in the creek hydrology.

CDFW recommends the SEIR should include focused species and nesting bird surveys; nest buffers; and avoidance, minimization, and mitigation measures, to reduce potential impacts to special-status species to less-than-significant levels. In order to avoid impacts to rare plant species, CDFW recommends the SEIR include a special-status plant habitat assessment, focused plant surveys, and plant avoidance measures.

The Midpeninsula Regional Open Space District (Letter F) notes that the 2012 EIR relied on the inclusion of Applicant Proposed Measures in the Final EIR or the Project Description to reduce impacts to California red-legged frog and other species to less-than-significant levels, which may conflict with the subsequent decision in Lotus v. Department of Transportation (2014). The letter further indicates that new information regarding California red-legged frog (and other species such as mountain lions) that was not available at publication of the 2012 FEIR should be incorporated into the SEIR analyses. The District noted that special-status plant surveys should be updated from the 2012 EIR and that mitigation should include periodic surveys to address potential for plant establishment over the duration of the project. The District also suggests the SEIR should consider potential impacts to any Sensitive Natural Communities as defined by NatureServe's Heritage Methodology, which is the same system used to assign global and state rarity ranks for plant and animal species in the California Natural Diversity Database.

A member of the public (Letter E) suggests the SEIR include establishment of a native plant nursery that only uses plants from the watershed, and prohibition of the use of chemicals for weed suppression. The commenter questions whether current protocols are being followed regarding the gathering of seeds of oaks and other preferred trees in preparation for initiation of the Permanente Creek Restoration Plan.

Cultural and Tribal Cultural Resources

The Native American Heritage Commission (NAHC) (Letter B) references the CEQA Guidelines sections that are applicable to potential impacts to historical resources as well as the requirements of Assembly Bill 52 (AB 52) and Senate Bill 18 (SB 18) pertaining to tribal cultural resources. The NAHC recommends consultation with California Native American tribes that are traditionally and culturally affiliated with the geographic area of the proposed project as early as possible in order to

avoid inadvertent discoveries of Native American human remains and to best protect tribal cultural resources. Summaries of the requirements of AB 52 and SB 18 are provided as well as NAHC recommendations for cultural resources assessments.

The Midpeninsula Regional Open Space District (Letter F) states that a qualified archaeologist should review the excavation work through the Phase II analysis and discuss findings with the State Historic Preservation Officer (SHPO). If an archaeologist and SHPO has already been consulted pursuant to Section 106, then the appropriate measures can be borrowed.

A letter from a private citizen (Letter E) indicates that an Ohlone Indian village has been unearthed just downstream by the Santa Clara Valley Water District. Therefore, the species of wetlands vegetation selected for reaches of Permanente Creek should reflect Native American-era plants conducive to supporting resident trout and California red-legged frog. Specifically, the establishment of tule in Reach #6 should be encouraged. A special pallet of wetlands vegetation could be temporarily grown in ponds adjacent to reaches of the creek where they could be used for restoration efforts. The commenter stressed the importance of a restoration plan reflecting Ohlone Indian occupation of Upper Permanente Creek for centuries, including a trail that Ohlone used to reach Monte Bello Ridge and the Pacific Ocean.

Hydrology and Water Quality

The Town of Los Altos Hills (Letter C) states that the SEIR should include detailed and specific mitigation measures for the restoration and demolition activities so that pollutants and sediments are not released into the creek, and that the activities be limited to dry months to further reduce potential impacts on water quality. Potential impacts beyond the Reclamation Plan Area should be identified, with particular focus on potential downstream impacts.

Letter I from the Santa Clara Valley Water District states that any changes to the hydrology/hydraulics of the proposed restored channel should not result in impacts to the Permanente Flood Protection Project, particularly as it pertains to the functioning of the San Antonio detention basins. Furthermore, any increase in the 100-year flows and volumes due to the proposed improvements must be mitigated to pre-improvement conditions.

A member of the public (Letter E) expressed concern with haul roads and impacts on the creek and the Yeager Yard landslide. Concern also was expressed regarding the stability of mining waste and potential effects on the watershed.

Mineral Resources

The California Department of Conservation, Division of Mine Reclamation (Letter D), stated that its primary focus is on active surface mining operations, but the Division also addresses issues related to abandoned legacy mines and has review responsibilities associated with lead agency implementation of the Surface Mining and Reclamation Act of 1975 (SMARA). Staff had no specific comments on the proposed project at this time.

Other Topics

Project Description

CDFW (Letter H) states that the project description in the NOP does not discuss the nexus of the proposed project to the proposed amendments to the Lehigh Permanente Quarry Reclamation Plan dated May 2019. CDFW recommends that the SEIR discuss the association between the project and the Reclamation Plan and explain whether the project will be further described and analyzed in any future CEQA documentation for the Reclamation Plan.

The Sierra Club (Letter G) states that the NOP project description should be revised to indicate that the provisions of the 2016 Amended Consent Decree, particularly paragraphs 33 through 42, reflect mandatory, minimum restoration duties imposed on Lehigh and are therefore necessary minimum elements of any "Project Description" applicable to the SEIR. For each activity in the Project Description, the SEIR should describe in detail and by reach which actions and impacts are covered in the 2012 Lehigh Permanente Quarry Reclamation Plan Amendment EIR and identify sections and page numbers for easy reference. Trees should only be removed if necessary to secure the long-term restoration of the creek, and to the extent native trees are removed, they should be replaced with 15-gallon trees at appropriate ratios rather than 24-inch box trees.

Alternatives

The Sierra Club states that alternatives to the restoration requirements in the Consent Decree that entail additional costs are still enforceable as restoration requirements if they fit within the cost escalation values in Decree paragraph 49.

EXHIBIT A

Notice of Preparation and Mailing List

DocuSign Envelope ID: F632CFBF-C763-443D-B832-0F8FD727B684

County of Santa Clara
Department of Planning and Development
County Government Center, East Wing
70 West Hedding Street, 7th Floor
San Jose, California 95110

NOTICE OF PREPARATION OF A SUPPLEMENTAL ENVIRONMENTAL IMPACT REPORT FOR THE PERMANENTE CREEK RESTORATION PROJECT

Project Applicant: Lehigh Southwest Cement Company and Hanson Permanente Cement Inc.
File Number: PLN17-2250
Application For: Grading Approval

The County of Santa Clara ("County") will be the Lead Agency and will prepare a Supplemental Environmental Impact Report (SEIR) to the 2012 Lehigh Permanente Quarry Reclamation Plan Amendment EIR for the Permanente Creek Restoration Project ("PCRP" or "project"). The County requests your input on the scope and content of the environmental information to be included in the SEIR that is germane to your agency's statutory responsibilities in connection with the proposed project. A brief description of the project, its site boundary, and a summary of the potential environmental effects are provided on the following pages. Approval of the project will require actions by the County of Santa Clara, including the preparation and certification of an SEIR and a Grading Approval. The SEIR also may be used by your agency when considering approvals for the project.

A Public Scoping/Community Meeting to solicit comments for the Notice of Preparation will be held virtually via Zoom (https://sccgov-org.zoom.us/j/92372836537) on **Thursday, April 29, 2021, from 6:00 p.m. to 8:00 p.m**. The deadline for your response is Monday, May 10, 2021 at 5:00 p.m.; however, an earlier response, if possible, would be appreciated. Please send your response to:

County of Santa Clara Planning Office
Attention: Robert Salisbury
County Government Center
70 West Hedding, 7th Floor, East Wing, San Jose CA 95110
E-mail: Robert.Salisbury@pln.sccgov.org

Prepared by:
Robert Salisbury, Senior Planner

DocuSigned by: Robert Salisbury C149DFC1F718456...
Signature

April 12, 2021
Date

Approved by:
Manira Sandhir
Principal Planner, AICP

DocuSigned by: Manira Sandhir 6BD23CC8C7554B3...
Signature

April 12, 2021
Date

Board of Supervisors: Mike Wasserman, Cindy Chavez, Dave Cortese, Ken Yeager, S. Joseph Simitian
County Executive: Jeffrey V. Smith

DocuSign Envelope ID: F632CFBF-C763-443D-B832-0F8FD727B684

Introduction

As the lead agency, the County plans to analyze the potential environmental impacts associated with a Grading Approval application submitted by Lehigh Southwest Cement Company (Lehigh) for the PCRP pursuant to the California Environmental Quality Act (CEQA) (Public Resources Code §21000 et seq.) and its implementing regulations, the CEQA Guidelines (14 Cal. Code Regs. Section 15000 et seq.). The PCRP would restore and modify specific segments of Permanente Creek located within and outside of the existing reclamation plan boundary for the Lehigh Permanente Quarry. The entirety of the project will be evaluated in the SEIR.

A lead agency may choose to prepare a supplement to an existing environmental impact report (EIR) if any of the conditions described in CEQA Guidelines Section 15162 would require the preparation of a subsequent EIR, and if only minor additions or changes would be necessary to make the previous EIR adequately apply to the project in the changed situation. The County evaluated the impacts of the PCRP within seven subareas collectively identified as the Permanente Creek Restoration Area (PCRA) in the 2012 EIR. Lehigh now proposes to implement the PCRP with the modifications described below relative to the original description of the work as provided in the 2012 EIR.

Project Location

Hanson Permanente Cement, Inc. owns, and Lehigh Southwest Cement Company operates (hereinafter, jointly, referred to as "Lehigh") the Permanente Quarry in the County foothills west of the City of Cupertino. The Quarry is located along the East Branch of Permanente Creek within the Permanente Creek watershed (**Figure 1**). Permanente Creek's main channel is approximately 13.1 miles long. Its headwaters rise on the southeast side of Black Mountain. Approximately 4.2 miles of Permanente Creek traverse Lehigh's property before flowing through the cities of Los Altos and Mountain View and discharging into the South San Francisco Bay through the Mountain View Slough or Stevens Creek through the Stevens Creek Diversion Channel. The area evaluated in the 2012 EIR included a 25.9-acre area of disturbance along Permanente Creek and the adjacent hillsides referred to in the EIR as the PCRA. The PCRA had been affected by mining activities, erosion events, and activities to control erosion in that area. The PCRP would restore the streambed, banks, and floodplain along an approximately 3.7-mile extent of the portion of Permanente Creek within Lehigh's ownership.

Project Description

In accordance with a Cleanup and Abatement Order issued by the San Francisco Bay Regional Water Quality Control Board (RWQCB) (RWQCB Order No. 99-018), RWQCB and Lehigh staffs spent a number of years developing the scope of a Permanente Creek restoration plan. Ultimately, the agreed upon terms of the Permanente Creek restoration plan were included in an Amended Consent Decree (Decree) between the Sierra Club and Lehigh, entered by the U.S. District Court, Northern District, on May 11, 2016 (with an updated Exhibit D entered on May 18, 2016) (2016 Creek Restoration Plan). The 2016 Creek Restoration Plan identified reach-specific and site-specific restoration recommendations, identified optional restoration design alternatives, contained implementation schedules, and updated prior reports submitted to the RWQCB based on more recent field reconnaissance. It focused on the long-term removal of structures in and adjacent to the creek and the restoration of the creek's riparian zone. Some of the activities that would occur under the 2016 Creek Restoration Plan overlapped with the activities analyzed in the 2012 EIR. Where that was true, the 2012 EIR described and analyzed the associated environmental effects as direct and indirect impacts of the project under consideration. Where there was no overlap, the 2012 EIR described and analyzed the impacts of the Creek Restoration Plan as part of the cumulative scenario.

DocuSign Envelope ID: F632CFBF-C763-443D-B832-0F8FD727B684

The proposed creek restoration activities are reflected in the current PCRP, including the following major project components:

Concrete Channel (Reach 6)

- Encourage development of mature riparian canopy along the southern bank to shade the concrete channel to reduce solar heat gain on instream flow and discourage the establishment of tules;
- Preservation of existing native vegetation;
- Removal of non-native species and suppression of weeds around existing native seedlings and smaller native plants to encourage their establishment; and
- Installation of native vegetation.

Channel Widening Area (Reaches 8-10)

- Removal of concrete road segments;
- Construction of floodplain bench areas with habitat elements and reduction of access road width;
- Removal of 260 linear feet of culverts, including a road crossing, and daylighting the creek to improve fish passage conditions and ecological complexity;
- Installation of large woody debris (LWD) at the Culvert 7 and Culvert 8 removal sites.
- Removal of old tractor tires along streambanks at a culvert removal site;
- Removal of imported sediment from the bed and banks of a tributary reach;
- Select removal of rock slope protection (RSP) and concrete rubble bank protection at an area that now has adequate mature riparian vegetation that is providing root reinforcement to bank soils;
- Removal of the idled Rock Plant conveyor system and associated infrastructure; and
- Installation of native vegetation.

Rock Pile Area (Reaches 11 through 13)

- Removal of concrete road segment and road-related fill material;
- Removal of 930 linear feet of culverts and daylighting of the creek that would help improve fish passage conditions and ecological complexity;
- Construction of a new channel with floodplain bench areas with habitat elements that would help improve fish passage conditions and ecological complexity;
- Removal of Rock Pile and idled Rock Plant conveyor system and associated infrastructure;
- Removal of Pond 13 dam infrastructure;
- Construction of a restored channel through abandoned Pond 13; and
- Installation of native vegetation.

“Old Crusher Foundation” (Reach 17)

- Cutting back the concrete block that is projecting into the channel to better conform to the natural creek bank.

Material Removal Area (Reaches 17 and 18)

- Removal of overburden/fill and a relic concrete structure, and moving the north toe of slope northward, in accordance with the Decree, to retain Pond 4A in its current location;
- Construction of a new channel with floodplain bench areas with habitat elements that would help improve fish passage conditions and ecological complexity, and
- Installation of native vegetation.

DocuSign Envelope ID: F632CFBF-C763-443D-B832-0F8FD727B684

Required Project Approvals

In addition to County certification of an SEIR and issuance of Grading Approval, the project would require authorizations from the RWQCB, including Clean Water Act Section 401 certification and waste discharge requirements; the California Department of Fish and Wildlife ("CDFW"), including a Fish & Game Code Section 1602 Streambed Alteration Agreement; U.S. Fish and Wildlife Service ("USFWS"), including Endangered Species Act Section 7 consultation regarding the California red legged frog or other relevant species; and the U.S. Army Corps of Engineers (the "Corps"), including a nationwide Section 404 permit.

Potential Environmental Effects of the Project

An electronic copy of the 2012 EIR is available online: https://www.sccgov.org/sites/dpd/DocsForms/Documents/Lehigh_DEIR_201112.pdf. The 2012 EIR retains informational value, and only minor additions or changes would be necessary to make the 2012 EIR adequately apply to the PCRP as modified. Therefore, the County will prepare a supplement to the 2012 EIR (SEIR).

Pursuant to CEQA Guidelines Section 15163, the SEIR need only contain the information necessary to analyze the project modifications, changed circumstances, or new information that triggered the need for additional environmental review. The purpose of an SEIR is to explore environmental impacts that were not considered in the original environmental document. That the project has changed is not an occasion to revisit environmental concerns addressed in the original analysis - only the changed circumstances are at issue. Therefore, the SEIR will evaluate only those geographic areas that were not analyzed as part of the 2012 EIR and those environmental resource areas in which modifications to the PCRP could cause new or more severe significant impacts relative to those analyzed in the 2012 EIR. Aspects of the PCRP that were known at the time of the 2012 EIR are not subject to reconsideration, and the SEIR will not reconsider impacts that were approved as part of the certification of the 2012 EIR.[1]

Although all of the environmental considerations in the CEQA Guidelines Appendix G checklist will be considered, the SEIR is expected to focus on the following specific environmental topics:

- **Air Quality –** The air quality analysis presented in the SEIR will present applicable air quality conditions and air-pollutant sensitive land uses or activities in the vicinity of the project area and determine whether the PCRP, as revised, has the potential to result in a new or more significant air quality impact than disclosed in the 2012 EIR. The County will prepare an Air Quality and Greenhouse Gas Emissions Technical Study and will seek input from the Bay Area Air Quality Management District (BAAQMD) as part of the SEIR process.
- **Biological Resources –** The SEIR will present information on applicable biological resources in the project area, including special-status wildlife and plant species, natural communities, and wetlands; describe impact conclusions of the 2012 EIR; and evaluate potential for the PCRP, as modified, to result in a new or more significant impact to biological resources than disclosed in the 2012 EIR. The County will seek input from CDFW and USFWS as part of this effort.
- **Cultural Resources –** The SEIR will present relevant cultural resources information, including data from a cultural resources inventory and evaluation report, and will assess the potential for the PCRP, as revised, to result in a new or more significant impact to historical resources, archaeological and unique

[1] Focusing the scope of the SEIR in this way is consistent with CEQA. See, for example, *City of Irvine v. County of Orange* (2015) 238 Cal.App.4th 526, 539, and the California Supreme court's decision in *Friends of the College of San Mateo Gardens v. San Mateo County Community College District* (2016) 1 Cal.5th 937, 949.

DocuSign Envelope ID: F632CFBF-C763-443D-B832-0F8FD727B684

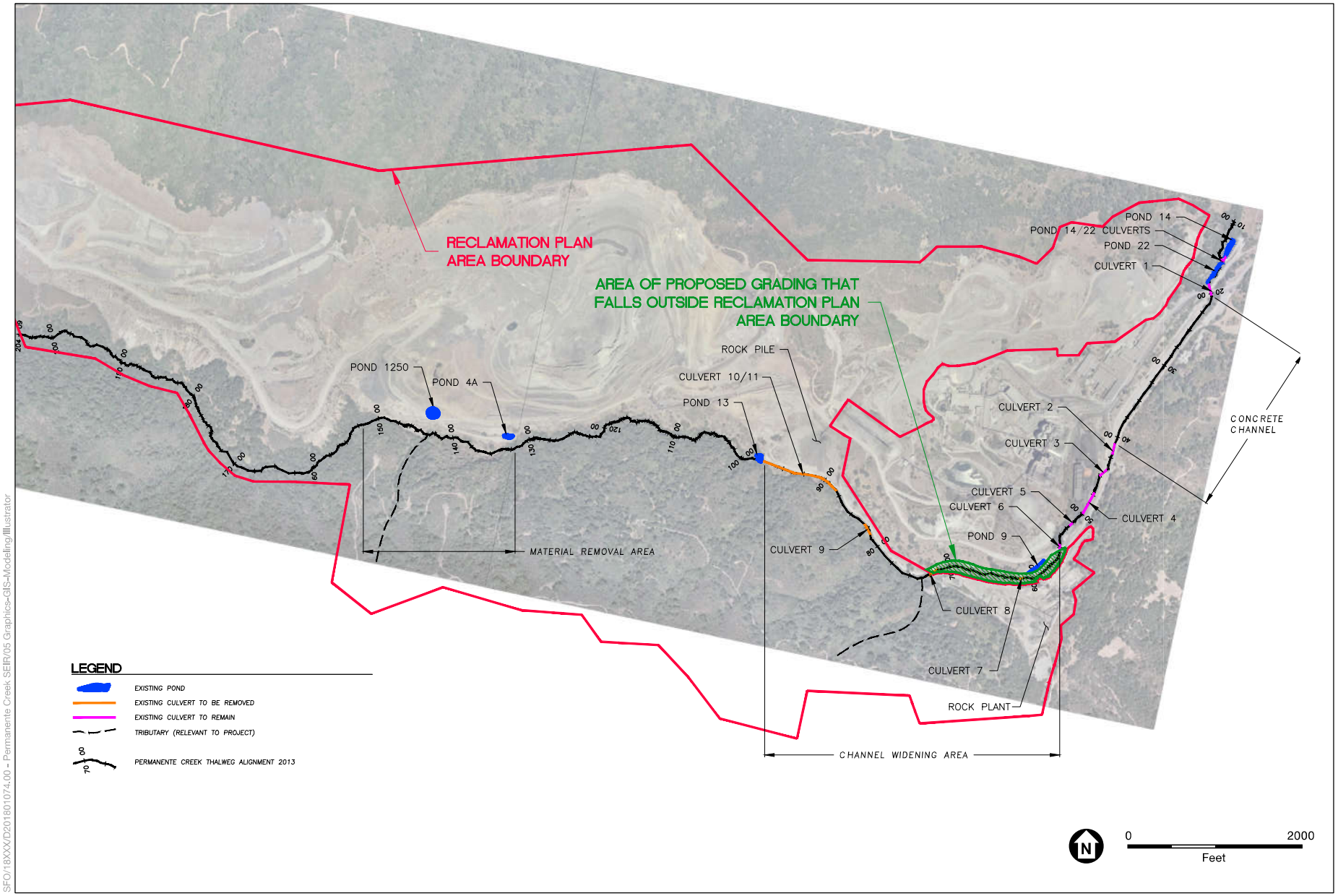
paleontological resources, tribal cultural resources, or potential disturbance of human remains than disclosed in the 2012 EIR.

- **Energy Conservation –** The SEIR will evaluate the potential energy impacts of operation, construction, and transportation of the PCRP, as revised, to determine whether they could result in a new or more significant impact to energy than disclosed in the 2012 EIR.
- **Geology and Soils –** The SEIR will present relevant information on the geology and geomorphology of Permanente Creek and will evaluate the potential for the PCRP, as revised, to result in a new or more significant impact to geology and soils than disclosed in the 2012 EIR.
- **Greenhouse Gas Emissions –** The SEIR will report greenhouse gas (GHG) emissions associated with the PCRP, as revised, and will assess whether changes in the project that have been made since the 2012 EIR could cause a new or more significant impact relating to GHG emissions. The County will prepare an Air Quality and Greenhouse Gas Emissions Technical Study and will seek input from BAAQMD as part of the SEIR process.
- **Hydrology and Water Quality –** The SEIR will generally describe hydrology and water quality conditions in and around Permanente Creek in the project area and will evaluate the potential for the PCRP, as revised, to result in a new or more significant impact to hydrology and water quality than disclosed in the 2012 EIR. The County will seek input from the RWQCB, the Corps, and the Santa Clara Valley Water District as part of this effort.
- **Cumulative Impacts –** To the extent the SEIR identifies any new or more significant impact than disclosed in the 2012 EIR, the SEIR will evaluate, on an issue-by-issue basis, the potential for the incremental change caused by the PCRP, as revised, to cause or contribute to new or more significant cumulative effects.
- **Alternatives.** CEQA requires an EIR to describe a range of reasonable alternatives to a project (or project location) that would feasibly attain most of the objectives and that could avoid or reduce at least one significant environmental impact (see CEQA Guidelines §15126.6). The SEIR will evaluate a No Project Alternative and will consider any new or more significant impact caused by the PCRP, as modified, in considering other potential alternatives.

The County welcomes all input on the scope and content of the SEIR in response to this Notice of Preparation, and especially welcomes responses that will assist the County in:

1. Identifying significant environmental issues raised by the proposed modifications to the PCRP as its activities were described in the 2012 EIR;
2. Identifying and evaluating potential alternatives to the proposed modifications or mitigation measures that could avoid or reduce new or more significant impacts of the proposed creek restoration activities than disclosed in the 2012 EIR; and
3. Confirming which agencies will be a responsible and/or trustee agency for this project and providing information germane to these agencies' statutory responsibilities as they relate to the County's analysis of potential effects of the PCRP, as revised.

DocuSign Envelope ID: F632CFBF-C763-443D-B832-0F8FD727B684



SOURCE: Waterways Consulting, Inc., Permanente Creek Restoration Plan 90% Level Submittal Design Basis Technical Memorandum, October 31, 2019.

Permanente Creek Restoration Project Grading Approval Notice of Preparation

Figure 1
Project Overview

ESA

[redacted]

From: Salisbury, Robert <Robert.Salisbury@PLN.SCCGOV.ORG>
Sent: Tuesday, April 13, 2021 2:20 PM
Subject: Notice of Preparation for Permanente Creek Supplemental Environmental Impact Report
Attachments: FINAL_PCRP_NOP_with_Figure_1 (signed).pdf

To all Lehigh interested parties:

The County Santa Clara Department of Planning and Development is commencing work on a Supplemental Environmental Impact Report ("SEIR") for the Permanente Creek Restoration Project. The County has scheduled an EIR scoping meeting/community meeting on Thursday, April 29 from 6 – 8 PM.

Please be aware that this SEIR is for the Permanente Creek Restoration Project (PLN17-2250) only, not for Lehigh's proposed Reclamation Plan Amendment (PLN19-0106) that the County is also processing.

The Notice of Preparation for the SEIR describing the project and providing details and a Zoom link for the scoping meeting is attached to this email. We look forward to your comments and hope you all will consider attending the scoping meeting on April 29.

Kind regards,

Robert Salisbury, Senior Planner
County of Santa Clara Planning Office
70 W. Hedding Street, East Wing, 7th Floor
San Jose, CA 95110
email: Robert.Salisbury@pln.sccgov.org
Phone: (408) 299-5785

inSite
InSite, our new digital permit system is now operational. What to expect: customers will be able to initiate request or apply for a permit online or on site; check the status of your project, submit digital documents, and make payments online or on site; get better customer service through smooth & efficient internal routing. To register for an InSite account, click here.

Save Paper. Think Before You Print.

Steve Beams	steve.beams@pln.sccgov.org
Susan Moore	suemmo@comcast.net
Linda	lndsell@gmail.com
Greg Unangst	gunangst@pacbell.net
Dorit Perry	pomodorit@gmail.com
Pen Li	penli9@yahoo.com
Dallas Hodgson	rockisland@iname.com
Sharon Shields-Parker	sheriparker@me.com
Maurice Hamilton	mauricehamilton@gmail.com
Stephen Gross	steve@grosses.org
Robert Chen	chenhongrobert@gmail.com
Gail Hall	gh2406@sbcglobal.net
Tamzen B White	twhite@elliot.com
April Sakara	asakara24@gmail.com
Eric Zell	eric@zellandassociates.com
Lesley Boncich	Lboncich@sbcglobal.net
Laurel Mechling	lmechling2015@comcast.net
Neil Hunt	lehigh@nhunt.org
seth flagsberg	flagsberg@aol.com
DAVE M SINGHAL	dave@singhals.us
Margaret Bernal	mtbgirl1@yahoo.com
Melissa Waters	mfwaters3@gmail.com
Shiaoping Lu	shiaoping.lu@gmail.com
Kinshuk Govil	kinshuk@gmail.com
Sharon Blaine	seb@theblaines.net
Katja Irvin	katja.irvin@sbcglobal.net
Howard Mueller	hmuellerca@aol.com
LEENA MENON	leenamenon@me.com
Bonnie de Berry	bdeberry@eoainc.com
Irma Mora	imora@openspace.org
Kevin Ma	kevinma.sd@gmail.com
Emily Amend	emilyramend@gmail.com
Lisa Schmidt	lschmidt@losaltoshills.ca.gov
Davin Chan	davin.chan@cslships.com
Elias Zabor	rezall@sbv
Elias Zabor	rezall@sbcglobal.net
Gordon Covey	gcovey@dirtmarket.com
A. Folden	talk2aim@gmail.com
Carole Foster	cfoster@valleywater.org
Kit Gordon	kitgordona@gmail.com
Mike Bowman	mbowman@swspr.com
Jay Su	Jsp01a@gmail.com
Kitty Moore	Ckittymoore@gmail.com
Harriet John	harrietjohn@gmail.com

Michal Tal	mikstars@gmail.com
Daisy zhao	niuma.daisy@gmail.com
Kristi Myllenbeck	kmyllenbeck@bayareanewsgroup.com
Joshua Hugg	jhugg@openspace.org
Suzanne Gisinger	Sgisinger@att.net
Sachin Deshmukh	dr_sachin@hotmail.com
peter chang	pchang001@gmail.com
Michelle Kaplan	kaplanmw@gmail.com
James Gusek	jgusek@sovcon.com
Cathy Helgerson	cathyhelger@gmail.com
Charles Z Kalko	kalkocz@hmsvictory.org
EUGENE WERTZ	GENE@ADVANCEDMICROTECH.COM
Jeremy Fusco	jeremy@footclan.org
wayne	armorleon@gmail.com
Joon Lee	calbear1995@yahoo.com
Erika Guerra	erika.guerra@lehighhanson.com
Howard L Strachman	hstrachman@gmail.com
Susan Ormsbee Murphy	somurphy@earthlink.net
P	sccgov_org@oicirtap.com
alan	iamshanghaiese@gmail.com
Talia Flagan	talia.flagan@lehighhanson.com
Barbara West	Barbara4444@me.com
Yoriko Kishimoto	yoriko12330@icloud.com
Angel Islas	aislas1@gmail.com
Padma Satish	padma.satish@gmail.com
Janna	JScott@esassoc.com
Peter Forster	pf.westvac@gmail.com
Gerhard Eschelbeck	gerhard@eschelbeck.com
Bob Delp	bdelp@benchmarkresources.com
Parviz Namvar	pnamvar@comcast.net
Suleyman Cetintas	scetintas@gmail.com
karen leakins	karenl1212@yahoo.com
Amit Butala	abutala@gmail.com
Muralidhara kalyanthaya	Murali.kalyan@gmail.com
Tressa Jackson	tressa.jackson@lehighhanson.com
Raymond Leung	raymondleung98@aim.com
Ingrid Linn	ingrid@rogerlinndesign.com
Frank Biehl	frank@scbtc.org
Julia Gorsky	y_gorsky2002@yahoo.com
Lyn Faust	lynfaust@yahoo.com
Emily Fan	emilyfan8@gmail.com
Susan Myers	s.myers@sbcglobal.net
Alexander Carlton	fisodd@yahoo.com
Thu Bui	tbui@baaqmd.gov

Sheere Willis	sheere@ecologicalconcerns.com
Alexis Lewis	alewis@gis-ip.com
Anthony Paredes, Jr. " Butch"	bparedes@graniterock.com
Vanessa Turner	vanessa.turner@bos.sccgov.org
Jeremy Van Grinsven	jeremy@vangrinsven.us
David Brown	dbrown@benchmarkresources.net
Pat Mapelli	mapellipat@gmail.com
Parick Lin	patts.lin@gmail.com
Lynette Lee Eng	lynetteleeeng@sbcglobal.net
John D Johnson	jdj@alumni.stanford.org
Oliver Donoghue	exelautomation@outlook.com
Roger S Lee	rogerl@cupertino.org
WL Fowler	bfowler@golder.com
Lorien Cunningham	lorien@jumpgate.com
Jane Holt	cajanemh@gmail.com
Rene Williams	renewilliams@me.com
DM Boyle	dmboyle@comcast.net
Erica Key	erica.key@conservation.ca.gov
Elisabeth Eschelbeck	Lisa@eschelbeck.com
John kolski	Ducksfly10@gmail.com
Sarah Sigman	sigman@smwlaw.com
Brian Barkwill	brian.barkwill@conservation.ca.gov
Roger Costa	roger@costaclan.com
Thy Vo	tvo@bayareanewsgroup.com
Steve Busby	sebusby@hotmail.com
Ada Marquez	amarquez@baaqmd.gov
Kurt Takara	kurtakara@yahoo.com
Josephine Fong	jfong@baaqmd.gov
Steve Faust	steve_faust@comcast.net
Reed Zars	reed@zarslaw.com
Megan Crissman	megan_crissman@hotmail.com
Claudio Giori	giori@yahoo.com
Kathleen Towmey	2mefamily@comcast.net
Pam Reed	Pamelareed@theforumrsa.com
M Singh	bhamram@gmail.com
Pranay Mamileti	mamiletipranay@gmail.com
Aditya Manikonda	adityamanikonda123@gmail.com
Megan Winslow	meganw@latc.com
Charles Kerns	charles@kernscorp.com
Eleanor Tung	eleanor_tung@yahoo.com
Rev. Jeffrey Schmidt	jeffrey.schmidt@conservation.ca.gov
James I Anderson	janderson@hthjlaw.com
Ryan Rauzon	Ryan@summitstrategygroup.net
Brian Malone	bmalone@openspace.org
Christophe LaBelle	clabelle@svlg.org
rhoda fry	fryhouse@earthlink.net

Libby Lucas	jlucas1099@aol.com
yvonne arroyo	yarroyo@valleywater.org
Karen Beekley	karenbeekley@gmail.com
Helen Wolter	helen@greenfoothills.org
James Anderson	janderson@hthjlaw.com
Sean Hungerford	shungerford@hthjlaw.com
Aaron Hebert	ahebert@openspace.org
Alice Kaufman	alice@greenfoothills.org
Sharon Simonson	Sharon.Simonson@sjsu.edu
Leigh Ann Gessner	lgessner@openspace.org
Brian Korek	brian@korek.com
Kai Mueller	kckc@gmx.de
Cathleen Brennan	cathleenbrennan@comcast.net
Curt Riffle	criffle@openspace.org
sheilah young	syoung1411@sbcglobal.net
Brian Mahavier	bmahavier@us-concrete.com
Don Macauley	Macauleydon@gmail.com
Judith A Lange	codykait@live.com
Candice R Lange	CGT92@MSN.Com
David Hibbert	Hibbertdl@gmail.com
Tom Allen	tom.allen@cricketsoft.com
Isabel Rodríguez	Rhisabel@aol.com
Claudia Munoz	Clmunoz@icloud.com
Jodi Bisely	Jobee@yahoo.com
Laurel Mechling	scu_grad_84@yahoo.com
Sunil Shukla	Wayaalias007@outlook.com
Lee Shahinian, Jr.	Lshahinianjr@gmail.com
Curt Riffle	criffle@openspace.org
San Ro	Santo_a_rao@yahoo.com
Mahesh Kumar S Rumale	mrumale@gmail.com
Mayra Reyes	mayra9933@yahoo.com
David O'Connell	davido@goodfellowbros.com
Ana Ruiz	aruiz@openspace.org
Larissa Ruckl	lruckl@trinityconsultants.com
Kelly Gibson	kelly.gibson@PRK.SCCGOV.ORG
James L Bellegante	jbellegantenad@charter.net
Danny Nip	dnip@baaqmd.gov
Maggie Angst	mangst@bayareanewsgroup.com
Kian Nikzad	kian.nikzad@gmail.com
Hung Wei	hungweichien@gmail.com
Curt Riffle	criffle@openspace.org
Kristina Loquist	kristina.loquist@bos.sccgov.org
Brian Schmidt	brian@greenfoothills.org
Anna De Giuli	nukiangelo@sbcglobal.net
Robert Ponce	robert911s@netscape.net

EXHIBIT B

Electronic Access

Permanente Creek Restoration Project (File PLN17-2250)

Project Description:

Lehigh submitted a Grading Approval application for the Permanente Creek Restoration Project (PCRP) on November 2, 2017. The PCRP would restore and modify specific segments of Permanente Creek located within and outside of the existing Reclamation Plan boundary for Lehigh Permanente Quarry. The proposed PCRP includes the following significant modifications:

- Removal of non-native species, installation of native vegetation, and preservation of existing native vegetation;
- Removal of concrete road segments, tractor tires, imported sediment, 260 linear feet of culverts in the channel widening area, 960 linear feet of culverts in the Rock Pile Area, and retired Rock Plant conveyor system;
- Construction of floodplain bench areas with habitat elements and reduction of access road width;
- Construction of new channel with floodplain bench areas;
- Removal of overburden/fill, and a relic concrete structure;
- Re-alignment of the centerline of Permanente Creek to the north, which will push the toe of the restored streambank approximately 25 feet northward, except near Pond 4A where it will move 16 feet northward.

Project Status

Lehigh's proposed PCRP is currently undergoing environmental review through the preparation of a Supplemental Environmental Impact Report (SEIR). The County is currently in the process of finalizing the scope and bid of the SEIR. Once the scope and bid have been finalized, the County will prepare and circulate a Notice of Preparation (NOP) and post the NOP to the project website. The County provides periodic updates to interested members of the community. If you are interested in receiving information from the County about this project, please consider signing up to be added to the Lehigh Interested parties list.

Project Materials

- Complete Letter
- Resubmittal
  - Cover Letter
  - Permanente Creek Restoration Plan 90% Level Submittal - Design Basis Technical Memorandum and Grading Plan
  - Geologic and Geomorphic Assessment (Golder Technical Memorandum)
- Superseded - Plans
- Superseded - Design Basis Technical Memorandum
  - Appendices
- Response Letter to March 5, 2018 Incomplete Letter
- Response Letter to February 14, 2019 Grading Application Incomplete Letter
- Notice of Preparation of a Supplemental Environmental Impact Report for the Permanente Creek Restoration Project

Last updated: 5/10/2021 5:36 PM

Report a problem with this page

County Holidays
Newsroom
Parking and Transit Information
Privacy Policy
Terms of Use
SCCVOTE
Property Tax Payment
Weed Hazard
View All

All Content Copyright © 2021 , County of Santa Clara, CA

EXHIBIT C

Newspaper Notification

Newspaper : Cupertino Courier
Issue Date : 04/23/2021
Advertiser : COUNTY OF SANTA CLARA PLANNING
Ad Number : 6568812

Sponsored Content

Dave Wetzel
President and CEO,
MLSListings

Will the Real Estate Market Still Have Seasonality in 2021?

MLS LISTINGS

California is well-renowned for our delightful, temperate year-round climate. While other regions of the country suffer from harsh winters and muggy summers each year, we have subtle, yet beautiful California seasons. Now we are starting to see signs of spring in the air, which typically signal the start of the peak real estate season. Many are asking if COVID-19 has impacted the traditional real estate cycle, and if spring will remain the traditional peak of sales activity in 2021.

"With COVID-19 in 2020, that traditional spike in spring real estate activity got pushed into the summer and fall. The disruption in seasonality stemmed from the seismic shift of children going to school online and adults working from home. Without summer camps, summer vacations, and the typical start of a school year, families had more leeway in terms of timing to purchase a home. Suddenly, it could hinge on finding just the right one or waiting until when it was most convenient, rather than everything being dictated by the calendar. But now, with vaccines being deployed, schedules will come into play again. School and sports will resume more normal patterns, and more typical seasonality including traditional real estate cycles will return," said MLSListings partner economist Elliot Eisenberg in a recent episode of MLSListings Live.

"The 2021 real estate market may benefit from a number of additional positive factors," remarked Karl Lee, Chair of the MLSListings Board of Directors. "Millennials are getting married, having babies, and buying homes. Low interest rates are also a huge driver. Many have been amassing savings during the pandemic and those funds could be unleashed as part of the release of pent-up demand."

Local tech companies are thriving and have benefited from the increased need for technology for work, school, telehealth, entertainment, socializing, and shopping. With almost every aspect of daily life shifting online, these companies have become more important than ever in our lives. With the tech industry as a major local employer, our region's economy is able to benefit from this significant economic driver and contributor.

Housing supply and demand is also a factor as the greater Bay Area and Monterey Bay region benefit from a finite supply of homes to choose from in the area. There is also a greater appreciation for houses due to the pandemic. Suddenly we know what it's like to spend a lot more time in our homes. The concept of a house is fundamentally more valuable than it was before COVID.

As our new world slowly inches toward normalcy and real estate seasonality gradually makes it return, one thing becomes clear: now is a good time to buy or sell a home here. Remember that your Realtor® is a guiding star. Armed with MLSListings data, your Realtor® can point the way forward in 2021.

County of Santa Clara
Department of Planning and Development
County Government Center, East Wing
70 West Hedding Street, 7th Floor
San Jose, California 95110-1770
Telephone (408) 299-5770
Facsimile (408) 288-9198

NOTICE OF ENVIRONMENTAL IMPACT REPORT SCOPING MEETING

BY VIRTUAL TELECONFERENCE ONLY

(https://sccgov-org.zoom.us/j/92372836537)

Thursday, April 29, 2021, from 6:00 p.m. to 8:00 p.m.

NOTICE IS HEREBY GIVEN that the County of Santa Clara ("County") Department of Planning and Development has scheduled a public scoping meeting to request input and comments on the scope and content of the environmental information to be included in the Supplemental Environmental Impact Report for the Permanente Creek Restoration Project (PCRP). The County will be the Lead Agency for this project and will prepare a Supplemental Environmental Impact Report (SEIR) to the 2012 Lehigh Permanente Quarry Reclamation Plan Amendment EIR for the Permanente Creek Restoration Project.

The Public Scoping Meeting to solicit comments for the Notice of Preparation (NOP) will be held virtually via Zoom (https://sccgov-org.zoom.us/j/92372836537) on **Thursday, April 29, 2021, from 6:00 p.m. to 8:00 p.m.**

The public review period for the Notice of Preparation for the PCRP SEIR closes on **May 14, 2021**, however, an earlier response, if possible, would be appreciated. Written comments on the PCRP SEIR NOP should be addressed to Robert Salisbury at robert.salisbury@pln.sccgov.org and Claudia Garcia at Claudia.Garcia@ascentenvironmental.com.

Project documents are currently available online at: https://www.sccgov.org/sites/dpd/Programs/SMARA/PermanenteQuarry/Pages/PermanenteCreekRestoration.aspx

Psst! Do you want to know our secret?

Our circulation is greater than any of our competitors in the communities we serve.

Silicon Valley Community Newspapers
Call today to advertise. 408-200-1000

SILICON VALLEY COMMUNITY NEWSPAPERS

EXHIBIT D

Public Scoping Meeting Presentation

Permanente Creek Restoration Project Scoping Meeting

County File No. PLN17-2250

VIRTUAL MEETING

APRIL 29, 2021 - 6:00 TO 8:00 PM

ROBERT SALISBURY, SENIOR PLANNER

Meeting Agenda

1. Introductions
2. Project Overview
3. CEQA Process Overview
4. Public Participation
5. Virtual Meeting Logistics
6. Public Comments on Scope of Supplemental Environmental Impact Report

Introductions

Roles and Responsibilities

- Lead Agency – County of Santa Clara
- Responsible Agencies and agency permits
  - Regional Water Quality Control Board
  - California Department of Fish and Wildlife
  - U.S. Army Corps of Engineers
- Trustee Agencies
  - California Department of Fish and Wildlife

Project Overview

Lehigh Hanson
HEIDELBERGCEMENT Group

Notice of Preparation

SUPPLEMENTAL ENVIRONMENTAL IMPACT REPORT

PERMANENTE CREEK RESTORATION PROJECT.

Project Setting

Project Setting

- East Branch of Permanente Creek within the Permanente Creek watershed
- The Permanente Creek Restoration Project (PCRP) will restore specified areas of streambed, banks, and floodplain along an approximately 3.7-mile portion of Permanente Creek adjacent to Lehigh's Permanente facility

Lehigh Hanson
HEIDELBERGCEMENT Group

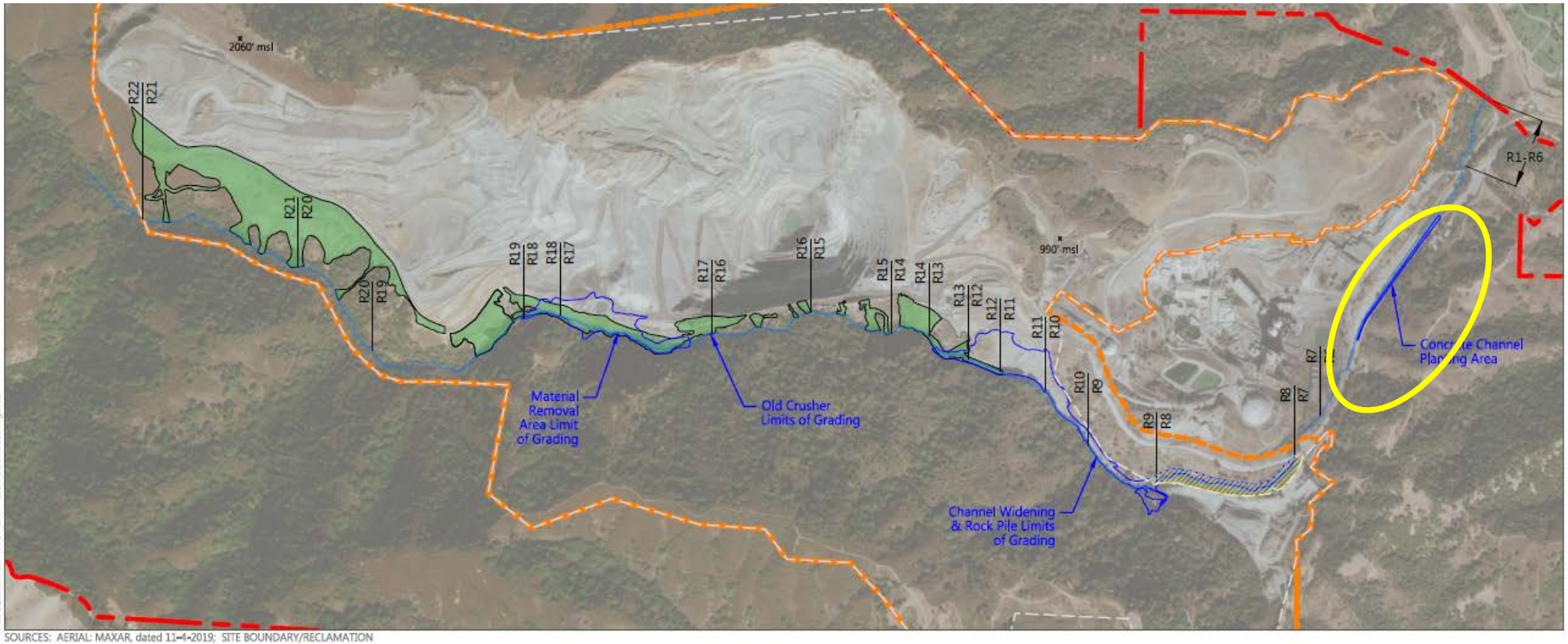
Project Development

Project Development

- PCRP developed after several years of discussion with:
  - Regional Water Quality Control Board
  - California Department of Fish & Wildlife
  - United States Fish & Wildlife Service
  - Sierra Club
- Memorialized in May 2016 agreement
- Watershed improvement project
  - Removes outdated flood control features
  - Lessens roads to reduce operational intensity near creek
  - Widens natural creek channel, restores habitat and removes legacy materials

Lehigh Hanson
HEIDELBERGCEMENT Group

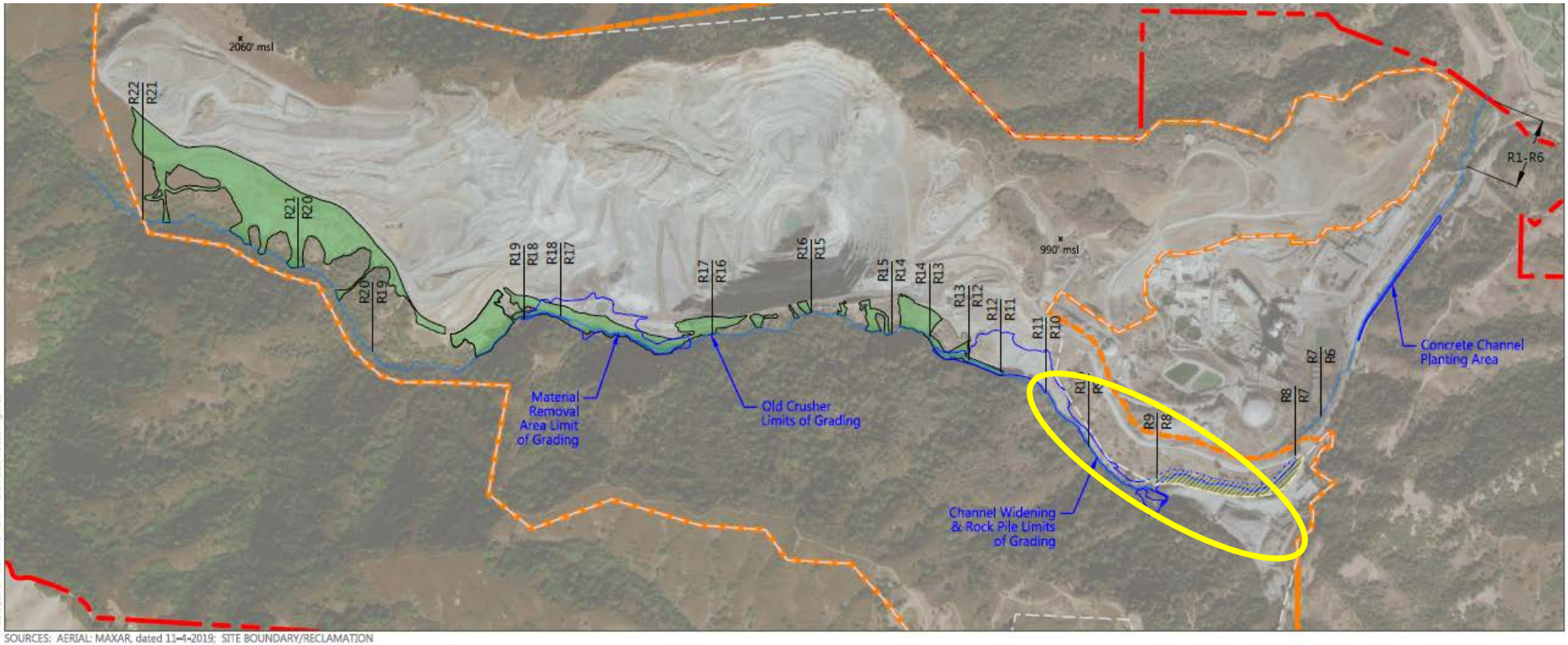
Project Elements



SOURCES: AERIAL: MAXAR, dated 11-4-2019; SITE BOUNDARY/RECLAMATION

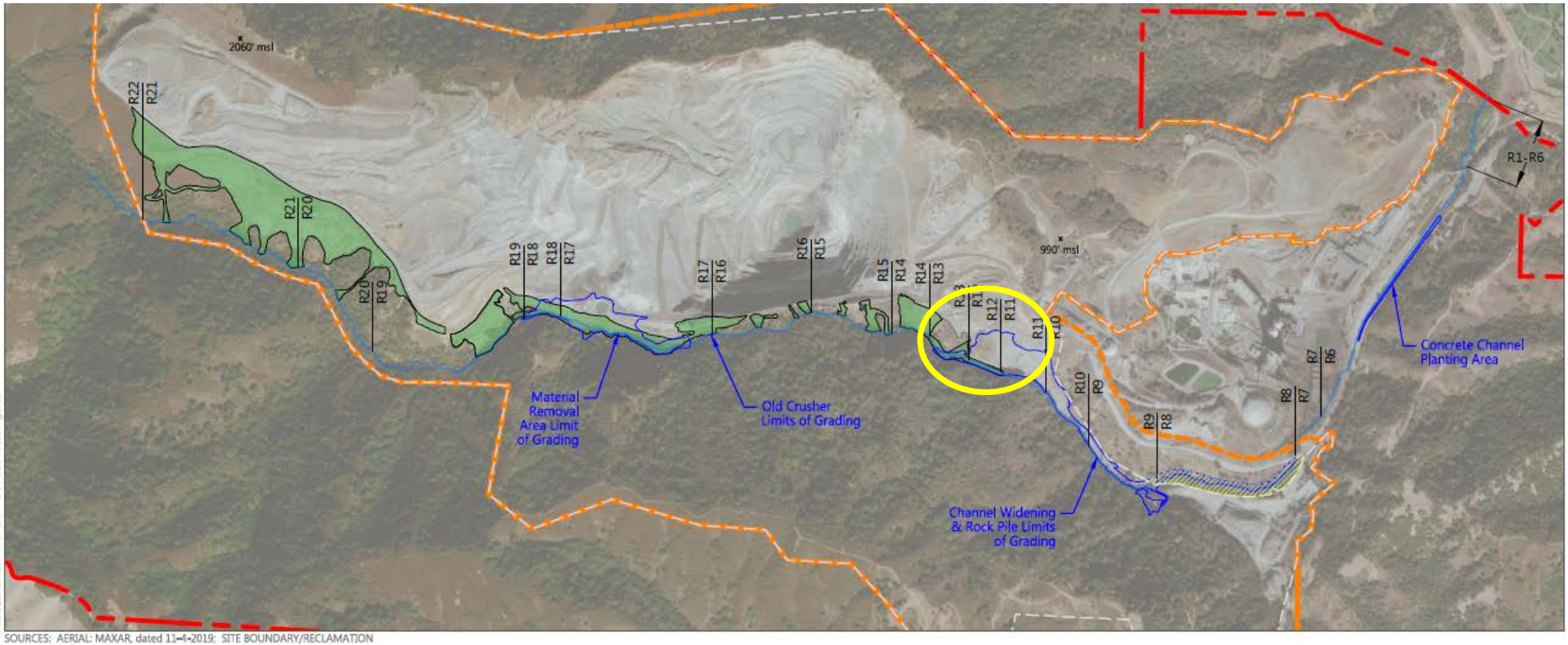
Lehigh Hanson
HEIDELBERGCEMENT Group

Project Elements



Lehigh Hanson
HEIDELBERGCEMENT Group

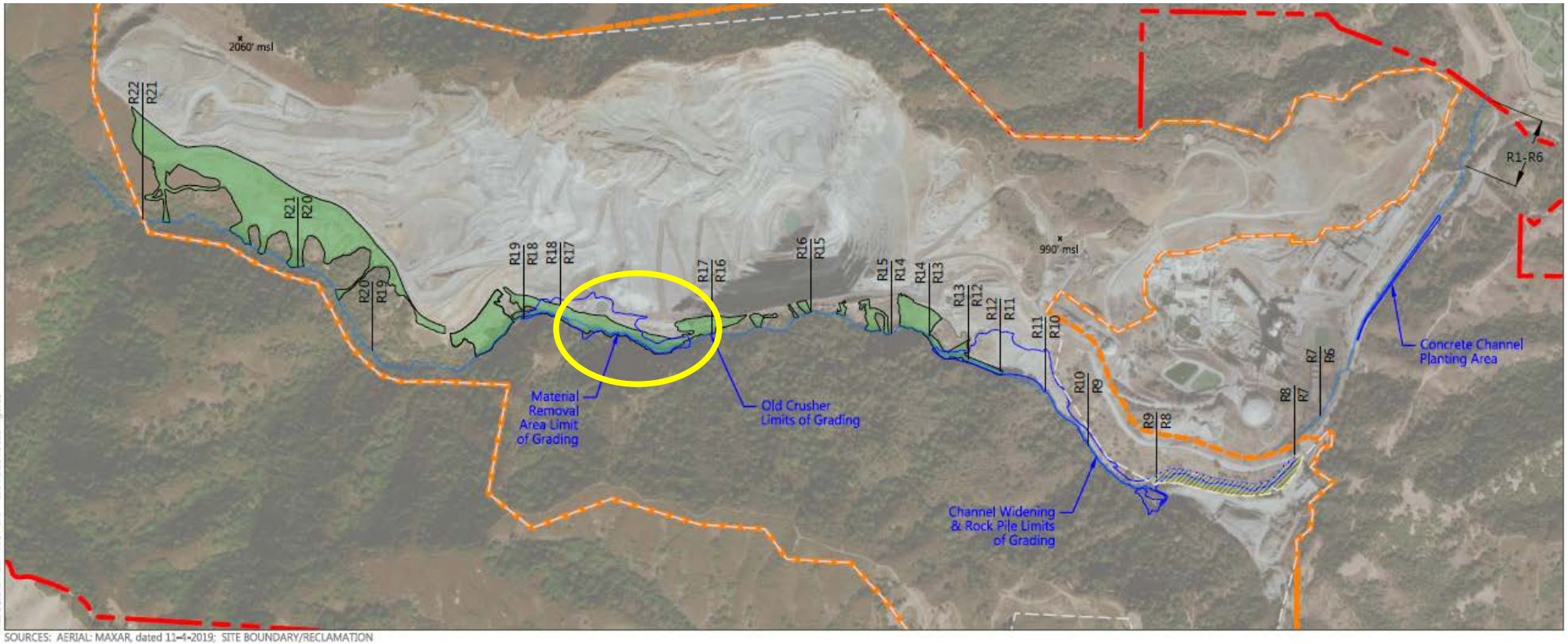
Project Elements



SOURCES: AERIAL: MAXAR, dated 11-4-2019; SITE BOUNDARY/RECLAMATION

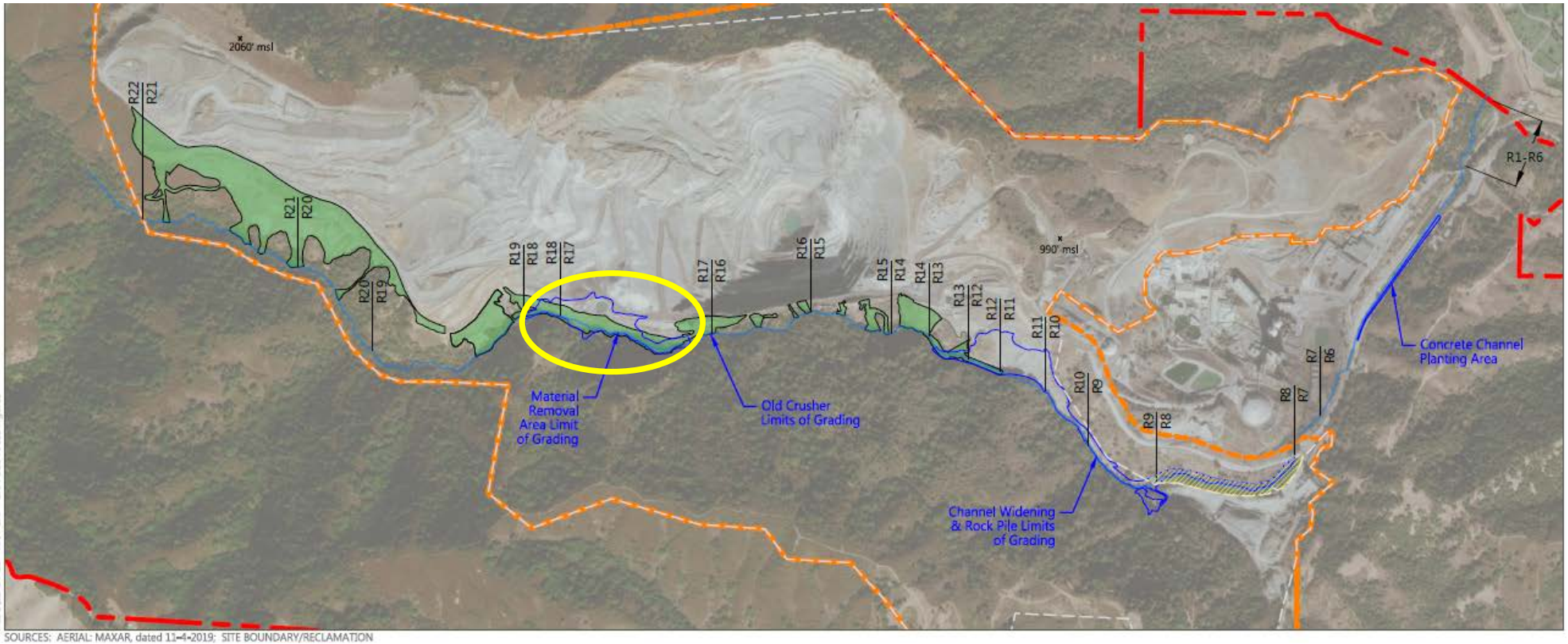
Lehigh Hanson
HEIDELBERGCEMENT Group

Project Elements



Lehigh Hanson
HEIDELBERGCEMENT Group

Project Elements



Lehigh Hanson
HEIDELBERGCEMENT Group

Project Schedule/Purpose of Supplemental EIR

Project Schedule

- Five (5) consecutive construction seasons after environmental review complete and all permits issued

Purpose of Supplemental EIR

- Early creek restoration project was considered in 2012 Reclamation Plan EIR
- Supplemental EIR needed to address additions or changes to conform to the PCRP as modified.

Lehigh Hanson
HEIDELBERGCEMENT Group

CEQA Process Overview

2012 Reclamation Plan Amendment Environmental Impact Report

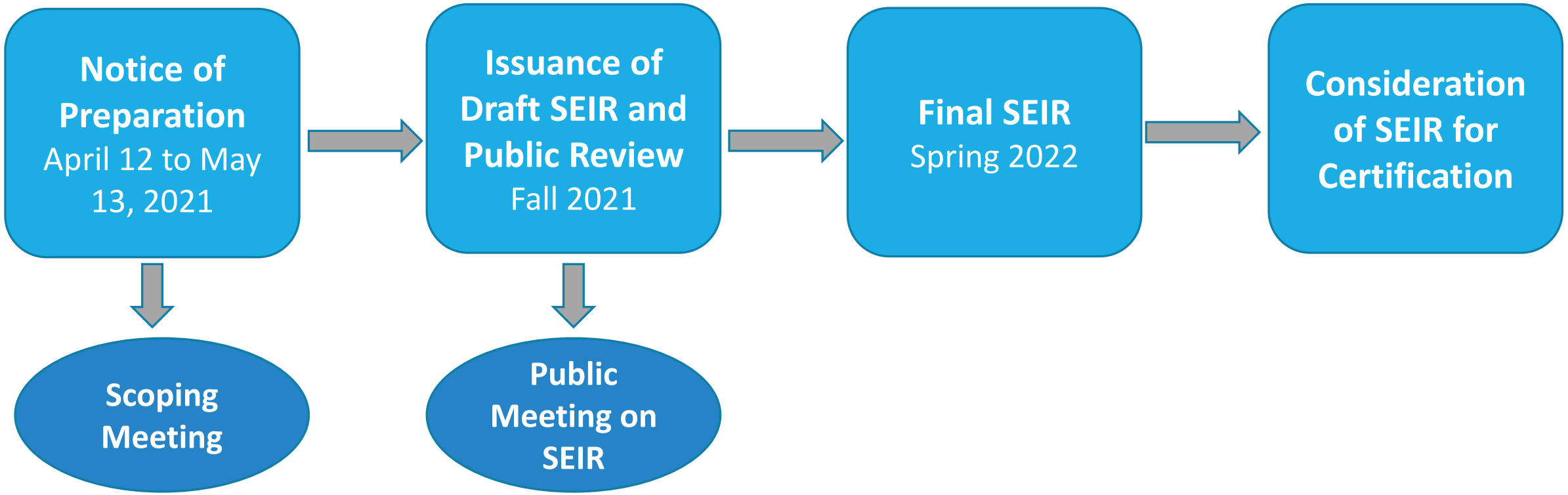
- Evaluated the impacts of the Permanente Creek Restoration Project (PCRP) within the Permanente Creek Restoration Area

Supplemental Environmental Impact Report (SEIR)

- An SEIR contains only the information necessary to make an EIR adequate for the project as revised if only minor additions or changes are necessary to make the original EIR adequate
- Will focus on the changes proposed within and immediately adjacent to the PCRA
- Will inform the County's decision-making about the potential environmental consequences of the PCRP

CEQA Process Overview

SEIR Schedule



CEQA Process Overview

- Aesthetics
- Agriculture and Forestry Resources
- Air Quality
- Biological Resources
- Cultural Resources
- Energy
- Geology and Soils
- Greenhouse Gas Emissions
- Hazards and Hazardous Materials
- Hydrology and Water Quality
- Land Use and Planning
- Mineral Resources
- Noise
- Population and Housing
- Public Services
- Recreation
- Transportation
- Tribal Cultural Resources
- Utilities and Service Systems
- Wildfire

Anticipated Focus Areas

- Air Quality
- Biological Resources
- Cultural Resources
- Energy Conservation
- Geology and Soils
- Greenhouse Gas Emissions
- Hydrology and Water Quality
- Cumulative Impacts
- Project Alternatives

CEQA Process Overview

Project Alternatives

- CEQA requires the lead agency to evaluate a reasonable range of alternatives to the project that attain most basic objectives and avoid or lessen significant impacts

Potential PCRP Alternatives

- No Project Alternative required by CEQA - will assume continued use of the project site in accordance with the reclamation plan

- Additional Project Alternatives may include design variations to avoid or reduce potential impacts

Public Participation

Participation at Scoping Meeting

- Provide comment during tonight's scoping meeting

Written Scoping Comments

- Submit written comments via email to: Robert.Salisbury@pln.sccgov.org
- Or mail to:

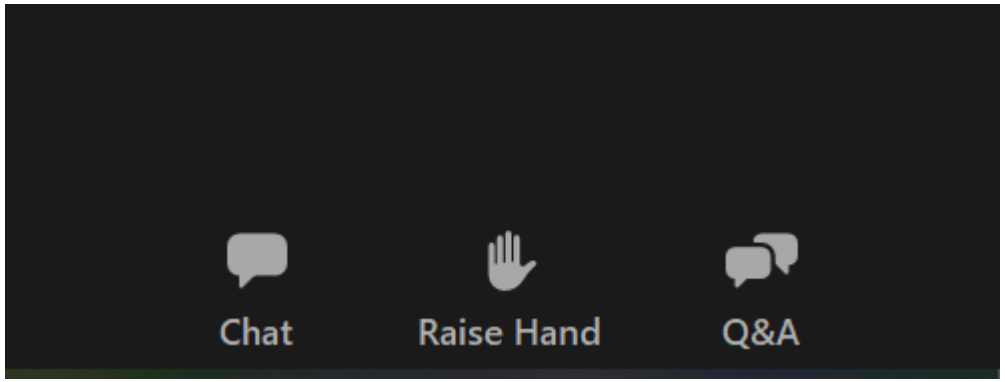
  County of Santa Clara Planning Division
  Attention: Robert Salisbury
  70 West Hedding Street, 7th Floor, East Wing
  San Jose CA 95110

Provide Comment on Draft SEIR

- During the 45-day public review period of Draft SEIR (Fall 2021)
- Comments on the completed environmental analysis

Virtual Meeting Logistics

- Press *9 or use the “Raise Hand” button to be placed in the comment queue
- Comments will be heard live following the presentation
- The Q&A and chat functions have been disabled for this meeting
- This meeting is being recorded



Thank you!

Stay Informed

- Status updates on the PCRP are available on the County website https://www.sccgov.org/sites/dpd/Programs/SMARA/PermanenteQuarry/Pages/PermanenteCreekRestoration.aspx

Robert Salisbury, Senior Planner
Robert.Salisbury@pln.sccgov.org

ESA

787 The Alameda
Suite 250
San Jose, CA 95126
408.660.4000 phone
408.660.4001 fax

esassoc.com

public scoping meeting notes

project	Permanente Creek Restoration Project	project no.	PLN17-2250
date	April 29, 2021	time	6 p.m.
present	(Identified below)	route to	File
subject	Scoping Meeting: Summary of Public Input Received		

Four people provided oral input at the April 29, 2021, public scoping meeting regarding the Permanente Creek Restoration Project Supplemental Environmental Impact Report (SEIR). Input and related discussion is summarized below:

1. Rhoda Fry:
    a. The Yaeger yard landslide, which is moving toward Permanente Creek, has been determined to be a health and safety risk to homes downstream. When will it be fixed? Rob Salisbury responded on behalf of the County that the County is continuing to monitor the Yaeger Yard, including the area where sediment occurred, and that Lehigh has installed equipment to monitor the speed at which the mass is moving. Current data showed significant movement at one brief time, but not outside what is considered "geologically normal" outside that time.
    b. How project being changed and why?
    c. What information is available now that was not available in 2012? Erika Guerra responded on behalf of Lehigh that, chronologically, information developed in 2016 and otherwise since the 2012 EIR are now available.
    d. How long is a "construction season"?
    e. The 90% plan available on the County's website seems most comprehensive thing posted there. Will there be a 100% plan?
    f. Will the Draft SEIR incorporate the elements of the 2012 plan so members of the public can easily see the comparison?

2. Aaron Hebert (Midpeninsula Regional Open Space District):
    a. Are you intending to reanalyze some of biological resources in the context of the SEIR? Rob Salisbury responded on behalf of the County that biological resources definitely will be a focus of the SEIR with a focus on impacts arising due to the change relative to the 2012 design.

3. Katja Irvin:
    a. Is the original EIR available anywhere? And the reclamation plan? Rob Salisbury responded on behalf of the County that both the 2012 EIR and the existing reclamation plan are available on County's website.
    b. Who is the deciding body for the grading permit? Rob Salisbury responded on behalf of the County that this an interesting project. Usually EIRs are associated with a Planning Commission or Board of Supervisors approval. However, here the County is only issuing a grading authorization and permit, which is a staff level approval, so certification of the SEIR also would be done at the staff level. Manira Sandhir confirmed on behalf of the County that the requested grading approval decision-maker would be Department staff, and that such a decision could be appealed to Planning Commission and then to the Board of Supervisors.

4. Caroline Kim
    a. What is the general timeframe in which decisions will be made? Ms. Kim lives close to the quarry and is starting to realize and become concerned about potential health impacts. Cars etc. constantly are covered in limestone dust. How much does resident feedback weigh in on decisions? Rob Salisbury responded on behalf of the County that Lehigh has a vested right to quarry, but that the Project that being discussed in this meeting is a creek restoration project unrelated to the broader quarrying operation. Lehigh has a reclamation plan amendment in process at the County that anticipates changes to the current plan; however, we are not at the EIR process for that. When we get there, the County will have a scoping meeting for that project much like this meeting for this project.

EXHIBIT E

Public Scoping Comment Letters

Comment Letter A

[redacted]

Subject: FW: [EXTERNAL] Re: Notice of Preparation for Permanente Creek Supplemental Environmental Impact Report

From: Susan Murphy <somurphy@earthlink.net>
Sent: Tuesday, April 13, 2021 4:22 PM
To: Salisbury, Robert <Robert.Salisbury@PLN.SCCGOV.ORG>
Subject: [EXTERNAL] Re: Notice of Preparation for Permanente Creek Supplemental Environmental Impact Report

Dear Robert,

Since 1971, I have been a resident down-wind from the cement quarry. Over the years, I have witnessed hundreds of trucks coming down from the quarry and cement plant, spewing polluting emissions; and have inhaled polluted air from the quarry/cement plant itself which have contributed to years of asthma and compromised lung function in my family. I am not interested in having these kinds of detrimental health conditions continue, especially since they affect quality of life and life expectancy in both children and adults. Recently, there has been a significant number of new families with very young children moving into this neighborhood. I would not want them to have to experience them health effects that my family has experienced from this cement business over 50 years.

Please describe how the plans in this report will reduce the environmental pollution for those who live down-wind from the quarry. If there is someone else with whom I should communicate to stop the spread of pollutants from this business, please give me the information so I can communicate with them directly.

Dr. Susan Murphy
somurphy@earthlink.net
2043 El Sereno Avenue
Los Altos, CA 94024

On Apr 13, 2021, at 2:20 PM, Salisbury, Robert <Robert.Salisbury@PLN.SCCGOV.ORG> wrote:

To all Lehigh interested parties:

The County Santa Clara Department of Planning and Development is commencing work on a Supplemental Environmental Impact Report ("SEIR") for the Permanente Creek Restoration Project. The County has scheduled an EIR scoping meeting/community meeting on Thursday, April 29 from 6 – 8 PM.

Please be aware that this SEIR is for the Permanente Creek Restoration Project (PLN17-2250) only, not for Lehigh's proposed Reclamation Plan Amendment (PLN19-0106) that the County is also processing.

The Notice of Preparation for the SEIR describing the project and providing details and a Zoom link for the scoping meeting is attached to this email. We look forward to your comments and hope you all will consider attending the scoping meeting on April 29.

Kind regards,

Robert Salisbury, Senior Planner
County of Santa Clara Planning Office

70 W. Hedding Street, East Wing, 7th Floor
San Jose, CA 95110
email: Robert.Salisbury@pln.sccgov.org
Phone: (408) 299-5785

<image001.jpg>
InSite, our new digital permit system is now operational. What to expect: customers will be able to initiate request or apply for a permit online or on site; check the status of your project, submit digital documents, and make payments online or on site; get better customer service through smooth & efficient internal routing. To register for an InSite account, click here.

<image002.png>

<FINAL_PCRP_NOP_with_Figure_1 (signed).pdf>

STATE OF CALIFORNIA — Gavin Newsom, Governor

NATIVE AMERICAN HERITAGE COMMISSION

RECEIVED
APR 19 2021

April 14, 2021

Robert Salisbury
County of Santa Clara, Department of Planning and Development
70 W. Hedding Street, East Wing, 7th Floor
San Jose, CA 95110

Re: 2021040331, Permanente Creek Restoration Project, Santa Clara County

Dear Mr. Salisbury:

The Native American Heritage Commission (NAHC) has received the Notice of Preparation (NOP), Draft Environmental Impact Report (DEIR) or Early Consultation for the project referenced above. The California Environmental Quality Act (CEQA) (Pub. Resources Code §21000 et seq.), specifically Public Resources Code §21084.1, states that a project that may cause a substantial adverse change in the significance of a historical resource, is a project that may have a significant effect on the environment. (Pub. Resources Code § 21084.1; Cal. Code Regs., tit.14, §15064.5 (b) (CEQA Guidelines §15064.5 (b)). If there is substantial evidence, in light of the whole record before a lead agency, that a project may have a significant effect on the environment, an Environmental Impact Report (EIR) shall be prepared. (Pub. Resources Code §21080 (d); Cal. Code Regs., tit. 14, § 5064 subd.(a)(1) (CEQA Guidelines §15064 (a)(1)). In order to determine whether a project will cause a substantial adverse change in the significance of a historical resource, a lead agency will need to determine whether there are historical resources within the area of potential effect (APE).

CEQA was amended significantly in 2014. Assembly Bill 52 (Gatto, Chapter 532, Statutes of 2014) (AB 52) amended CEQA to create a separate category of cultural resources, "tribal cultural resources" (Pub. Resources Code §21074) and provides that a project with an effect that may cause a substantial adverse change in the significance of a tribal cultural resource is a project that may have a significant effect on the environment. (Pub. Resources Code §21084.2). Public agencies shall, when feasible, avoid damaging effects to any tribal cultural resource. (Pub. Resources Code §21084.3 (a)). **AB 52 applies to any project for which a notice of preparation, a notice of negative declaration, or a mitigated negative declaration is filed on or after July 1, 2015.** If your project involves the adoption of or amendment to a general plan or a specific plan, or the designation or proposed designation of open space, on or after March 1, 2005, it may also be subject to Senate Bill 18 (Burton, Chapter 905, Statutes of 2004) (SB 18). **Both SB 18 and AB 52 have tribal consultation requirements.** If your project is also subject to the federal National Environmental Policy Act (42 U.S.C. § 4321 et seq.) (NEPA), the tribal consultation requirements of Section 106 of the National Historic Preservation Act of 1966 (154 U.S.C. 300101, 36 C.F.R. §800 et seq.) may also apply.

The NAHC recommends consultation with California Native American tribes that are traditionally and culturally affiliated with the geographic area of your proposed project as early as possible in order to avoid inadvertent discoveries of Native American human remains and best protect tribal cultural resources. Below is a brief summary of portions of AB 52 and SB 18 as well as the NAHC's recommendations for conducting cultural resources assessments.

Consult your legal counsel about compliance with AB 52 and SB 18 as well as compliance with any other applicable laws.

CHAIRPERSON
Laura Miranda
Luiseño

VICE CHAIRPERSON
Reginald Pagaling
Chumash

SECRETARY
Merri Lopez-Keifer
Luiseño

PARLIAMENTARIAN
Russell Attebery
Karuk

COMMISSIONER
William Mungary
Paiute/White Mountain Apache

COMMISSIONER
Julie Tumamait-Stenslie
Chumash

COMMISSIONER
[Vacant]

COMMISSIONER
[Vacant]

COMMISSIONER
[Vacant]

EXECUTIVE SECRETARY
Christina Snider
Pomo

NAHC HEADQUARTERS
1550 Harbor Boulevard
Suite 100
West Sacramento,
California 95691
(916) 373-3710
nahc@nahc.ca.gov
NAHC.ca.gov

AB 52

AB 52 has added to CEQA the additional requirements listed below, along with many other requirements:

1. Fourteen Day Period to Provide Notice of Completion of an Application/Decision to Undertake a Project: Within fourteen (14) days of determining that an application for a project is complete or of a decision by a public agency to undertake a project, a lead agency shall provide formal notification to a designated contact of, or tribal representative of, traditionally and culturally affiliated California Native American tribes that have requested notice, to be accomplished by at least one written notice that includes:

a. A brief description of the project.

b. The lead agency contact information.

c. Notification that the California Native American tribe has 30 days to request consultation. (Pub. Resources Code §21080.3.1 (d)).

d. A "California Native American tribe" is defined as a Native American tribe located in California that is on the contact list maintained by the NAHC for the purposes of Chapter 905 of Statutes of 2004 (SB 18). (Pub. Resources Code §21073).

2. Begin Consultation Within 30 Days of Receiving a Tribe's Request for Consultation and Before Releasing a Negative Declaration, Mitigated Negative Declaration, or Environmental Impact Report: A lead agency shall begin the consultation process within 30 days of receiving a request for consultation from a California Native American tribe that is traditionally and culturally affiliated with the geographic area of the proposed project. (Pub. Resources Code §21080.3.1, subds. (d) and (e)) and prior to the release of a negative declaration, mitigated negative declaration or Environmental Impact Report. (Pub. Resources Code §21080.3.1(b)).

a. For purposes of AB 52, "consultation shall have the same meaning as provided in Gov. Code §65352.4 (SB 18). (Pub. Resources Code §21080.3.1 (b)).

3. Mandatory Topics of Consultation If Requested by a Tribe: The following topics of consultation, if a tribe requests to discuss them, are mandatory topics of consultation:

a. Alternatives to the project.

b. Recommended mitigation measures.

c. Significant effects. (Pub. Resources Code §21080.3.2 (a)).

4. Discretionary Topics of Consultation: The following topics are discretionary topics of consultation:

a. Type of environmental review necessary.

b. Significance of the tribal cultural resources.

c. Significance of the project's impacts on tribal cultural resources.

d. If necessary, project alternatives or appropriate measures for preservation or mitigation that the tribe may recommend to the lead agency. (Pub. Resources Code §21080.3.2 (a)).

5. Confidentiality of Information Submitted by a Tribe During the Environmental Review Process: With some exceptions, any information, including but not limited to, the location, description, and use of tribal cultural resources submitted by a California Native American tribe during the environmental review process shall not be included in the environmental document or otherwise disclosed by the lead agency or any other public agency to the public, consistent with Government Code §6254 (r) and §6254.10. Any information submitted by a California Native American tribe during the consultation or environmental review process shall be published in a confidential appendix to the environmental document unless the tribe that provided the information consents, in writing, to the disclosure of some or all of the information to the public. (Pub. Resources Code §21082.3 (c)(1)).

6. Discussion of Impacts to Tribal Cultural Resources in the Environmental Document: If a project may have a significant impact on a tribal cultural resource, the lead agency's environmental document shall discuss both of the following:

a. Whether the proposed project has a significant impact on an identified tribal cultural resource.

b. Whether feasible alternatives or mitigation measures, including those measures that may be agreed to pursuant to Public Resources Code §21082.3, subdivision (a), avoid or substantially lessen the impact on the identified tribal cultural resource. (Pub. Resources Code §21082.3 (b)).

7. Conclusion of Consultation: Consultation with a tribe shall be considered concluded when either of the following occurs:

a. The parties agree to measures to mitigate or avoid a significant effect, if a significant effect exists, on a tribal cultural resource; or

b. A party, acting in good faith and after reasonable effort, concludes that mutual agreement cannot be reached. (Pub. Resources Code §21080.3.2 (b)).

8. Recommending Mitigation Measures Agreed Upon in Consultation in the Environmental Document: Any mitigation measures agreed upon in the consultation conducted pursuant to Public Resources Code §21080.3.2 shall be recommended for inclusion in the environmental document and in an adopted mitigation monitoring and reporting program, if determined to avoid or lessen the impact pursuant to Public Resources Code §21082.3, subdivision (b), paragraph 2, and shall be fully enforceable. (Pub. Resources Code §21082.3 (a)).

9. Required Consideration of Feasible Mitigation: If mitigation measures recommended by the staff of the lead agency as a result of the consultation process are not included in the environmental document or if there are no agreed upon mitigation measures at the conclusion of consultation, or if consultation does not occur, and if substantial evidence demonstrates that a project will cause a significant effect to a tribal cultural resource, the lead agency shall consider feasible mitigation pursuant to Public Resources Code §21084.3 (b). (Pub. Resources Code §21082.3 (e)).

10. Examples of Mitigation Measures That, If Feasible, May Be Considered to Avoid or Minimize Significant Adverse Impacts to Tribal Cultural Resources:

a. Avoidance and preservation of the resources in place, including, but not limited to:

i. Planning and construction to avoid the resources and protect the cultural and natural context.

ii. Planning greenspace, parks, or other open space, to incorporate the resources with culturally appropriate protection and management criteria.

b. Treating the resource with culturally appropriate dignity, taking into account the tribal cultural values and meaning of the resource, including, but not limited to, the following:

i. Protecting the cultural character and integrity of the resource.

ii. Protecting the traditional use of the resource.

iii. Protecting the confidentiality of the resource.

c. Permanent conservation easements or other interests in real property, with culturally appropriate management criteria for the purposes of preserving or utilizing the resources or places.

d. Protecting the resource. (Pub. Resource Code §21084.3 (b)).

e. Please note that a federally recognized California Native American tribe or a non-federally recognized California Native American tribe that is on the contact list maintained by the NAHC to protect a California prehistoric, archaeological, cultural, spiritual, or ceremonial place may acquire and hold conservation easements if the conservation easement is voluntarily conveyed. (Civ. Code §815.3 (c)).

f. Please note that it is the policy of the state that Native American remains and associated grave artifacts shall be repatriated. (Pub. Resources Code §5097.991).

11. Prerequisites for Certifying an Environmental Impact Report or Adopting a Mitigated Negative Declaration or Negative Declaration with a Significant Impact on an Identified Tribal Cultural Resource: An Environmental Impact Report may not be certified, nor may a mitigated negative declaration or a negative declaration be adopted unless one of the following occurs:

a. The consultation process between the tribes and the lead agency has occurred as provided in Public Resources Code §21080.3.1 and §21080.3.2 and concluded pursuant to Public Resources Code §21080.3.2.

b. The tribe that requested consultation failed to provide comments to the lead agency or otherwise failed to engage in the consultation process.

c. The lead agency provided notice of the project to the tribe in compliance with Public Resources Code §21080.3.1 (d) and the tribe failed to request consultation within 30 days. (Pub. Resources Code §21082.3 (d)).

The NAHC's PowerPoint presentation titled, "Tribal Consultation Under AB 52: Requirements and Best Practices" may be found online at: http://nahc.ca.gov/wp-content/uploads/2015/10/AB52TribalConsultation_CalEPAPDF.pdf

SB 18

SB 18 applies to local governments and requires local governments to contact, provide notice to, refer plans to, and consult with tribes prior to the adoption or amendment of a general plan or a specific plan, or the designation of open space. (Gov. Code §65352.3). Local governments should consult the Governor's Office of Planning and Research's "Tribal Consultation Guidelines," which can be found online at: https://www.opr.ca.gov/docs/09_14_05_Updated_Guidelines_922.pdf.

Some of SB 18's provisions include:

1. Tribal Consultation: If a local government considers a proposal to adopt or amend a general plan or a specific plan, or to designate open space it is required to contact the appropriate tribes identified by the NAHC by requesting a "Tribal Consultation List." If a tribe, once contacted, requests consultation the local government must consult with the tribe on the plan proposal. **A tribe has 90 days from the date of receipt of notification to request consultation unless a shorter timeframe has been agreed to by the tribe.** (Gov. Code §65352.3 (a)(2)).
2. No Statutory Time Limit on SB 18 Tribal Consultation. There is no statutory time limit on SB 18 tribal consultation.
3. Confidentiality: Consistent with the guidelines developed and adopted by the Office of Planning and Research pursuant to Gov. Code §65040.2, the city or county shall protect the confidentiality of the information concerning the specific identity, location, character, and use of places, features and objects described in Public Resources Code §5097.9 and §5097.993 that are within the city's or county's jurisdiction. (Gov. Code §65352.3 (b)).
4. Conclusion of SB 18 Tribal Consultation: Consultation should be concluded at the point in which:
    a. The parties to the consultation come to a mutual agreement concerning the appropriate measures for preservation or mitigation; or
    b. Either the local government or the tribe, acting in good faith and after reasonable effort, concludes that mutual agreement cannot be reached concerning the appropriate measures of preservation or mitigation. (Tribal Consultation Guidelines, Governor's Office of Planning and Research (2005) at p. 18).

Agencies should be aware that neither AB 52 nor SB 18 precludes agencies from initiating tribal consultation with tribes that are traditionally and culturally affiliated with their jurisdictions before the timeframes provided in AB 52 and SB 18. For that reason, we urge you to continue to request Native American Tribal Contact Lists and "Sacred Lands File" searches from the NAHC. The request forms can be found online at: http://nahc.ca.gov/resources/forms/.

NAHC Recommendations for Cultural Resources Assessments

To adequately assess the existence and significance of tribal cultural resources and plan for avoidance, preservation in place, or barring both, mitigation of project-related impacts to tribal cultural resources, the NAHC recommends the following actions:

1. Contact the appropriate regional California Historical Research Information System (CHRIS) Center (http://ohp.parks.ca.gov/?page_id=1068) for an archaeological records search. The records search will determine:
    a. If part or all of the APE has been previously surveyed for cultural resources.
    b. If any known cultural resources have already been recorded on or adjacent to the APE.
    c. If the probability is low, moderate, or high that cultural resources are located in the APE.
    d. If a survey is required to determine whether previously unrecorded cultural resources are present.

2. If an archaeological inventory survey is required, the final stage is the preparation of a professional report detailing the findings and recommendations of the records search and field survey.
    a. The final report containing site forms, site significance, and mitigation measures should be submitted immediately to the planning department. All information regarding site locations, Native American human remains, and associated funerary objects should be in a separate confidential addendum and not be made available for public disclosure.
    b. The final written report should be submitted within 3 months after work has been completed to the appropriate regional CHRIS center.

3. Contact the NAHC for:
   a. A Sacred Lands File search. Remember that tribes do not always record their sacred sites in the Sacred Lands File, nor are they required to do so. A Sacred Lands File search is not a substitute for consultation with tribes that are traditionally and culturally affiliated with the geographic area of the project's APE.
   b. A Native American Tribal Consultation List of appropriate tribes for consultation concerning the project site and to assist in planning for avoidance, preservation in place, or, failing both, mitigation measures.

4. Remember that the lack of surface evidence of archaeological resources (including tribal cultural resources) does not preclude their subsurface existence.
   a. Lead agencies should include in their mitigation and monitoring reporting program plan provisions for the identification and evaluation of inadvertently discovered archaeological resources per Cal. Code Regs., tit. 14, §15064.5(f) (CEQA Guidelines §15064.5(f)). In areas of identified archaeological sensitivity, a certified archaeologist and a culturally affiliated Native American with knowledge of cultural resources should monitor all ground-disturbing activities.
   b. Lead agencies should include in their mitigation and monitoring reporting program plans provisions for the disposition of recovered cultural items that are not burial associated in consultation with culturally affiliated Native Americans.
   c. Lead agencies should include in their mitigation and monitoring reporting program plans provisions for the treatment and disposition of inadvertently discovered Native American human remains. Health and Safety Code §7050.5, Public Resources Code §5097.98, and Cal. Code Regs., tit. 14, §15064.5, subdivisions (d) and (e) (CEQA Guidelines §15064.5, subds. (d) and (e)) address the processes to be followed in the event of an inadvertent discovery of any Native American human remains and associated grave goods in a location other than a dedicated cemetery.

If you have any questions or need additional information, please contact me at my email address: Nancy.Gonzalez-Lopez@nahc.ca.gov.

Sincerely,

Nancy Gonzalez-Lopez
Cultural Resources Analyst

cc: State Clearinghouse

LOS ALTOS HILLS
CALIFORNIA

May 6, 2021

County of Santa Clara Planning Office
Attention: Robert Salisbury
70 West Hedding Street, 7th floor, east wing
San Jose, CA 95110

RE: Notice of Preparation of Supplemental Environmental Impact Report for Permanente Creek Restoration Project

Dear Mr. Salisbury:

The Town of Los Altos Hills has reviewed the Notice of Preparation (NOP) for a Supplemental Environmental Impact Report (SEIR) to the 2012 Lehigh Permanente Quarry Reclamation Plan Amendment EIR for the Permanente Creek Restoration Project ("Project") and has the following comments:

1. The SEIR should consider the impacts of the proposed creek restoration activities with regards to all environmental considerations in CEQA Guidelines Appendix G, with special attention being paid to water quality, air quality, and biological resources.

2. While the restoration activities will improve the health of the riparian corridor, the SEIR should include detailed and specific mitigation measures for the restoration and demolition activities so that pollutants and sediments are not released into the creek or air. Specifically, the SEIR should require that the restoration and demolition activities be limited to dry months to further reduce potential impacts on water quality.

3. The SEIR should assess potential impacts beyond the area identified as the Reclamation Plan Area, with particular focus on potential downstream impacts.

Beyond the SEIR, the County should ensure that all listed authorizations and approvals are obtained for the Project; with no approvals deferred or any exceptions granted. Finally, the Town requests that the County continue to closely monitor the activities of the Lehigh Quarry and Cement Plant operations to ensure compliance with all Regional, State, and Federal regulations.

The support and ongoing work of regulatory agencies and County Planning Staff on this Project is greatly appreciated. If you have any questions, please contact me at (650) 947-2544 or by email at jloh@losaltoshills.ca.gov.

Sincerely,

Jeremy Loh
Assistant Planner

CC: Carl Cahill, City Manger
Zachary Dahl, Planning and Building Director

Comment Letter D

Gavin Newsom, Governor
David Shabazian, Director

California
Department of Conservation
Division of Mine Reclamation

May 7, 2021

Robert Salisbury
County of Santa Clara Planning Office
County Government Center
70 West Hedding, 7th Floor, East Wing
San Jose, CA 95110

Copy sent via email: Robert.Salisbury@pln.sccgov.org

SUBJECT: PREPARATION OF A SUPPLEMENTAL ENVIRONMENTAL IMPACT REPORT FOR THE PERMANENTE CREEK RESTORATION PROJECT – STATE CLEARINGHOUSE NUMBER 202104331

Dear Mr. Salisbury:

Thank you for including the Department of Conservation's Division of Mine Reclamation (Division) in the environmental review process for the preparation of the Supplemental Environmental Impact Report (SEIR) for the 2012 Lehigh Permanente Quarry Reclamation Plan Amendment EIR for the Permanente Creek Restoration Project (Proposed Project) Notice of Preparation (NOP). The NOP indicates that the County of Santa Clara (County), as lead agency under the California Environmental Quality Act (CEQA), will prepare a Supplemental Environmental Impact Report (SEIR) for the Proposed Project.

As described in the NOP, the SEIR will analyze the potential environmental impacts associated with a grading approval application submitted by Lehigh Southwest Cement Company (Lehigh) for the Proposed Project. The Proposed Project makes modifications to a previously considered restoration project that would restore specific segments of Permanente Creek located within and outside of the existing reclamation plan boundary for the Lehigh Permanente Quarry. The County evaluated the impacts of the Proposed Project within seven subareas collectively identified as the Permanente Creek Restoration Area (PRCA) in the 2012 EIR. Lehigh is proposing modifications that are in accordance with the Cleanup and Abatement Order issued by the San Francisco Bay Regional Water Quality Control Board (RWQCB; RWQCB Order No. 99-018) and an Amended Consent Decree entered by the U.S. District Court, Northern District on May 11, 2016 (with an updated Exhibit D entered on May 18, 2016) between the Sierra Club and Lehigh. The SEIR will evaluate only those geographic areas that were not analyzed as part of the 2012 EIR and those environmental resource

areas in which modifications to the Proposed Project would cause new or more severe significant impacts relative to those analyzed in the 2012 EIR.

The Division's primary focus is on active surface mining operations; however, the Division also addresses issues related to abandoned (pre-1976) legacy mines. Additionally, the Division has review responsibilities associated with lead agency implementation of the Surface Mining and Reclamation Act of 1975 (SMARA). SMARA provides a comprehensive surface mining and reclamation policy to assure that:

- Adverse environmental effects of surface mining operations are prevented or minimized and mined lands are reclaimed to a usable condition which is readily adaptable for alternative land uses.
- Production and conservation of minerals are encouraged, while considering values relating to recreation, watershed, wildlife, range and forage, and aesthetic enjoyment.
- Residual hazards to the public health and safety are eliminated.

Division staff has reviewed the subject NOP pursuant to the CEQA statutes and Guidelines and offers no comments at this time. The Division will provide comments, as warranted, on documents prepared and submitted in accordance with SMARA.

The Division requests to be included on the distribution list for this Proposed Project. Additionally, the Division requests that any subsequent project documents (e.g., the Draft SEIR, hearing notices for the Draft and Final SEIRs, and any supplemental environmental documents), as well as a copy of the certified Final SEIR, be sent to the Division at DMR-Submittals@conservation.ca.gov or the mailing address on the bottom of page 1 of this letter. If you have any questions, please contact me at (916) 323-9198.

Sincerely,

DocuSigned by:
Carol E. Atkins
73ECCB6738194DA...

Carol E. Atkins
Manager
Environmental Services Unit

ec: State Clearinghouse, state.clearinghouse@opr.ca.gov
Department of Conservation, Office of Legislative and Regulatory Affairs, OLRA@conservation.ca.gov

Janna Scott

Subject: FW: [EXTERNAL] Supplemental Environmental Impact Report for Permanente Creek Restoration Project PLN17-2250

From: Jack Lucas <jlucas1099@aol.com>
Sent: Monday, May 10, 2021 4:11 PM
To: Salisbury, Robert <Robert.Salisbury@PLN.SCCGOV.ORG>
Subject: [EXTERNAL] Supplemental Environmental Impact Report for Permanente Creek Restoration Project PLN17-2250

County of Santa Clara Planning Office May 10, 2021
Attention: Robert Salisbury, County Government Center
70 West Hedding, 7th Floor, East Wing San Jose, CA 95110

Dear Robert Salisbury,

In regards the NOP of a Supplemental Environmental Impact Report for Permanente Creek Restoration Project there appear to be areas in the plan which need to more fully address recent environmental issues.

First, would hope this SEIR mandates establishment of a native plant nursery that uses only species from this watershed, and includes a directive to avoid chemicals in weed suppression.

In consideration of a sizable Ohlone Indian village which has been unearthed just downstream by Valley Water refocus needs to be made on species of wetlands vegetation selected for reaches of Permanente Creek that reflect historical Indian era plants ideal to support resident trout and colony of red-legged frog. (Believe these species were husbanded by Ohlone for food source).

In reach #6 this would mean efforts should be made to 'encourage' establishment of tules not discourage them. It could also indicate that a special pallet of wetlands vegetation could be temporarily grown in ponds adjacent to reaches of creek where they will be used for restoration of riparian corridor canopy and wetlands.. An on site nursery would hasten restoration efforts and provide verisimilitude of elevation and soils of ultimate habitat.

As according to present protocols are seeds of oaks and preferred trees of this watershed being gathered and grown in a contractor's nursery in preparation for initiation of the Permanente Creek Restoration Plan? What timeline will this SEIR envision?

Wish to stress the importance of a restoration plan reflecting Ohlone Indian occupation of Upper Permanente Creek for centuries. This would include trail that Ohlone used to reach Monte Bello Ridge and Pacific Ocean..
This was old County road alignment..

The recent creation of rather massive haul road needs to be added to this environmental review for all reaches of Permanente Creek that it effects. It appears to cross from the Yeager Yard to Pond 4A to existing road that parallels creek and then across creek again to rock pile near culverts #6 and #8. Have no confidence in this analysis of trajectory but would expect SEIR to make adjustment to environmental impacts to these reaches in clear maps and descriptions in text.

Yeager Yard landslide needs to be mentioned with mitigation measures and preventive structures.

Lastly would like to request that further consideration be given to removal of rock pile conveyor system What was its historical use and can it still be considered in alternative measures for plant operation? Is avoidance of mention of the existence or usability of the rail line that runs to heart of operations another lost alternative use?

In consideration of global warming projections of an increase in storm intensities and in review of rainfall data which cites 7 inches in a 48 hour period in February of 1998 for this slope of Black Mountain which is underlain by the Berrocal Fault, I continue to have grave misgivings about stability of WMSA and EMSA in Permanente Creek's watershed. If these rather toxic masses of mining waste are not to be shipped elsewhere by rail and recycled for some beneficial use then think retaining walls need be included as an alternative in this SEIR.

Thank you for consideration of these concerns relative to proposed SEIR for Permaanente Creek Restoration.

Libby Lucas, 174 Yerba Santa Ave., Los Altos, CA 94022

Rob,

I am glad to see the restoration work on the creek moving forward. Please accept the following comments to guide the County and its consultants in evaluating the prior EIR's mitigations, per the NOP notice:

"2. Identifying and evaluating potential alternatives to the proposed modifications or **mitigation measures that could avoid or reduce new or more significant impacts of the proposed creek restoration activities than disclosed in the 2012 EIR"**

In summary, in order to avoid and reduce potentially significant impacts, the County should modify its mitigations under the biological resources section.

California red-legged frog

First, I'd like to note the prior analysis on the federally threatened California red-legged frog (CRLF). The draft EIR asserted that CRLF are "not expected within the project area" and therefore the project would have less-than-significant impacts. So no mitigation for the species was developed. The Final EIR was revised, after a number of comments raised this concern, to include "three Applicant Proposed Measures" for the Basin40A stormwater pond, including limiting grading between May 1 and October 15th, pre-construction surveys prior to construction, and to limit work to daylight hours and outside of rain events. The County determined that these Applicant Proposed Measures, in addition to a stormwater mitigation measures, provided "sufficient protection for CRLF in the Project Area and this impact is considered less than significant." Later, the County's Conditions of Approval from the Planning Commission included similar measures for the Permanente Creek Restoration subareas 4-7.

The prior analysis relies on the incorporation of Applicant Proposed Measures in lieu of mitigation in order to make a finding of a less-than-significant impact. Rather than analyzing a potential impact of the project and creating an appropriate mitigation, the FEIR incorporated those measures into the analysis. The analysis is not the project description.

The 2014 Lotus v. Department of Transportation case (which occurred after adoption of the 2012 EIR) examined a scenario where CEQA lead agencies circumvent the standard process of (1) defining the project, (2) analyzing the project, and (3) developing appropriate mitigation minimize impacts resulting from activities identified in the project description. In that case, DOT incorporated an "environmental protection feature" into the project description and thus concluded that no mitigation was necessary, because that feature was part of the project. The courts determined that "an environmental protection feature must be credible as a true component of the project plan or design, rather than a mitigating action that is . . . responsive to the project's impacts" (borrowing from Ascent's white paper on the topic). The Applicant Proposed Measures included in the prior FEIR were developed for the sole purpose of responding to the project's impacts and were not part of the project.

By committing to those measures in the FEIR analysis and not the project description or via mitigation measures, what is the mechanism for ensuring compliance? How can the public be sure the Applicant Proposed Measures will be applied? By not incorporating these measures as mitigation measure, the County's oversight was also removed. The County's annual monitoring

reports indicate the Conditions of Approval related to CRLF mitigation near the Permanente Creek Restoration Area was monitored, whereas the Applicant Proposed Measure in the analysis appear not to have been.

The other tenet of the analysis was that CRLF stay close to their breeding ponds, so the potential for them to be elsewhere in the project area was limited ("While CRLF movement and habitat use would be limited through most of the Project Area, frogs could move into vegetated upland areas directly surrounding Pond 13."). That conclusion was, respectfully, incorrect at the time. Peer reviewed literature has demonstrated red-legged frogs move many miles overland between breeding areas and as far as 1,600 feet from water (see Bulger et al 2002 or Fellers and Kleeman 2007).[1] The FEIR analysis notes that frogs move overland after rain events. This is consistent with Midpen's monitoring experience: the odds of observing a CRLF in the relatively drier uplands increases dramatically in response to rain. After rains, frogs could be in many parts of the project area.

The EIR also concluded that CRLF would only be present in select ponds and not the creek itself. Adult CRLF may move between isolated pools in intermittent or ephemeral streams. CRLF adults and sub-adults are often observed in Midpen's streams. Case in point, a CRLF was observed in the project area in 2017 in the stream. The addition of the Conditions of Approval from the Planning Commission related to CRLF in subareas of the Creek Restoration adds to this conclusion. CRLF could be present in the creek during their larval stage, depending on the water year and creek conditions, and a typical work window to avoid potential disruption of the larval stage is August 15 to Oct 15. Additionally, the new flood-detention basin downstream created an ideal breeding habitat for the species and dozens of CRLF were relocated as part of that project. The idea that CRLF are not present in these creeks is not accurate, that they stay solely within the areas they've been observed is not based on the best available information and is inconsistent with permits issued in the region. CRLF are increasingly present in the area and the prior analysis did not have this information at the time of the 2012 FEIR.

US Fish and Wildlife Service issued a permit for the flood detention project using a mitigation that required a biological monitor during ground-disturbing activities and they correctly describe "riparian" areas as frog-sensitive areas. Temporary and permanent impacts to their habitat need to be accounted for.

That the 2012 FEIR concluded the Permanente Creek restoration work would not have a potential impact on frogs is not consistent with the available science or biological opinions in the area (and the County's Conditions of Approval). As you know, take (including adverse modification of habitat) of a federally listed species would be a significant impact under CEQA. Therefore, a mitigation to avoid potential impacts or take is required. I understand USFWS provided information to the applicant regarding the Permanente Creek Restoration Project and determined the project is "likely to adversely affect the California red-legged frog." That seems inconsistent with the determination used in the FEIR. The expansion of scope in a sensitive habitat (as defined by USFWS) adds to the potential impact that the County needs to consider in

[1] A number of peer reviewed papers are available here, including those mentioned: http://www.elkhornsloughctp.org/training/show_train_detail.php?TRAIN_ID=EcUZQK3

its analysis. Please add an appropriate mitigation for frogs using the US Fish and Wildlife Service permit for the flood basin project, or, if the permit for creek restoration project has them, to use those.

Other Wildlife

A similar approach was used for migratory birds and San Francisco dusky footed woodrat, but in this case incorporated the Applicant Proposed Measure in the Project Description (as in the Lotus case); please create mitigation measures instead. Protected bat species were mitigated through a blend of Applicant Proposed Measures in the project description and additional mitigation measures; please add the Application Proposed measures into those the mitigation measures. Riparian areas are more likely to have migratory birds, bats, and woodrats. The expansion of scope adds to the potential impact.

Last year, Mountain Lions were listed as a candidate species by CDFW, requiring analysis under CEQA. The 2012 EIR did not consider mountain lions, as they were not a candidate species at the time. Rancho San Antonio Open Space has been monitoring mountain lions with wildlife cameras and through a research project with the Puma Lab at UC Santa Cruz. There are several hundred observations and many lions that regularly use Rancho San Antonio. You can see tracking data on the Puma Project's website showing lions moving within the Lehigh property. Mountain lions are present in the project area and qualified biologists should develop appropriate mitigation(s).

Special Status Plants and Plant Communities

The prior EIR determined that 81 special status plants were potentially present but surveys determined they did not occur in the project area and no mitigation was required. Industry protocol is that botanical surveys are good for approximately 5 years due to changing ecological conditions over time; the prior analysis is now outdated. For example, there are 28 occurrences of western leatherwood in Rancho San Antonio, just north of the Lehigh quarry. Qualified biologists should resurvey the project area for special status species. Given the lengthy time associated with these plans, it seems appropriate to include mitigations that include periodic re-surveys as conditions naturally change over time. The FEIR's conclusion that no special status plants could ever occur during a 30-year period of operation does not reflect the biology of plants. An appropriate mitigation measure should include the periodic survey for special status plants. I'd also note that plants can establish within the 5-year period of the construction activities and that ground disturbance can often generate plant establishment that would not otherwise occur.

Another emerging area of CEQA practice in the biological resources section are consideration of Natural Communities. Natural Communities are evaluated using NatureServe's Heritage Methodology, the same system used to assign global and state rarity ranks for plant and animal species in the California Natural Diversity Database. VegCAMP has been ranking California Natural Communities by their rarity and threat since the inception of the program. However, since 2012 the ranking methodology has become more transparent and defensible through the

advent of a rank calculator.[2] VegCAMP and the California Native Plant Society's Vegetation Program now use this calculator to rank Natural Communities; rankings are reviewed by both programs..

Natural Communities with ranks of S1-S3 are considered Sensitive Natural Communities to be addressed in the environmental review processes of CEQA and its equivalents. The analysis in the SEIR should identify all Natural Communities within the project footprint using the best means possible, for example, keying them out in the Manual of California, Second Edition (Sawyer et al. 2009) or in classification or mapping reports from the region, available on VegCAMP's Reports and Maps page. Refer to the current standard list of Natural Communities to determine if any of these types are ranked Sensitive (S1-S3 rank); if so, see CEQA Guidelines checklist at IVb. Again, I assume agency permits for the project incorporate some plant survey requirements that come to a different conclusion than the FEIR. The expansion of scope in a sensitive habitat merits additional plant surveys.

Cultural Resources

A qualified archaeologist should review the excavation work through Phase II analysis and discuss their findings with the State Historic Preservation Officer. If an archaeologist and SHPO has already been consulted pursuant to Section 106, then the appropriate measures can be borrowed.

Thank you,

Aaron Hebert, Senior Resource Management Specialist

Midpeninsula Regional Open Space District

[2] https://www.natureserve.org/conservation-tools/conservation-rank-calculator

SIERRA CLUB
LOMA PRIETA CHAPTER

Serving San Mateo, Santa Clara, and San Benito Counties

May 10, 2021

Mr. Robert Salisbury
County of Santa Clara
Department of Planning and Development
70 W. Hedding Street, East Wing, 7th Floor
San Jose, CA 95110

RE: Supplemental Environmental Impact Report for the Permanente Creek Restoration Project, Comments on Notice of Preparation

Dear Mr. Salisbury,

Please take into account the following comments from the Sierra Club Loma Prieta Chapter regarding your Notice of Preparation (NOP) of a Supplemental Environmental Impact Report (SEIR) to the 2012 Lehigh Permanente Quarry Reclamation Plan Amendment EIR for the Permanente Creek Restoration Project ("PCRP" or "project").

Project Description:

First, the Project Description at NOP pp. 2-3 should be revised to state that the provisions of the 2016 Amended Consent Decree (Decree), particularly paragraphs 33 through 42, reflect mandatory, minimum restoration duties imposed on Lehigh and are therefore necessary minimum elements of any "Project Description" applicable to the SEIR. For example, where paragraph 35 of the Decree that states Lehigh "shall layback and re-grade the north overburden slope to provide a stable slope no steeper than 2:1 (50% grade) and shall remove sufficient material to move the north toe of the slope at least 25 feet northward from its current location and elevation," that statement is a minimum requirement, not simply a recommendation. [1] To the extent any such requirement in the Decree does not obtain legally necessary agency approval(s) after issuance of the SEIR the provisions of Decree paragraph 52 shall apply.

Second, for each activity in the Project Description, please describe in detail and by reach which actions and impacts are covered in the 2012 Lehigh Permanente Quarry Reclamation Plan Amendment EIR and identify sections and page numbers for easy reference. Likewise, please identify what new impacts not covered will be evaluated in this SEIR and reference the sections where this analysis is presented.

Mitigation:

The creek restoration objectives and activities described in the Decree are themselves mitigation requirements to resolve decades of Lehigh's Clean Water Act violations. Applicable measures to mitigate the impacts of the mitigation itself should be viewed in light of the ultimate restorative objective. That said, adequate mitigation for restoration project impacts is important, especially related to impacts on species and habitats. Trees form the backbone of what is left of the riparian habitat in this section of Permanente Creek and should only be removed if necessary, to secure the long-term restoration of the creek. To the extent native trees are removed, they should be replaced with 15-gallon trees at appropriate ratios, rather than 24-inch box trees. 15-gallon trees adapt better in the long run because they have not lived for as long in a box in the nursery environment.

Alternatives:

Alternatives to the restoration requirements in the Decree that entail additional costs are still enforceable as restoration requirements under the Decree if they fit within the cost escalation values in Decree paragraph 49. Moreover, nothing in the Decree limits any agency from imposing additional restoration requirements.

Please contact us with any additional design information about the preferred project and any proposed alternatives as soon as possible so we can respond as needed in relation to the requirements of the Decree.

We continue to urge the Department of Planning and Development to pursue this restoration project with all deliberate speed. Although the Decree was initially signed over eight years ago, not one shovel of mining waste has been removed from the creek and impacts of Lehigh's illegal disposal activities persist unabated.

Thank you for your consideration of these comments.

Sincerely,

Katja Irvin, AICP
Water Committee Co-Chair
Sierra Club Loma Prieta Chapter

cc: Reed Zars, Attorney at Law
James Eggers, Executive Director, Sierra Club, Loma Prieta Chapter

DocuSign Envelope ID: 46949A12-A9E6-4A39-A00F-A746D0DBF960

Comment Letter H

State of California – Natural Resources Agency
DEPARTMENT OF FISH AND WILDLIFE
Bay Delta Region
2825 Cordelia Road, Suite 100
Fairfield, CA 94534
(707) 428-2002
www.wildlife.ca.gov

GAVIN NEWSOM, Governor
CHARLTON H. BONHAM, Director

May 13, 2021

Mr. Robert Salisbury
County of Santa Clara
70 West Hedding, 7th Floor, East Wing
San Jose CA 95110
Robert.Salisbury@pln.sccgov.org

Subject: Permanente Creek Restoration Project, Notice of Preparation of a Supplemental Draft Environmental Impact Report, SCH No. 2021040331, Santa Clara County

Dear Mr. Salisbury:

The California Department of Fish and Wildlife (CDFW) received the Notice of Preparation (NOP) of a Supplemental Draft Environmental Impact Report (SDEIR) from the County of Santa Clara (County) for the Permanente Creek Restoration Project (Project) pursuant the California Environmental Quality Act (CEQA) and CEQA Guidelines.[1]

Thank you for the opportunity to provide comments and recommendations regarding those activities involved in the Project that may affect California fish and wildlife resources. Likewise, we appreciate the opportunity to provide comments regarding those aspects of the Project that CDFW, by law, may be required to carry out or approve through the exercise of its own regulatory authority under the Fish and Game Code.

CDFW ROLE

CDFW is a Trustee Agency with responsibility under CEQA §15386 for commenting on projects that could impact fish, plant and wildlife resources. CDFW is also considered a Responsible Agency if a project would require discretionary approval, such as permits issued under the California Endangered Species Act (CESA), the Native Plant Protection Act, the Lake and Streambed Alteration (LSA) Program and other provisions of the Fish and Game Code that afford protection to the State's fish and wildlife trust resources. Pursuant to our jurisdiction, CDFW has the following concerns, comments, and recommendations regarding the Project.

[1] CEQA is codified in the California Public Resources Code in section 21000 et seq. The "CEQA Guidelines" are found in Title 14 of the California Code of Regulations, commencing with section 15000.

DocuSign Envelope ID: 46949A12-A9E6-4A39-A00F-A746D0DBF960

PROJECT DESCRIPTION SUMMARY

Proponent: Lehigh Southwest Cement Company

Objective: Specific reaches of Permanente Creek within the Project proponents land ownership will be restored. This includes activities such as removal of roads or reduction in the size of roads, removal of culverts, sediment, rock and concrete debris, construction of floodplain, restoration of creek channel, installation of large woody debris, removal of invasive plants, and planting native vegetation.

Location: The Project is located at the Permanente Quarry, west of the City of Cupertino, in Santa Clara County. The Assessor's Parcel Numbers are 351-10-038, 351-09-022, 342-64-003, 351-10-033, 351-10-035, 351-10-034, 351-10-008, 351-10-011, 351-11-001.

COMMENTS AND RECOMMENDATIONS

CDFW offers the comments and recommendations below to assist the County in adequately identifying and/or mitigating the Project's significant, or potentially significant, direct and indirect impacts on fish and wildlife (biological) resources.

Project Description

The NOP, on page 2, in the Project Description, does not discuss the nexus of the proposed Project to the proposed amendment to the Lehigh Permanente Quarry Reclamation Plan (Reclamation Plan), currently dated May 2019. CEQA guidelines §15124(d)(1)(C) state that an EIR Project Description should list related environmental review and consultation requirements required by state laws, regulations, or policies, which may apply to this issue. CDFW reviewed and provided comments on the proposed May 2019 Reclamation Plan amendment, however, the proposed Project was not discussed in the amendment. CDFW recommends that the DSEIR for the proposed Project discuss the association between the proposed Project and the Reclamation Plan and explain whether the proposed Project will be further described and analyzed in any future CEQA documentation for the Reclamation Plan.

Biological Resources, Long-term Impacts to Riparian Sensitive Community

Stability of Permanente Creek Bed and Bank

CEQA Guidelines Section 15126.2(a) state that long-term significant effects of a project should be considered and discussed. CDFW engineering staff reviewed and provided comments on the revised 90% engineering designs and supporting documents for the Project. CDFW engineering staff determined that implementation of the Project as designed could potentially result in post-construction instability of the creek bed and

DocuSign Envelope ID: 46949A12-A9E6-4A39-A00F-A746D0DBF960

bank. For example, unstable conditions may occur due to steep 1.5:1 or 1:1 creek bank slopes, lack of in-channel sub-surface geologic investigation, lack of rock weirs in reaches with very steep gradients, and inclusion of large woody debris in reaches where it could become dislodged due to steep gradients. Creek bed and bank instability could result in significant impacts to the sensitive riparian community and special-status species habitat. The SDEIR should therefore include a thorough analysis of the current designs, and any necessary modifications to the designs to prevent adverse effects to the sensitive habitat types. To avoid or reduce potential long-term impacts of the Project to a less-than-significant level, CDFW recommends that a long-term (e.g., 10-year) post-construction monitoring and adaptive management plan be developed and described in the SDEIR. The SDEIR should include monitoring of the creek geomorphology, consultation with CDFW and other resource agencies and identification of corrective and remediation actions in the event that creek bed or bank instability is detected.

Riparian Vegetation Impacts

The revised 90% engineering designs appear to indicate that approximately 30 trees will be removed during Project construction. However, only larger trees to be removed were included in the designs (e.g., non-oak trees equal to or greater than 12-inch diameter). Sapling (1-inch to 4-inch diameter) and pole sized (5-inch to 11-inch diameter) trees are important to riparian vegetation structural complexity and habitat succession. Based on the current designs, impacts of the Project to riparian habitat may be underestimated. CDFW recommends that analysis of riparian vegetation impacts include trees less than 12 inches in diameter or based on area calculations for seedlings and saplings and understory vegetation. As discussed in the previous section of this letter, the long-term (e.g., 10-year) post-construction monitoring and adaptive management plan should include monitoring of revegetated areas and include performance standards to ensure establishment or maintenance of riparian habitat.

Biological Resources, Impacts to Special-Status Species

The revised 90% engineering designs appear to indicate that the treated water outfall located at Pond 1250 may be moved to a different location, however, the alternate location was not described in the NOP. Changing the outfall location could potentially result in significant hydrological impacts to stream reaches that would no longer receive water, and consequently adversely impact riparian vegetation or aquatic special-status species (e.g., California giant salamander (*Dicamptodon ensatus,* State Species of Special Concern) and California red-legged frog [CRLF, *Rana draytonii*, Federally Threatened and State Species of Special Concern)]. CDFW recommends that the SDEIR clearly demarcate the proposed new outfall location on a map and discuss the significance of the treated water contribution from the outfall to this stream reach, and any potential effects on riparian habitat and special-status species resulting from relocation of the outfall. The SDEIR should discuss design modifications or alternate

DocuSign Envelope ID: 46949A12-A9E6-4A39-A00F-A746D0DBF960

outfall sites to ensure the Project results in less-than-significant impacts to aquatic and riparian habitats from either direct or indirect changes in creek hydrology.

The NOP does not discuss potential occurrences of special-status and sensitive bat species within the Project area. As discussed in the *Riparian Vegetation Impacts* section above, the revised 90% engineering designs did appear to indicate the removal of approximately 30 trees. Removal of trees could impact special-status and sensitive bat species such as Pallid bat (*Antrozous pallidus*, State Species of Special Concern) and Hoary bat (*Lasiurus cinereus*) that may roost in woodland and riparian habitats.

The California Natural Diversity Database (CDFW 2021) shows occurrences of CRLF, California giant salamander, and Santa Cruz black salamander (*Aneides niger,* State Species of Special Concern) within the Project area. There may also be potential presence of San Francisco dusky-footed woodrat (SFDWR, *Neotoma fuscipes annectens*, State Species of Special Concern).

To reduce impacts to less-than-significant levels, CDFW recommends the measures below be included in the SDEIR.

1. Focused Surveys: The Project location and tree removal locations should be surveyed for Species of Special Concern and sensitive bat species by a qualified biologist following protocol-level surveys. In the absence of protocol-level surveys being performed, focused surveys for Species of Special Concern presence or indicators of presence (e.g., bat guano and acoustic surveys) should be conducted.

2. Avoidance, Minimization, and Mitigation: If Species of Special Concern or sensitive bat species are found within or adjacent to the Project site, the qualified biologist should establish a no-disturbance buffer appropriate for the species and conduct on-site monitoring during all Project-related activities. The SDEIR should include additional minimization and mitigation measures for each species that could be potentially impacted by Project activities.

Biological Resources, Bird Nest Measures

The NOP does not include a discussion of wildlife that may be present within the Permanente Creek riparian area. However, in CDFW review of aerials, there is a potential for avian species to nest within the riparian area. In order to avoid significant impacts to nesting avian species, CDFW recommends that the following protective measures be included in the SDEIR:

1. Nesting Bird Surveys: If Project-related work is scheduled during the nesting season (typically February 15 to August 30 for small bird species such as passerines; January 15 to September 15 for owls; and February 15 to September

DocuSign Envelope ID: 46949A12-A9E6-4A39-A00F-A746D0DBF960

15 for other raptors), a qualified biologist will conduct two surveys for active nests of such birds within 14 days prior to the beginning of Project construction, with a final survey conducted within 48 hours prior to construction. Appropriate minimum survey radii surrounding the work area are typically the following: i) 250 feet for passerines; ii) 500 feet for small raptors such as accipiters; and iii) 1,000 feet for larger raptors such as buteos. Surveys will be conducted at the appropriate times of day and during appropriate nesting times.

2. Active Nest Buffers: If the qualified biologist documents active nests within the Project area or in nearby surrounding areas, an appropriate buffer between the nest and active construction will be established. The buffer will be clearly marked and maintained until the young have fledged and are foraging independently. Prior to construction, the qualified biologist will conduct baseline monitoring of the nest to characterize "normal" bird behavior and establish a buffer distance which allows the birds to exhibit normal behavior. The qualified biologist will monitor the nesting birds daily during construction activities and increase the buffer if the birds show signs of unusual or distressed behavior (e.g., defensive flights and vocalizations, standing up from a brooding position, and/or flying away from the nest). If buffer establishment is not possible, the qualified biologist or construction foreman will have the authority to cease all construction work in the area until the young have fledged and the nest is no longer active.

Biological Resources, Rare Plant Species

The NOP does not include a discussion of special-status or rare plants that may be present within the impact area. In review of the California Natural Diversity Database (CNDDB, CDFW 2021), there are rare plant species that are located within 2 miles of the Project site, including woodland woollythreads (*Monolopia gracilens*, California Rare Plant Rank 1B.2) and western leatherwood (*Dirca occidentalis,* California Rare Plant Rank 1B.2). In order to avoid significant impacts to rare plant species within the impact area, CDFW recommends that the following protective measures be included in the SDEIR:

1. Special-Status Plant Habitat Assessment: A qualified botanist should conduct an assessment of the plant communities/land cover (e.g., chaparral, cismontane woodland, riparian forest) that provide habitat for these rare plant species.

2. Special-Status Plant Focused Surveys: If plant communities/land cover suitable for rare plants are determined to be present, the Project location should be surveyed for rare plant species by a qualified biologist following protocol-level surveys. Protocol-level surveys, which are intended to maximize detectability, may include identification of reference populations to facilitate the likelihood of field investigations occurring during the appropriate floristic period.

DocuSign Envelope ID: 46949A12-A9E6-4A39-A00F-A746D0DBF960

3. Special-Status Plant Avoidance: Rare plant species should be avoided through delineation and establishment of a no-disturbance buffer of at least 50 feet from the outer edge of the plant population or specific habitat type required by rare plant species.

ENVIRONMENTAL DATA

CEQA requires that information developed in draft environmental impact reports be incorporated into a data base which may be used to make subsequent or supplemental environmental determinations. [Pub. Resources Code, § 21003, subd. (e)]. Accordingly, please report any special-status species and natural communities detected during Project surveys to the California Natural Diversity Database (CNDDB). The CNNDB field survey form, online field survey form, and contact information for CNDDB staff can be found at the following link: https://wildlife.ca.gov/data/CNDDB/submitting-data. The types of information reported to CNDDB can be found at the following link: https://wildlife.ca.gov/Data/CNDDB/Plants-and-Animals.

FILING FEES

CDFW anticipates that the Project will have an impact on fish and/or wildlife, and assessment of filing fees is necessary (Fish and Game Code, § 711.4; Pub. Resources Code, § 21089). Fees are payable upon filing of the Notice of Determination by the Lead Agency and serve to help defray the cost of environmental review by CDFW.

CONCLUSION

CDFW appreciates the opportunity to comment on the NOP to assist the County in identifying and mitigating Project impacts on biological resources. CDFW appreciates the County's past coordination on this Project and offers continued guidance on project design and environmental review.

Questions regarding this letter or further coordination should be directed to Ms. Kristin Garrison, Environmental Scientist, at (707) 944-5534 or by email at Kristin.Garrison@wildlife.ca.gov; or Ms. Brenda Blinn, Senior Environmental Scientist (Supervisory), at (707) 944-5541 or by email at Brenda.Blinn@widlife.ca.gov.

Sincerely,

DocuSigned by:
Gregg Erickson
BE74D4C93C604EA...

Gregg Erickson
Regional Manager
Bay Delta Region

DocuSign Envelope ID: 46949A12-A9E6-4A39-A00F-A746D0DBF960

cc:

Office of Planning and Research, State Clearinghouse, Sacramento
Brian Wines, Regional Water Quality Control Board, brian.wines@waterboards.ca.gov
Joseph Terry, US Fish and Wildlife Service, Joseph_terry@fws.gov

LITERATURE CITED

California Department of Fish and Wildlife (CDFW). 2021. Biogeographic Information and Observation System (BIOS). https://www.wildlife.ca.gov/Data/BIOS. Accessed May 5, 2021.

[redacted]

Subject: FW: Notice of Preparation of a Supplemental Environmental Impact Report for the Permanente Creek Restoration Project

From: Shree Dharasker <sdharasker@valleywater.org>
Sent: Friday, May 14, 2021 4:26 PM
To: Salisbury, Robert <Robert.Salisbury@PLN.SCCGOV.ORG>
Cc: Usha Chatwani <uchatwani@valleywater.org>
Subject: [EXTERNAL] Notice of Preparation of a Supplemental Environmental Impact Report for the Permanente Creek Restoration Project

Hi Robert:

The Santa Clara Valley Water District (Valley Water) has reviewed the Notice of Preparation (NOP) of a Supplemental Environmental Impact Report (SEIR) for the Permanente Creek Restoration Project (PCRP), received on April 13, 2021, and has the following comments:

1) The SEIR must address any changes to the hydrology/hydraulics of the proposed restored channel so it doesn't have any negative impacts on the Permanente Flood Protection Project (Project), particularly as it pertains to the functioning of the San Antonio detention basins. Valley Water would like to ensure that this comment is covered under "Cumulative Impacts" and/or "Hydrology and Water Quality" sections.
2) Any increase in the 100-year flows and volumes due to the proposed improvements must be mitigated to pre-improvement conditions.
3) Valley Water would like to review the SEIR when complete to ensure our concerns have been addressed.

Please contact me if there are any questions.

Shree Dharasker
Associate Engineer-Civil
Community Projects Review Unit
(408)630-3037

[redacted]

Appendix B
Amended Consent Decree

United States District Court
For the Northern District of California

IN THE UNITED STATES DISTRICT COURT

FOR THE NORTHERN DISTRICT OF CALIFORNIA

SAN JOSE DIVISION

SIERRA CLUB, Plaintiff, v. LEHIGH SOUTHWEST CEMENT COMPANY, and HANSON PERMANENTE CEMENT, INC. Defendants.	Case No.: 5:11-cv-06392-HRL Case No.: 5:15-cv-01896-HRL Judge: Hon. Howard R. Lloyd **AMENDED CONSENT DECREE** **Date Lodged: February 22, 2016** **Date Entered** May 11, 2016

I. RECITALS

1. On December 19, 2011, Plaintiff Sierra Club ("Plaintiff" or "Sierra Club") filed a Complaint for Declaratory and Injunctive Relief and for Civil Penalties in this federal Clean Water Act case against Defendants Lehigh Southwest Cement Company and Hanson Permanente Cement, Inc. ("Defendants") pertaining to Defendants' quarry, cement plant and associated facilities, located in Santa Clara County, California. Sierra Club and Defendants are collectively referred to herein as "Parties," and individually referred to as "Party."

2. The Complaint alleges that Defendants have, and continue to, discharge pollutants from the quarry pit into Permanente Creek without an authorizing national pollutant discharge elimination system ("NPDES") permit and in violation of their storm water discharge permit.

3. The Complaint also alleges that Defendants have caused fill, including but not limited to mining wastes, overburden and sediment, to enter the bed and banks of Permanente Creek, and that such fill degrades, and continues to degrade, the water quality, habitat and natural function of the Creek.

4. Defendants deny all of Plaintiff's allegations and claims in the Complaint.

5. The Parties, through their authorized representatives and without either adjudication of Plaintiff's claims or admission by Defendants of any alleged wrongdoing have

chosen to resolve in full Plaintiff's Complaint through settlement and avoid the cost and uncertainties of further litigation.

6. The Parties' original Consent Decree was entered by the Court on June 18, 2013 (Docket No. 86). This Amended Consent Decree modifies several of Defendants' creek restoration requirements set forth in the original Consent Decree in response to agency comments. This Amended Consent Decree has been negotiated in good faith, will avoid further litigation among the Parties, and is fair, reasonable and in the public interest.

NOW, THEREFORE, with the consent of the Parties, IT IS HEREBY ADJUDGED, ORDERED AND DECREED as follows:

II. JURISDICTION AND VENUE

7. This Court has subject matter jurisdiction in this matter pursuant to 33 U.S.C. § 1365(a)(l)(A) (citizen suit provision of the Clean Water Act) and 28 U.S.C. § 1331 (federal question statute). The relief required is authorized pursuant to 28 U.S.C. §§ 2201 and 2202 (declaratory judgment), and 33 U.S.C. §§ 1319 and 1365 (Clean Water Act).

8. Venue in the Northern District of California is proper pursuant to 33 U.S.C. § 1365(c)(1) (Clean Water Act citizen suit provision) because Defendants' discharges are located in this District. Venue also lies in the Northern District of California, pursuant to 28 U.S.C. § 1391(b) and (e), because the property that is the subject of this action is in Santa Clara County, California, and because Defendants' Facility is located in Santa Clara County, California.

9. Plaintiff and Defendants consent to this Court's jurisdiction to enter and enforce this Amended Consent Decree, and consent to venue in this judicial district.

III. APPLICABILITY

10. The provisions of this Amended Consent Decree apply to and are binding on Plaintiff and Defendants, any of their respective successors and/or assigns, officers, agents, servants, and employees, and any other entities who are in active concert or participation with Plaintiff or Defendants.

11. No transfer of ownership or operation of the Facility shall relieve Defendants of their obligation to comply with the terms of this Amended Consent Decree. Moreover, prior to

any transfer of ownership or operation, the transferee shall provide written confirmation to the Court and Plaintiff acknowledging the terms of the Amended Consent Decree and consenting to be bound by its terms.

12. Defendants shall provide a copy of this Amended Consent Decree to all officers, employees, agents, performance guarantors, consultants and contractors whose duties include the implementation of any provision of this Amended Consent Decree.

IV. DEFINITIONS

13. Terms used in this Amended Consent Decree that are defined in the federal Clean Water Act, 33 U.S.C. §§ 1251, *et seq*., ("CWA"), or in regulations issued pursuant thereto, shall have the meanings assigned to them therein, unless otherwise provided in this Decree. Whenever the terms set forth below are used in this Amended Consent Decree, the following definitions shall apply:

(a) "Applicable chronic water quality standard for Selenium" means 5 micrograms per liter (µg/l) of total Selenium.

(b) "Complaint" shall mean the Complaint filed by Sierra Club in this action on December 19, 2011.

(c) "Amended Consent Decree" or "Decree" shall mean this Amended Consent Decree and the exhibits attached hereto.

(d) "Creek" shall mean Permanente Creek.

(e) "Day" shall mean a calendar day unless expressly stated to be a business day. In computing any period of time under this Decree, where the last day would fall on a Saturday, Sunday or federal holiday, the period shall run until the close of business of the next business day.

(f) "DFW" shall mean the California Department of Fish and Wildlife.

(g) "DFW Restoration Manual" shall mean the California Department of Fish & Wildlife's California Salmonid Stream Habitat Restoration Manual, 4th Edition (Vols. One and Two, 2010), attached hereto as Exhibit A.

(h) "Effective Date" shall mean the date this Decree is entered by the Court.

United States District Court
For the Northern District of California

United States District Court
For the Northern District of California

(i) "Facility" shall mean Defendants' Permanente quarry, cement plant and associated works and property, located in Santa Clara County, California.

(j) "Field Engineering Description" shall mean the Field Engineering Description dated February 2, 2016 and attached hereto as Exhibit B.

(k) "Final treatment system" shall mean a water pollution abatement system and associated flow modulation facilities designed, constructed and operated to achieve continuous compliance with all NPDES permit limits, and all water quality standards applicable to Permanente Creek, for all discharges to Permanente Creek from the Facility, including quarry pit water and process waters currently associated with Pond 4A (quarry pit and primary crusher washdown), Ponds 9 & 11 (cement plant process waters in Pond 11 that flow through Pond 9), and Pond 20 (cement plant truck wash), and only excluding authorized storm water discharges from Pond 9 (after Pond 11 no longer flows to Pond 9), Pond 13, Pond 20 (after truck wash water no longer flows to Pond 20), and Pond 30. To the extent Defendants' future NPDES permit contains an effluent limit for nickel that differs from the water quality standard for nickel, such NPDES nickel effluent limit shall control.

(l) "Interim treatment system" shall mean a water pollution abatement system and associated flow modulation facilities designed, constructed and operated to treat up to 24,000 gallons per hour of the quarry pit water currently associated with Pond 4A (quarry pit and primary crusher washdown) for the primary purpose of substantially reducing Selenium in the quarry pit water prior to discharge. Operation of this interim treatment system is also intended to inform the final design and successful operation of the final treatment system.

(m) "Meet and confer" shall mean to communicate at the same time in person, by phone, or through any video or other virtual electronic method.

(n) "NPDES" shall mean National Pollutant Discharge Elimination System.

(o) "Parties" shall mean Plaintiff and Defendants.

(p) "Quarry pit water" shall mean that surface and ground water that is pumped by Defendants to facilitate quarry mining.

(q) "Reach" shall mean that length of Permanente Creek that has been assigned a

United States District Court
For the Northern District of California

numerical value from 1 to 22, originally designated as such by URS, as shown in the April 27, 2015 Permanente Creek Restoration Plan, Draft 70% Design drawings, prepared by Waterways Consulting, Inc. ("Restoration Plan Drawings") set forth as Exhibit C.

(r) "Regional Water Board" shall mean the San Francisco Bay Regional Water Quality Control Board.

(s) "Section" shall mean a portion of this Amended Consent Decree identified by a Roman numeral.

(t) "EPA" shall mean the United States Environmental Protection Agency and any of its successor departments or agencies.

(u) "Work", as that term is used in Section X, shall mean all activities necessary to satisfy the Permanente Creek restoration obligations described in Section VI of this Decree, including but not limited to design, contracting, permitting, construction and monitoring activities.

V. DISCHARGE TREATMENT

14. No later than August 1, 2013, Defendants shall supplement their November 30, 2011 application for an individual NPDES permit for the Facility by submitting an amended Report of Waste Discharge, or procedurally similar document, to the Regional Water Board that includes requirements no less stringent than those set forth in Paragraphs 15 through 32 below.

A. Interim Quarry Pit Water Discharge Compliance

15. No later than August 1, 2013, Defendants shall execute one or more contracts for the engineering, procurement, and construction of the interim treatment system. No later than January 17, 2014, Defendants shall commence construction of the interim treatment system.

16. No later than October 1, 2014, Defendants shall have installed and commenced operation of the interim treatment system.

17. Beginning no later than October 1, 2014, and continuing no later than September 30, 2017, Defendants shall direct all quarry pit water to the interim treatment system. Defendants shall treat no less than 24,000 gallons per hour of quarry pit water with the interim treatment system, except at those times when only flows less than 24,000 gallons per hour are

United States District Court
For the Northern District of California

available from the flow modulation facilities, in which case Defendants shall treat all lesser flows. Beginning no later than December 1, 2014, Defendants shall either remove, on a continuous basis, at least 50 percent of the total Selenium from the totality of such quarry pit water flow to be treated, or achieve a concentration of no greater than 10 µg/l of total Selenium in such quarry pit water flow to be treated when the concentration of total Selenium in the quarry pit water entering the interim treatment system is 20 µg/l or less, prior to its discharge into Permanente Creek. Notwithstanding the above, Defendants shall operate the treatment system at all times to maximize the reduction of Selenium in the quarry pit discharge.

18. To determine the flow rates described above, Defendants shall use automatic, continuous flow measuring equipment with continuous data logging to monitor the total gallons per hour of quarry pit water entering the interim treatment system. Defendants shall also monitor the total gallons per hour of all quarry pit water treated by the interim treatment system and discharged to Permanente Creek, and the total gallons per hour of any quarry pit water that is not treated by the interim treatment system and discharged to Permanente Creek.

19. Beginning on October 1, 2014, and continuing through September 30, 2017, Defendants shall monitor, on no less than a weekly basis, the total Selenium in the untreated quarry pit water at the inlet to the interim treatment system, and at the outlet from the interim treatment system. The inlet and outlet samples shall be taken at the same time, and shall consist of a composite of twelve equal aliquots collected evenly over a 24-hour period. Data generated from this monitoring shall be used to assess compliance with Paragraph 17 on a weekly basis.

20. No later than March 31, 2015, Defendants shall provide Plaintiff with a report summarizing the performance of the interim treatment system since October 1, 2014, including but not limited to the measured concentration of total Selenium in the water discharged from the interim treatment system to Permanente Creek.

21. No later than June 30, 2015, Defendants shall provide Plaintiff with a report summarizing what additional treatment facilities or operational changes, if any, are necessary to ensure that quarry pit water treated by the interim treatment system will comply with the applicable chronic water quality standard for Selenium. If the water discharged from the interim

United States District Court
For the Northern District of California

treatment system is in compliance with the applicable chronic water quality standard for Selenium at that time, no additional treatment facilities or operational changes must be identified by Defendants, and in that case, after June 30, 2015 Defendants shall comply with such standard, in lieu of the 50 percent removal requirement set forth in Paragraph 17.

22. No later than December 31, 2015, Defendants shall have installed and shall commence operation of additional treatment facilities, if any, necessary to ensure that quarry pit water treated by the interim treatment system will comply with the applicable chronic water quality standard for Selenium.

23. No later than March 31, 2016, the water discharged from the interim treatment system shall comply with the applicable chronic water quality standard for Selenium, in lieu of the 50 percent removal requirement set forth in Paragraph 17, unless compliance with the applicable chronic water quality standard for Selenium was achieved by June 30, 2015 pursuant to Paragraph 21.

24. No later than September 5, 2014, and continuing no later than September 30, 2017, Defendants shall not discharge process-related waters from Pond 11 into Pond 9, and Defendants shall have installed and commenced operation of treatment facilities for the discharge of water from Pond 11 to Pond 4A and shall attain and maintain compliance with the Regional Water Board's discharge limitations applicable to such discharge.

25. Defendants shall provide to Plaintiff on a quarterly basis, in .pdf electronic format, all monitoring results from the interim treatment facility and Pond 11 discharges to Pond 4A from the previous calendar quarter, within 30 days of the last day of each calendar quarter, including but not limited to the results of all flow and Selenium monitoring.

B. Final Facility Discharge Compliance

26. No later than August 1, 2016, Defendants shall execute contract(s) for engineering, procurement, and construction of the final treatment system. No later than February 1, 2017, Defendants shall commence construction of the final treatment system.

27. Beginning no later than September 30, 2017, Defendants shall have installed and commenced operation of the final treatment system.

United States District Court
For the Northern District of California

28. Beginning no later than September 30, 2017, Defendants shall not discharge any quarry pit water, or any process water, or stormwater mixed with process water, from the Facility into Permanente Creek unless such discharge is treated by the final treatment system and is in compliance with all applicable NPDES permit effluent limits, and all applicable receiving water quality standards, including but not limited to the applicable chronic Selenium and chronic toxicity standards.

29. Compliance with the chronic toxicity standard shall be determined by EPA's whole effluent toxicity (WET) test, based on: (1) survival and reproduction of Ceriodaphnia (water flea) (EPA/821/R-02/013 (Test Method 1002.0), (2) survival and growth of pimephales promelas (fathead minnow), EPA/821/R-02/013, Test Method 1000.0 (2002), and (3) growth of Selenastrum (algae), EPA/821/R-02/012, Test Method 1003.0 (2002). If Defendants' NPDES permit requires a different method for determining compliance with the chronic toxicity water quality standard, Defendants' compliance with the chronic toxicity water quality standard shall be determined by such method.

30. For the first six months of operation of the final treatment system, compliance sampling and analysis for conventional constituents and metals, including Selenium, shall take place on no less than a weekly basis. To determine compliance with the chronic toxicity standard, sampling and analysis shall take place on no less than a monthly basis consistent with Paragraph 29 immediately above.

31. Beginning on the seventh month of operation of the final treatment system, and continuing thereafter, Defendants' compliance with all applicable water quality standards and effluent limits shall be determined by the monitoring requirements in Defendants' individual Facility NPDES permit.

32. Defendants shall provide to Plaintiff on a quarterly basis, in .pdf electronic format, all monitoring results required by this Decree and Defendants' NPDES permit, from the previous calendar quarter within 30 days of the last day of each calendar quarter.

United States District Court
For the Northern District of California

VI. CREEK RESTORATION

A. Permanente Creek Restoration.

33. The Parties agree that the objectives of the Permanente Creek restoration requirements set forth below include the following:

- Increase quantity and quality of resident rainbow trout habitat through creation of pools, increased channel complexity and cover, and by fish passage through and between reaches consistent with a geomorphically stable, self-sustaining channel unless DFW Restoration Manual hydraulic design criteria cannot be met due to (1) the gradient of the reach, or (2) bedrock grade controls confirmed by the independent geologist;
- Improve riparian habitat, including improvement to channel and stream bank stability and ecological/geomorphic function;
- Remove mining-related fill and sediments in the bed, banks and adjacent slopes;
- Remove or alter man-made structures so as to improve riparian habitat;
- Layback creek banks and adjacent hill slopes to provide stable slopes sufficient to prevent fill from entering the creek;
- Require restoration that is no less stringent than any restoration that is approved or required by any agency, including but not limited to the Santa Clara County Planning Department, the DFW, and the Regional Water Board, and that is to be performed in a period of time no greater than any restoration that is approved or required by any agency, including but not limited to the Santa Clara County Planning Department, the DFW, and the Regional Water Board.

34. Reaches 19-20-21. Defendants shall improve holding and rearing habitat for the resident trout population during summer low-flow periods and improve cover during high flows as follows. Defendants shall create four (4) woody debris installations within each Reach (for a total of 12 installations). Wood type, size, location and installation criteria for implementation of each installation shall comply with DFW and Regional Water Board permit or other approval requirements.

35. Reaches 17-18. Defendants shall excavate and permanently export overburden and mining-related sediment from the creek bed, banks, and from upland slopes (to the extent upland slope materials pose a risk of entering the creek), sufficient to establish approximate pre-disturbance creek alignment and slopes, and to facilitate above-grade flows, as generally depicted in the Restoration Plan Drawings. Defendants shall provide for enhanced ecological function and resident trout passage consistent with a geomorphically stable, self-sustaining

United States District Court
For the Northern District of California

channel. Defendants shall follow the hydraulic design criteria in the DFW Restoration Manual unless such criteria cannot be met due to the gradient of the reaches, or bedrock grade controls confirmed by the independent geologist as described below, in which case the stream simulation criteria in the DFW Restoration Manual, revised as necessary with off-site analogs, shall apply.

Defendants shall reconstruct the channel at a lowered profile and alignment within the "grading envelope" as depicted in the Restoration Plan Drawings and Field Engineering Description. Defendants shall remove all material to the lower limit of the potential design channel invert shown in the Restoration Plan Drawings, subject to the criteria in the Field Engineering Description. If Defendants assert they have excavated to bedrock prior to reaching the lowest elevation at any location within the "grading envelope," an independent professional geologist will assess Defendants' assertion and make the final determination of the existence and extent of any such bedrock. Pursuant to the time periods in Paragraph 46, Plaintiff and Defendants shall mutually agree to an independent professional geologist from a list of up to three candidates proposed by each party. If the Parties cannot agree they shall submit the matter to the Court for the Court to select an appropriate independent professional geologist. Prior to the commencement of construction Defendants shall contract with the independent professional geologist to reasonably perform the work described in this Decree, and the costs of such work shall be borne by the Defendants.

In particular, Defendants shall layback and re-grade the north overburden slope to provide a stable slope no steeper than 2:1 (50% grade) and shall remove sufficient material to move the north toe of the slope at least 25 feet northward from its current location and elevation. In the immediate vicinity of Pond 4A and the associated interim and final treatment facilities, Defendants shall move the north toe of the slope at least 16 feet northward from its current location and elevation for a length of no more than 160 feet. Defendants shall establish an enlarged creek channel and flood plain as depicted in the Restoration Plan Drawings, the horizontal dimensions of which shall be determined by the extent of excavation within the "grading envelope." The course of the Creek shall follow exposed bedrock, and/or large boulders, cobbles, sands and gravels not sourced from limestone-containing mine wastes or

United States District Court
For the Northern District of California

overburden. Defendants shall either create a berm along both reaches at the toe of the north slope, parallel to the creek (but set-back above the 100-year flood high water line) or install other structures (*e.g.,* benches along the north slope) to prevent overburden and sediment from entering the Creek.

As depicted in the Restoration Plan Drawings, Defendants shall remove the relic concrete structure, and shall cut back a portion of what is referred to as the "old concrete crusher foundation," that currently resides, in part, within Permanente Creek, to match the natural direction and slope of the Creek, leaving a benign portion of the foundation buried within the Creek bank. Work on the "old concrete crusher foundation" will be performed using reasonable methods and equipment, including but not limited to small equipment with materials and spoils lowered and raised via a Constant Rate Descender or equivalent. Should Defendants encounter an unexpected condition while performing the required work on the "old concrete crusher foundation," which precludes completion of the work prescribed herein, Defendants shall meet and confer with Plaintiff regarding said condition. If the Parties are unable to agree upon the appropriate course of action, Defendants may invoke the dispute resolution provisions of this Decree.

36. Reaches 14-15-16. Defendants shall improve holding and rearing habitat for the resident trout population during summer low-flow periods and improve cover during high flows as follows. Defendants shall create four (4) woody debris installations within each Reach (for a total of 12 installations). Wood type, size, location and installation criteria for implementation of each installation shall comply with DFW and Regional Water Board permit or other approval requirements.

37. Reach 13. Defendants shall remove the dam infrastructure at Pond 13 and the associated impounded fine sediments. Within this area Defendants shall establish a new, enlarged creek channel that includes increased channel complexity and a restored flood plain with restored vegetation as depicted in the Restoration Plan Drawings, the horizontal dimensions of which shall be determined by the extent of excavation within the "grading envelope." Defendants shall provide for enhanced ecological function and resident trout passage consistent

United States District Court
For the Northern District of California

with a geomorphically stable, self-sustaining channel. Defendants shall follow the hydraulic design criteria in the DFW Restoration Manual unless such criteria cannot be met due to the gradient of the reach, or bedrock grade controls confirmed by the independent geologist, in which case the stream simulation criteria in the DFW Restoration Manual, revised as necessary with off-site analogs, shall apply.

Defendants shall reconstruct the channel at a lowered profile and alignment within the "grading envelope" as depicted in the Restoration Plan Drawings and incorporated Field Engineering Description. Defendants shall remove all material to the lower limit of the potential design channel invert shown in the Restoration Plan Drawings, subject to the criteria in the Field Engineering Description. If Defendants assert they have excavated to bedrock prior to reaching the lowest elevation at any location within the "grading envelope," an independent professional geologist will assess Defendants' assertion and make the final determination of the existence and extent of any such bedrock consistent with Paragraph 35 above. The course of the Creek shall follow exposed bedrock, and/or large boulders, cobbles, sands and gravels not sourced from limestone-containing mine wastes or overburden. A new, enlarged creek channel upstream of Pond 13 with consistent characteristics will be constructed as necessary to conform to the conditions depicted in the Restoration Plan Drawings.

38. Reaches 11-12. Defendants shall remove the half-culvert immediately downstream of Pond 13, including the removal of all artificial fill and metal structures within the valley floor in this Reach as generally depicted on the Restoration Plan Drawings. Defendants shall also remove the existing aggregate rock pile and associated rock pile infrastructure, all culverts, riprap, and the road on top of the creek (concrete ramp), and set back the road to provide more room for a natural streambed and banks. Defendants shall narrow the road and accompanying vehicle barrier to a reduced total width no greater than 20 feet at any point, measured from the toe of the inside slope to the top of the creek-side vehicle barrier. The vehicle barrier height shall not exceed two (2) feet, and the slope of the creek-side vehicle barrier shall be no steeper than 1.5h to 1v (67% slope). Runoff from the road shall be controlled pursuant to DFW and Regional Water Board requirements. Defendants shall establish an enlarged creek

United States District Court
For the Northern District of California

channel that contains the features set forth in the Restoration Plan Drawings, the horizontal dimensions of such channel shall be determined by the extent of excavation within the "grading envelope." Defendants shall provide for enhanced ecological function and resident trout passage consistent with a geomorphically stable, self-sustaining channel. Defendants shall follow the hydraulic design criteria in the DFW Restoration Manual unless such criteria cannot be met due to the gradient of the reaches, or bedrock grade controls confirmed by the independent geologist as described below, in which case the stream simulation criteria in the DFW Restoration Manual, revised as necessary with off-site analogs, shall apply.

Defendants shall reconstruct the channel at a lowered profile and alignment within the "grading envelope" as depicted in the Restoration Plan Drawings and incorporated Field Engineering Description. Defendants shall remove all material to the lower limit of the potential design channel invert shown in the Restoration Plan Drawings, subject to the criteria in the Field Engineering Description. If Defendants assert they have excavated to bedrock prior to reaching the lowest elevation at any location within the "grading envelope," an independent professional geologist will assess Defendants' assertion and make the final determination of the existence and extent of any such bedrock consistent with Paragraph 35 above. The course of the Creek shall follow exposed bedrock, and/or large boulders, cobbles, sands and gravels not sourced from limestone-containing mine wastes or overburden.

39. Reaches 8-9-10. Defendants shall improve channel stability and enhance ecological function throughout reaches 8, 9 and 10 by sufficiently setting back the road and associated slopes to provide more room for a natural streambed and banks as depicted in the Restoration Plan Drawings. Defendants shall narrow the road and accompanying vehicle barrier to a reduced total width no greater than 20 feet at any point, measured from the toe of the inside slope to the top of the creek-side vehicle barrier. The vehicle barrier height shall not exceed two (2) feet, and the slope of the creek-side vehicle barrier shall be no steeper than 1.5h to 1v (67% slope). Runoff from the road shall be controlled by DFW and Regional Water Board requirements. Defendants shall establish an enlarged creek channel that contains the features set forth in the Restoration Plan Drawings. Defendants shall provide for enhanced ecological

United States District Court
For the Northern District of California

function and resident trout passage through these reaches consistent with a geomorphically stable, self-sustaining channel. Defendants shall follow the hydraulic design criteria in the DFW Restoration Manual unless such criteria cannot be met due to the gradient of the reaches, or bedrock grade controls confirmed by the independent geologist as described herein, in which case the stream simulation criteria in the DFW Restoration Manual, revised as necessary with off-site analogs, shall apply.

Defendants shall remove the culverts identified as Culverts 7 and 9 in the Restoration Plan Drawings and restore the area with a naturalized channel as depicted in the Restoration Plan Drawings. With respect to fish passage, Defendants shall follow the hydraulic design criteria in the DFW Restoration Manual unless such criteria cannot be met due to the gradient of the reaches, or bedrock grade controls confirmed by the independent geologist as described herein, in which case the stream simulation criteria in the DFW Restoration Manual, revised as necessary with off-site analogs, shall apply.

Defendants shall remove the alluvial fan of gravel deposited on the floodplain located upstream of the culvert crossing as depicted in the Restoration Plan Drawings. Defendants shall remove the gravel from the channel and banks located in the ephemeral drainage from a storage area as depicted in the Restoration Plan Drawings and take all other necessary measures to prevent further mining-related sediment and material from reaching Permanente Creek in the future from this drainage. Defendants shall revegetate the floodplain and ephemeral channel with native vegetation.

40. Reaches 6-7. Defendants shall plant native riparian vegetation and trees on the southern bank along the concrete channelized portion of Permanente Creek to provide improved shading and reduce vegetation growth within the concrete channel, thereby improving sediment transport and enhancing fish passage.

41. Reaches 2-5. Nothing in this Amended Consent Decree is intended to preclude measures that Defendants may take in Reaches 2 - 5 to improve fish passage or make other Permanente Creek habitat improvements, or that other parties may take downstream therefrom.

United States District Court
For the Northern District of California

42. After completing the required restoration construction work in each reach, Defendants shall revegetate the Creek banks and disturbed areas with native vegetation including willows, alders, elderberries, blackberries, rushes, and sedges. Defendants shall incorporate willow fascines along the edges of banks and spillways where high bank shear stress is expected.

43. By no later than July 1, 2013, Defendants shall correctly and permanently stake all reach boundaries and stations identified herein at locations adjacent to the Creek that will not be disturbed by the restoration activities. The stakes shall be permanently labeled by applicable number and their location recorded using a professional "sub-foot" GPS. By no later than September 1, 2013, Defendants shall provide to Plaintiff a plan view topographic map (in hard copy and electronic format) showing the professional "sub-foot" GPS locations of all stakes, the current thalweg and bank slope toes of the Creek, and all other current features such as road dimensions and pond and culvert locations referred to in this Decree.

B. Permanente Creek Restoration Permitting and Performance Deadlines.

44. The Parties anticipate that approvals will be required prior to the implementation of the Creek restoration work required above, including but not limited to approvals from:

- U.S. Army Corps of Engineers (Section 404 permit)
- California Regional Water Quality Control Board, San Francisco Region (NPDES permits and Section 401 certification)
- California Department of Fish & Wildlife (Section 1602 Streambed Alteration Agreement, California Endangered Species Act permits, if necessary)
- U.S. Fish & Wildlife Service and National Marine Fisheries Service (Section 7 Endangered Species Act consultation)
- Santa Clara County (Reclamation Plan amendment and grading or other County-required permits)

Applicable environmental review processes (*e.g.*, CEQA and/or NEPA) must also be satisfied prior to proceeding with any creek restoration activities that require permits or approvals. The Parties agree to meet and confer to the extent any material change to a requirement in this Decree needs to be made in the course of the environmental analysis or permitting process. Any change to the Restoration Plan Drawings or associated text required in writing by any agency shall be

United States District Court
For the Northern District of California

incorporated automatically into this Decree. Any other changes to the Restoration Plan Drawings or associated text shall be not be effective unless approved by both Parties and incorporated into this Decree by stipulation or motion.

45. To ensure a timely permit application and approval process with respect to the creek restoration work required above, Defendants shall complete the tasks below by the following deadlines:

(a) June 1, 2013: Notify all pertinent agencies of all restoration requirements, design and permitting milestones, and anticipated transmittal of Conceptual Restoration Plan (30% design level) by October 7, 2013. Request agency meeting and/or meetings to be calendared in November 2013 through January 2014.

(b) September 10, 2013: Complete Conceptual Restoration Plan, submit to Plaintiff for review and comment.

(c) October 7, 2013: Submit Conceptual Restoration Plan to all pertinent agencies.

(d) November 2013 through January 2014: Participate in agency meetings regarding Conceptual Restoration Plan and permitting. To the extent one or more agency meetings do not take place by January 2014, the Parties shall meet and confer to determine whether subsequent deadlines can and should be modified. If the Parties cannot agree, then Defendants may invoke the dispute resolution provisions of this Decree.

(e) July 30, 2014: Complete Draft Restoration Plan (70% design level) and permit applications, submit to Plaintiff for review and comment.

(f) March 30, 2016: Submit Nationwide Permit Pre-construction Notification to the U.S. Army Corps of Engineers under Section 404 of the federal Clean Water Act (33 U.S.C. § 1344). The Parties understand that the Army Corps of Engineers has confirmed that a Nationwide Permit is appropriate for this restoration project.

(g) April 29, 2016: Submit Notice of Preparation and Initial Study to the County of Santa Clara for environmental review of the restoration project under the California Environmental Quality Act ("CEQA").

(h) Within sixty (60) days of certification of environmental review by the County of

United States District Court
For the Northern District of California

Santa Clara under CEQA, submit all necessary permit and approval applications to appropriate governmental agencies (*e.g.*, Army Corps of Engineers, Santa Clara County, DFW, California Regional Water Quality Control Board, San Francisco Region). This submission shall include all conditions reasonably calculated to be necessary to secure approval.

46. Defendants shall complete all restoration work within five (5) consecutive construction seasons immediately after receipt of all necessary permits and approvals (*e.g.*, if all permits and approvals are received by December 2017, the work must be completed by December 2022), provided that if any condition of any permit or approval requires a shorter or longer timeframe for completion of all the restoration work, the Parties shall request a modification of the deadline set forth in this paragraph accordingly. Defendants shall notify Plaintiff within seven days of receipt of all such permits and approvals, whereafter the Parties shall have 30 days in which to identify and mutually agree on an independent professional geologist as set forth in Paragraph 35. If on the 30th day the Parties have not reached an agreement, within ten days of such date the Parties shall submit the matter to the Court for the Court to select an appropriate independent professional geologist. In addition, within thirty (30) days of receipt of all such permits and approvals, Defendants shall provide Plaintiff with a schedule that describes the commencement and completion dates for all restoration activities in each Reach for each construction season.

47. This Decree shall not relieve Defendants of their obligation to comply with all applicable federal, state and local laws, regulations and permits. To the extent there is any conflict between any provision in this decree and any other applicable requirement, the most stringent requirement shall apply.

C. Alternative Permanente Creek Restoration.

48. Should any regulatory agency not provide one or more legally necessary approvals to conduct the actions specified in Section VI.A., or place one or more unexpected conditions on the approval of any given action, Paragraphs 49 - 52 shall apply.

49. For purposes of this Section, "unexpected conditions" shall mean: (i) one or more conditions placed by a regulatory agency on the approval to undertake a creek restoration activity

United States District Court
For the Northern District of California

in addition to the conditions specified in Paragraph 45(h), (ii) such conditions exceed the costs specified in subparagraph (b) below, and (iii) Defendants are unwilling to expend the additional costs of such conditions.

(a) For purposes of this Section, the total estimated cost to Defendants of the Permanente Creek restoration project is approximately ten (10) million dollars in 2013 dollars. This estimated cost shall be adjusted annually consistent with the Engineering News-Record construction cost index for the Bay Area or, if unavailable, an equivalent cost index. The Parties agree that the estimated total cost of the project is projected to be allocated within the Reaches of Permanente Creek as follows:

Reaches 6 – 7: Three percent (3%) of total project cost

Reaches 8 – 13: Fifty-seven percent (57%) of total project cost

Reaches 14 - 21: Forty percent (40%) of total project cost

(b) Unexpected conditions occur if the cost of the conditions of approval exceed the following amounts:[1]

Reaches 6 – 7: Conditions cause the cost of creek restoration actions in these reaches to exceed ten percent (10%) of the total project cost, as adjusted.

Reaches 8 – 13: Conditions cause the cost of creek restoration actions to exceed the total project cost by twenty percent (20%) of the total estimated cost, as adjusted.

Reaches 14 – 21: Conditions cause the value of creek restoration actions to exceed the total project cost by twenty percent (20%) of the total estimated cost, as adjusted.

50. For purposes of this Section, if Defendants believe any unexpected conditions will be or have been placed upon the approval or authorization to undertake one or more Creek restoration activities, Defendants shall notify Plaintiff within thirty (30) days of becoming aware of such unexpected conditions. The Parties shall meet and confer regarding any unexpected conditions.

[1] These percentages were derived by multiplying the allocated percentage by reach group times fifty percent. Thus, for Reaches 8-13, 57% allocation x 50% cost buffer = 28.5% of the total estimated cost of the restoration project.

United States District Court
For the Northern District of California

51. In the event any unexpected conditions become final, within thirty (30) days of such event, Defendants shall notify Plaintiff and provide Plaintiff with a written demonstration explaining why the conditions are unexpected. The Parties shall meet and confer within fourteen (14) days of such notice. If Plaintiff does not agree that unexpected conditions have been imposed, Defendants may invoke the dispute resolution provisions of this Decree. If Plaintiff agrees unexpected conditions have been imposed, the Parties may stipulate to an alternative method of achieving the purposes of this Decree and present it to the Court for approval. Otherwise, without a stipulated agreement, and in lieu of implementing the relevant Creek restoration actions required by this Decree, for the affected reaches, Defendants shall pay the value of the project cost specified in Paragraph 49(a) above, plus the additional value specified in Paragraph 49(b) above, as follows: Defendants shall pay the funds to the Rose Foundation for Communities and the Environment ("Rose Foundation"), 1970 Broadway, Suite 600, Oakland, California 94612, to be held in a separate Permanente Creek restoration account. Such funds shall be subject to the condition that they only be distributed by the Rose Foundation after a competitive application process, and that such funds, after satisfying any Rose Foundation administrative costs,[2] shall only be used for the purpose of Permanente Creek restoration, unless such restoration activity is unavailable, in which case, the funds shall be used for other local watershed restoration projects, including those on Stevens Creek.

52. In the event any regulatory agency does not provide a legally necessary approval to conduct an action specified in Section VI.A, either by actual notice or constructively through inaction, the Parties shall meet and confer within fourteen (14) days of such event or extended period of inaction. If Plaintiff disagrees that a necessary approval has not been provided, Defendants may invoke the dispute resolution provisions of this Decree. If Plaintiff agrees that a

[2] Rose Foundation administrative costs shall not exceed the following amounts: for funds paid of $500,000 or less, administrative costs shall not exceed ten percent of the total funds paid; for funds greater than $500,000 but no more than $1,500,000, administrative costs shall not exceed eight percent of the total funds paid; for funds greater than $1,500,000 but no more than $3,000,000, administrative costs shall not exceed seven percent of the total funds paid; and for funds greater than $3,000,000, administrative costs shall not exceed six percent of the total funds paid.

United States District Court
For the Northern District of California

necessary approval has not been provided, the Parties may stipulate to an alternative method of achieving the purposes of this Decree and present it to the Court for approval. Otherwise, without a stipulated agreement, and in lieu of implementing the relevant creek restoration actions required by this Decree, for the affected reaches, Defendants shall pay the value of the project cost specified in Paragraph 49(a) above, plus the additional value specified in Paragraph 49(b) above, to the Rose Foundation in the same manner and for the same purposes as specified in Paragraph 51 above.

VII. REPORTING REQUIREMENTS

53. All reports shall be submitted to the persons designated in Paragraph 96 of this Decree.

54. The reporting requirements of this Decree do not relieve Defendants of any reporting obligation required by the CWA or its implementing regulations, or by any other federal, state or local law, regulation, permit or other requirement.

55. Any information provided pursuant to this Decree may be used by Plaintiff in any proceeding to enforce the provisions of this Decree and as otherwise permitted by law.

VIII. SITE INSPECTIONS

56. Defendants shall provide access to Plaintiff to inspect the interim and final treatment systems and related facilities, and to Permanente Creek and adjacent lands, at such intervals and times sufficient for Plaintiff to assess compliance with the terms of this Decree. At a minimum, access shall be provided to Plaintiff to inspect the interim and final treatment systems during construction and within six (6) months of the completion of construction of such systems. At a minimum, access shall also be provided to Plaintiff to inspect any Creek restoration work within five (5) days of the commencement of work in any Reach, at thirty (30) day intervals during restoration work in any Reach, and within six (6) months of the completion of any work in any Reach.

57. Plaintiff shall provide Defendants written notice of the date of any requested inspection at least five (5) days in advance of any inspection, and the requested inspection shall take place on that date unless Defendants propose a different date in which case the Parties shall

meet and confer to determine the best date for an inspection within a period no greater than fourteen (14) days after Plaintiff's notice.

IX. STIPULATED PENALTIES

58. In any calendar month in which Defendants violate any provision of this Decree, Defendants shall pay all accrued stipulated penalties to the Rose Foundation as specified in Paragraph 61 below within ten (10) days after the end of such month, without written demand from Plaintiff, except for penalties due under Paragraph 59(d). Stipulated penalties due under Paragraph 59(d) shall be due and payable to the Rose Foundation within 25 months of the violation if mandatory minimum penalties have not been paid to the State of California for the same violation. To the extent Defendants believe their non-compliance is due to a force majeure event, the funds shall be paid into an escrow account until such issue is resolved.

59. Defendants shall pay stipulated penalties for each failure to comply with the interim and final treatment system terms of this Decree as follows:

(a) For each failure to meet the obligation to install and operate the interim treatment system after October 1, 2014, as specified in Section V, Paragraph 16, per violation per day:

(1) 1st through 30th day after deadline - $1,000/day

(2) 31st through 60th day after deadline - $2,000/day

(3) Beyond 60th day - $5,000/day

(b) For each failure to meet the obligations to install and operate the final treatment system after September 30, 2017, as specified in Section V, Paragraph 27, per violation per day:

(1) 1st through 30th day after deadline - $1,000/day

(2) 31st through 60th day after deadline - $2,000/day

(3) Beyond 60th day - $5,000/day

(c) For each failure to comply with any interim discharge limit in Paragraph 17, $3,000 per violation per week up to fifteen weeks, and $10,000 per week after the fifteenth week, and for each failure to comply with any interim discharge limit in Paragraph 23 of this Decree, $3,000 per violation per day;

(d) For each failure to comply with any discharge (effluent) limit set forth in the NPDES

United States District Court
For the Northern District of California

United States District Court
For the Northern District of California

Permit applicable to the final treatment system, $3,000 per violation per day unless mandatory minimum penalties of the same or greater amounts for the same discharge limit are paid by Defendants to the State of California within 24 months of the violation.

60. Defendants shall pay stipulated penalties for each failure to comply with the stream restoration terms of this Decree as follows:

(a) For each day that Defendants fail to submit all necessary permit and approval applications to all appropriate agencies pursuant to Paragraph 45(h).

(1) 1st through 30th day after deadline - $1,000/day

(2) 31st through 60th day after deadline - $2,000/day

(3) Beyond 60th day - $5,000/day

(b) For each day that Defendants fail to complete the restoration work described in Section VI within the time period required by this Amended Decree or in any applicable permit or approval:

(1) 1st through 30th day after deadline - $1,000/day

(2) 31st through 60th day after deadline - $2,000/day

(3) Beyond 60th day - $5,000/day

61. Defendants shall pay the stipulated penalty funds to the Rose Foundation in the same manner and for the same purposes as specified in Paragraph 51 above.

62. During any period of dispute resolution where a stipulated penalty may run, Defendants may request that the Court reduce or eliminate any such penalty that accrued during the dispute resolution period if the Court deems that, although Defendants did not prevail in the dispute, the Defendants pursued the dispute in good faith and not for purposes of delay.

63. Stipulated penalties are not the Plaintiff's exclusive remedy for violations of this Decree. Plaintiff reserves its right to pursue any other remedies to which it is entitled, which may include, but are not limited to, additional injunctive relief or statutory penalties for Defendants' violations of the Decree or the Clean Water Act. The obligation to pay stipulated penalties under this Decree shall not relieve Defendants from any obligation to pay penalties for violations of any term or condition of any permit issued under the Act, including any NPDES

United States District Court
For the Northern District of California

permit. Any amounts paid by Defendants as stipulated penalties may be asserted by Defendants in response to any action requesting the imposition of additional civil penalties.

X. PERFORMANCE GUARANTEE

64. In order to ensure the full and final completion of the Work required in Section VI, Defendants shall establish and maintain an irrevocable performance guarantee, initially in the amount of $12 million, to ensure the completion of such Work after issuance of a Work Takeover Notice and determination of Work Takeover as provided for below. The performance guarantee shall state it is for the exclusive benefit of the U.S. District Court, Northern District, to fund the actions required by Section VI of this Decree, immediately upon issuance of Plaintiff's Work Takeover determination.

65. The Parties agree that the irrevocable surety bond set forth in Exhibit D, is an acceptable form of performance guarantee for the Work to be performed as required in Section VI.

66. Within ten (10) days of entry of this Decree, Defendants shall execute or otherwise finalize all instruments and other documents required in order to make the selected performance guarantee(s) legally binding in a form substantially identical to the documents attached hereto as Exhibit D, and such performance guarantee(s) shall thereupon be fully effective.

67. In the event that Plaintiff determines at any time that a performance guarantee provided by Defendants pursuant to this Section is no longer sufficient, whether due to an increase in the estimated cost of completing the Work required in Section VI or for any other reason, or in the event that Defendants become aware of information indicating that the performance guarantee is insufficient, whether due to an increase in the estimated cost of completing the Work required or for any other reason, Defendants, within thirty (30) days after receipt of notice of Plaintiff's determination or, as the case may be, within thirty (30) days after any Defendant becoming aware of such information, shall obtain and present to Plaintiff for approval a proposal for a revised performance guarantee. Within thirty (30) days after receiving Defendants' revised performance guarantee proposal, or within sixty (60) days after Plaintiff's

United States District Court
For the Northern District of California

insufficiency determination notice, Plaintiff shall provide to Defendants its determination of the additional amount of performance guarantee that is necessary to ensure completion of the Work required by Section VI. Defendants may dispute this determination pursuant to the dispute resolution provisions of this Decree, but only after they have provided the additional amount of performance guarantee consistent with Plaintiff's insufficiency determination.

68. In the event Plaintiff determines that Defendants have (1) ceased implementation of any portion of the Work, or (2) are seriously or repeatedly deficient or late in their performance of the Work, Plaintiff may issue a written notice ("Work Takeover Notice") to Defendants. Any Work Takeover Notice issued by Plaintiff will specify the grounds upon which such notice was issued and will provide Defendants a period of ten (10) days within which to cure the circumstances giving rise to Plaintiff's issuance of such notice. Within five (5) days of receipt of a Work Takeover Notice, Defendants shall establish the Permanente Creek Restoration escrow account to which performance guarantee funds shall be deposited if a Work Takeover is determined as described in Paragraph 69. Funds deposited into the Permanente Creek Restoration escrow account shall be accessible by the Court-appointed trustee described in Paragraph 69.

69. If, after expiration of the ten-day cure period specified above, Defendants have not remedied to Plaintiff's satisfaction the circumstances giving rise to Plaintiff's issuance of the relevant Work Takeover Notice, Plaintiff may at any time thereafter notify the Court, Defendants, and Defendants' Guarantor in writing (which writing may be electronic) that all or any portion(s) of the Work will be completed with performance guarantee funds ("Work Takeover"). Within fourteen (14) days of such notice to the Court, Defendants, and Defendants' Guarantor, Defendants' Guarantor shall convey all funds held as a performance guarantee to the Permanente Creek Restoration escrow account. Plaintiff shall provide to the Court the names of three (3) potential trustees from which the Court may select one trustee to take all necessary measures to complete the unfinished Work required by Section VI of this Decree using the performance guarantee funds deposited in the Permanente Creek Restoration escrow account.

United States District Court
For the Northern District of California

70. If Plaintiff triggers a Work Takeover, and actions are undertaken to complete the Work required in Section VI, the Defendants fully release Plaintiff, any Court-appointed trustee, any independent contractor, and any of their respective officers, employees, agents, successors, or assigns from any and all claims and demands, either at law or in equity, as to the sufficiency of actions taken to complete the Work required in Section VI.

71. When Defendants believe they have completed all Work required by this Decree, they may notify Plaintiff of their determination, which determination shall include sufficient evidence of such completion. If Defendants receive written notice from Plaintiff that the Work has been fully and finally completed in accordance with the terms of this Consent Decree, Defendants may thereafter release, cancel, or discontinue the performance guarantee. Only after Plaintiff provides such notice may Defendants release, cancel, or discontinue any performance guarantee. In the event of a dispute, Defendants may release, cancel, or discontinue the performance guarantee(s) required hereunder only in accordance with a final judicial decision resolving such dispute pursuant to the dispute resolution provisions of this Decree.

XI. FORCE MAJEURE

72. For the purposes of this Decree, a "force majeure event" is defined as any event arising from causes beyond the reasonable control of Defendants or any entity controlled by Defendants (including, without limitation, Defendants' contractors and subcontractors, and any entity in active participation or concert with Defendants with respect to the obligations to be undertaken by the Defendants pursuant to this Decree), that delays or prevents or can reasonably be anticipated to delay or prevent compliance with the obligations of this Decree, despite Defendants' best efforts to meet such deadlines. The requirement that Defendants exercise "best efforts" to meet the deadlines includes using best efforts to avoid any force majeure event before it occurs, and to use best efforts to mitigate the effects of any force majeure event as it is occurring, and after it has occurred, such that any delay is minimized to the greatest extent possible.

United States District Court
For the Northern District of California

73. Without limitation, unanticipated or increased costs or changed financial circumstances shall not constitute a force majeure event. The absence of any regulatory approval shall not constitute a force majeure event, unless Defendants demonstrate that, as appropriate to the approval: (a) they made timely and complete applications for such approval(s) to meet the deadlines set forth in Sections V and VI of this Decree; (b) they reasonably complied with all requirements to obtain such approval(s); (c) they diligently sought such approval, (d) they diligently and timely responded to all requests for additional information, and (e) without such approval, Defendants will be required to act in violation of law to meet one or more of the obligations set forth in this Decree.

74. If any event occurs which causes or may cause a delay by Defendants in meeting any deadline in this Decree, whether or not attributable to a force majeure event, Defendants shall notify Plaintiff in writing within ten (10) days of the time Defendants first knew, or within thirty (30) days of when Defendants reasonably should have known that the event is likely to cause a delay. Defendants shall be deemed to have notice of any circumstance of which its contractors or subcontractors had or reasonably should have had notice, provided that those contractors or subcontractors were retained by Defendants to implement, in whole or in part, the requirements of this Decree. Within fifteen (15) days thereafter, Defendants shall provide in writing to Plaintiff a report containing: (a) an explanation and description of the reasons for the delay; (b) the anticipated length of the delay; (c) a description of the activity(ies) that will be delayed; (d) all actions taken and to be taken to prevent or minimize the delay; (e) a timetable by which those measures will be implemented; and (f) a schedule that fully describes when Defendants propose to meet any deadlines in this Decree which have been or will be affected by the claimed force majeure event. Defendants shall include with any notice their rationale and all available documentation supporting its claim that the delay was or will be attributable to a force majeure event.

75. If Plaintiff agrees that the delay has been or will be caused by a force majeure event, the Parties may stipulate to an extension of the deadline for the affected activity(ies) as is necessary to complete the activity(ies). Plaintiff shall take into consideration, in establishing any

new deadline(s), evidence presented by Defendants relating to weather, outage schedules and remobilization requirements. In the event the Parties cannot agree to the length of the extension, Defendants may invoke the dispute resolution procedures set forth in this Decree. Notwithstanding the foregoing, if Plaintiff finds that a force majeure event may delay Defendants' compliance with the terms of this Decree for more than six (6) months, Plaintiff may seek further relief from the Court to fulfill the purposes of this Decree.

76. If Plaintiff does not agree that the delay or anticipated delay has been or will be caused by a force majeure event, it will notify Defendants in writing of this decision within twenty (20) days after receiving Defendants' report alleging a force majeure event, and will not extend the deadline for any activity identified in this Decree. If Defendants seek review of this decision, the matter shall be resolved through the dispute resolution procedures set forth in this Decree.

77. At all times, Defendants shall have the burden of proving that any delay was caused by a force majeure event (including proving that Defendants had given proper notice and had made "best efforts" to avoid and/or mitigate such event), and of proving the duration and extent of any delay(s) attributable to such event.

78. Failure by Defendants to fulfill in any way the notification and reporting requirements of this Section shall constitute a waiver of any claim of a force majeure event as to which proper notice and reporting was not provided.

79. Any extension of one deadline based on a particular incident does not necessarily constitute an extension of any subsequent deadline(s) unless agreed to by the Parties or directed by this Court.

80. If Defendants fail to perform an activity by a deadline in this Decree due to a force majeure event, Defendants may only be excused from performing that activity or activities, and paying stipulated penalties for such failure, for that period of time excused by the force majeure event.

United States District Court
For the Northern District of California

XII. DISPUTE RESOLUTION

81. Plaintiff and Defendants may invoke the dispute resolution procedures of this Section to the extent provided for in this Decree. The dispute resolution procedures of this Section shall be the exclusive mechanism to resolve such disputes with respect to such provisions of this Decree.

82. To invoke dispute resolution, a Party must provide written notice to the other party within thirty (30) days of the occurrence of the disputable event. The notice shall include all reasons the Party has for raising the disputed issue. Within thirty (30) days of receiving written notification, the other Party shall provide a written response and the Parties shall thereafter meet and confer within ten (10) days of such response. Failure of any party to fulfill this notification or response requirement shall constitute a waiver of the Party's right to dispute the issue(s).

83. If the Parties cannot resolve a dispute within fifteen (15) days of the Parties' meet and confer process above, the disputed issue shall be deemed to have been withdrawn unless the Party that raised the dispute files a petition or application with the Court to have the Court resolve the issue. Such petition or application shall include a description of the matter in dispute (but shall only rely on matters previously disclosed in writing in the dispute resolution process, unless information that was unavailable at the time of the filing of the initial dispute has come to light), the efforts made by the Parties to resolve it, the relief requested, and the schedule, if any, within which the dispute must be resolved to ensure orderly implementation of this Decree. The other Party shall have thirty (30) days from receipt of any petition or application to file a response.

84. In judicial proceedings on any dispute under this Section, the disputing Party shall carry the burdens of proof and persuasion.

85. The invocation of dispute resolution procedures under this Section shall not extend, postpone or affect in any way any obligation under this Decree not directly in dispute, unless the other Party or the Court agrees otherwise. Stipulated penalties with respect to the disputed matter shall continue to accrue, but payment shall be stayed pending resolution of the

dispute as provided in this Section. Notwithstanding the stay of payment, stipulated penalties shall accrue from the first day of noncompliance with any applicable provision of this Decree until or unless no violation is established. In the event that the Defendants do not prevail on the disputed issue, stipulated penalties shall be assessed and paid as provided in Section IX.

86. If Defendants' invoke the dispute resolution provisions of this Decree, Defendants shall pay Plaintiff's costs if Plaintiff substantially prevails, including reasonable attorney and expert witness fees, associated with such dispute.

XIII. FEES AND COSTS

87. Defendants agree that, pursuant to Section 505(d) of the Clean Water Act, 33 U.S.C. §1365(d), Plaintiff is both eligible and entitled to recover its reasonable costs of litigation in this action, including attorney and expert witness fees. Defendants and Plaintiff have resolved payment of Plaintiff's reasonable costs of litigation in this action through August 12, 2013. Plaintiff expressly reserves its right to petition the Court for recovery of additional costs and fees incurred after it signs this Amended Decree, and Defendants reserve their right to oppose any such petition.

XIV. MUTUAL RELEASE AND COVENANT NOT TO SUE

88. This Decree constitutes a complete and final release of all civil claims for violations alleged in the Complaint through the effective date of this Decree.

89. Nothing in this Decree shall be construed to create any rights in or grant any cause of action to any person not a Party to this Decree. The preceding sentence shall not be construed to waive or nullify any rights that a person not a signatory to this Decree may have under applicable law, including any regulatory agency with jurisdiction over Defendant's activities at the Facility. Plaintiff expressly reserve all rights, defenses, claims, demands, and causes of action that it might have against Defendants with respect to any matter, transaction, or occurrence relating to the Facility that is not addressed in this Decree. Defendants expressly reserve all rights and defenses that they may have to any claim, demand, or cause of action relating to the Facility that is not addressed in this Decree. The Parties expressly reserve all

United States District Court
For the Northern District of California

United States District Court
For the Northern District of California

rights, defenses, claims, demands, and causes of action which each Party may have against any person not a Party to this Decree with respect to any matter, transaction, or occurrence relating to the Facility. Nothing in this Decree shall be construed as a waiver of any privilege by a Party.

90. For the duration of this Decree, Plaintiff covenants not to sue Defendants, their officers, employees, agents, successors, or assigns for matters alleged in the Complaint. Nothing herein shall prevent Plaintiff from seeking any legal or equitable remedy to enforce the requirements of this Decree. This covenant not to sue does not pertain to any matters not alleged in the Complaint.

91. This Decree shall not be used to establish the liability of Defendants in any action, except to enforce the provisions of this Decree.

XV. MISCELLANEOUS PROVISIONS

92. **Severability.** In the event that any one of the provisions of this Decree is held by a Court to be unenforceable, the validity of the enforceable provisions shall not be adversely affected.

93. **Construction.** The language in all parts of this Decree, unless otherwise stated, shall be construed according to its plain and ordinary meaning.

94. **Choice of Law.** This Decree shall be governed by the laws of the United States.

95. **Third Party Beneficiary.** This Decree and its attachments are made for the sole benefit of the Parties, and no other person or entity shall have any rights or remedies under or by reason of this Decree unless otherwise expressly provided for therein.

96. **Notices.** Any notices or documents required or provided for by this Decree shall be sent by U.S. Mail, postage prepaid, and addressed as follows or, in the alternative, shall be sent by electronic mail transmission to the email addresses listed below:

For Plaintiff Sierra Club:

Reed Zars
Attorney at Law
910 Kearney Street
Laramie, Wyoming 82070
Tel: (307) 745-7979
E-mail: reed@zarslaw.com

George E. Hays
Attorney at Law
236 West Portal Avenue #110
San Francisco, CA 94127
Tel: (415) 566-5414
E-mail: georgehays@mindspring.com

For Defendants:

Kari Saragusa, President, Region West
Greg Knapp, Director Environmental Region West
Lehigh Hanson, Inc.
12667 Alcosta Blvd., Suite 400
San Ramon, CA 94583
Tel: (925) 244-6500
Email: KSaragusa@lehighcement.com
Email: Greg.Knapp@hanson.biz

With copies sent to:

Ana N. Damonte
Regional Counsel
Lehigh Hanson, Inc.
12667 Alcosta Blvd, Suite 400
San Ramon, CA 94583
Tel: (925) 244-6542
Email: Ana.Damonte@LehighHanson.com

Nicole E. Granquist
Downey Brand LLP
621 Capitol Mall, 18th Floor
Sacramento, CA 95814-4601
Tel: 916-444-1000
E-mail: ngranquist@downeybrand.com

Each Party shall promptly notify the other of any change in the above-listed contact information.

97. **Termination of Decree.** This Decree shall remain an enforceable order of the Court until Plaintiff agrees, or the Court determines in response to a petition by Defendants, that (a) Defendants have satisfied in full all requirements of this Decree, (b) Defendants have installed all treatment systems and have demonstrated compliance with all applicable NPDES permit limits for at least twelve (12) consecutive months, (c) Defendants have completed all required creek restoration work, and (d) Defendants have paid any stipulated penalties due under this Decree.

98. **Negotiated Agreement.** This Decree shall be deemed to have been drafted equally by the Parties, and shall not be interpreted for or against any Party on the ground that any such party drafted it.

99. **Full Settlement.** This Decree constitutes a full and final settlement of this matter. The Parties expressly understand and agree that each Party has freely and voluntarily entered into this Decree with and upon advice of counsel.

100. **Integration Clause.** This Decree and the attachments contain all of the final terms and conditions agreed upon by the Parties relating to the matters covered by the Decree, and supersede any and all prior and contemporaneous agreements, negotiations, correspondence, understandings, and communications of the Parties, whether oral or written, respecting the matters covered by this Decree.

101. **Modification.** This Decree may be amended or modified only by a writing signed by the Parties or their authorized representatives, and then by order of the Court.

102. **Counterparts.** The Decree may be executed in one or more counterparts which, taken together, shall be deemed to constitute one and the same document. An executed copy of this Decree shall be valid as an original.

103. **Authority.** The undersigned representatives of Plaintiff and Defendants are authorized to execute this Decree on behalf of the Party or Parties whom he/she represents.

104. **Electronic or Facsimile Signatures.** Telecopy, pdf, and/or facsimile copies of original signatures shall be deemed to be originally executed.

XVI. NOTICE OF AMENDED DECREE

105. Pursuant to 33 U.S.C. § 1365(c)(3) and 40 C.F.R. § 135.5, this Decree shall be lodged with the Court and simultaneously presented to the United States for review and comment for a period not to exceed forty-five (45) days.

106. After the review period, the Decree may be entered by the Court. If the Decree is not entered by the Court, the Parties shall retain all rights they had in this litigation before the lodging of the Decree.

United States District Court
For the Northern District of California

107. The Parties agree to cooperate in good faith to obtain prompt review of this Decree by the United States and the Court. If the United States or the Court comment on the Decree, and as a consequence the Decree is not entered, the Parties agree to discuss such comments and attempt to make such revisions as necessary to obtain entry of the Decree.

XVII. FINAL JUDGMENT

108. Upon approval and entry of this Decree by the Court, this Decree shall constitute a final judgment between the Plaintiff and Defendants.

SO ORDERED, THIS 11th **DAY OF** May**, 2016.**

UNITED STATES ~~DISTRICT COURT~~ JUDGE
MAGISTRATE
HOWARD R. LLOYD

United States District Court
For the Northern District of California

FOR PLAINTIFF:

Sierra Club Representative

February 9, 2016
Dated

Approved as to form:

Reed Zars
Attorney at Law
910 Kearney Street
Laramie, Wyoming 82070
Tel: (307) 745-7979
E-mail: reed@zarslaw.com

2/9/2016
Dated

George E. Hays
Attorney at Law
236 West Portal Avenue, #110
San Francisco, CA 94127
Tel: (415) 566-5414
E-mail: georgehays@mindspring.com

2/9/2016
Dated

United States District Court
Northern

FOR DEFENDANTS:

Kari Saragusa, President, Region West
Lehigh Hanson, Inc.
12667 Alcosta Blvd., Suite 400
San Ramon, CA 94583
Tel: (925) 244-6500
Email: KSaragusa@lehighcement.com

Dated

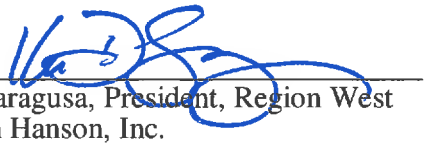
Approved as to form:

Nicole E. Granquist
Downey Brand LLP
621 Capitol Mall, 18th Floor
Sacramento, CA 95814-4601
Tel: 916-444-1000
E-mail: ngranquist@downeybrand.com

February 19, 2016
Dated

United States District Court
For the Northern District of California

FOR DEFENDANTS:



February 19th, 2016

Kari Saragusa, President, Region West
Lehigh Hanson, Inc.
12667 Alcosta Blvd., Suite 400
San Ramon, CA 94583
Tel: (925) 244-6500
Email: KSaragusa@lehighcement.com

Dated

Approved as to form:

Nicole E. Granquist
Downey Brand LLP
621 Capitol Mall, 18th Floor
Sacramento, CA 95814-4601
Tel: 916-444-1000
E-mail: ngranquist@downeybrand.com

Dated

United States District Court
For the Northern District of California

EXHIBITS To Amended Consent Decree

Sierra Club v. Lehigh Southwest Cement, 5:11-cv-06392-HRL

Exhibit A: California Department of Fish & Wildlife's California Salmonid Stream Habitat Restoration Manual, 4th Edition (Vols. One and Two, 2010) (cover page and table of contents only attached here, due to size constraints; complete document available on date of lodging at: http://www.dfg.ca.gov/fish/resources/habitatmanual.asp).

Exhibit B: Field Engineering Description dated February 1, 2016.

Exhibit C: Waterways Permanente Creek Restoration Plan, April 27, 2015 Draft 70% Design Submittal drawings.

Exhibit D: Irrevocable surety bond.

United States District Court
For the Northern District of California

Exhibit A

CALIFORNIA SALMONID STREAM HABITAT RESTORATION MANUAL

FOURTH EDITION

Prepared by:

GARY FLOSI, SCOTT DOWNIE, JAMES HOPELAIN,

MICHAEL BIRD, ROBERT COEY, and BARRY COLLINS

State of California
The Resources Agency
California Department of Fish and Game
Wildlife and Fisheries Division

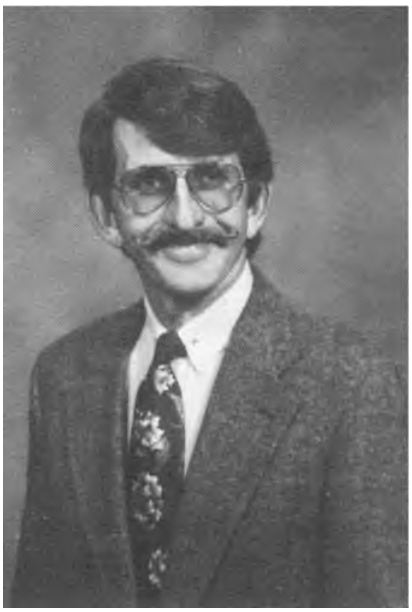
CALIFORNIA SALMONID STREAM HABITAT RESTORATION MANUAL

DEDICATION

to

Tim Curtis

1944 - 1996



The authors of the third edition of the ***California Salmonid Stream Habitat Restoration Manual*** wish to dedicate their work to **Tim Curtis**. Tim served with distinction with the California Department of Fish and Game as a fishery biologist, program supervisor, and patient mentor from 1971 to 1996. He was a pioneer in the Department=s modern salmonid habitat restoration program and a contributing author to the second edition of this manual. Tim died much too young at age fifty-one, October 19, 1996, after a courageous battle with brain cancer.

> Tim was a friend and motivational guide to all he came near. Although his life was brief he left his creative, inspirational mark on many. The third edition of this manual is part of his living legacy passed on through the present authors, and as such will continue to help improve the health of a resource he loved: the salmon and steelhead of California.

CALIFORNIA SALMONID STREAM HABITAT RESTORATION MANUAL

PREFACE

The first edition of this manual, written by Gary Flosi and Forrest Reynolds, and published in 1991, formally synthesized and described the Department of Fish and Game's approach and technical methods for anadromous salmonid habitat restoration. From 1991 through 1994 the first edition was broadly distributed and used as a "standard methods" text by many habitat restoration and resource inventory workers. As a result, many suggestions for improvement of the manual were received by the authors.

The second edition, by Flosi and Reynolds was supported by a team that included the authors of this third edition, and was published in October of 1994. The second edition included a number of revisions: 1) a reorganization of sections for project planning and project implementation; 2) the just then recently revised stream channel classification system developed by David Rosgen; 3) a new monitoring and evaluation section; 4) a listing of all databases used for resource inventory and analysis as presented in the manual; 5) a protocol for a large woody debris inventory; 6) a description of required environmental review processes and permits; 7) an expanded and updated listing of sensitive species; and 8) numerous editorial changes to text and data forms.

The third edition, like the second, incorporates changes recently developed in the practice of stream habitat inventory and restoration. The authorship list has changed with this edition to more accurately reflect the contributions of the writing team members. The manual is presented in binder form in this edition to more easily and economically incorporate future additions and developments as they evolve.

This fourth edition incorporates all changes, corrections, and revisions of this manual up to July 2010. The manual continues in binder form in this edition to easily and economically incorporate future additions and developments as they evolve.

The authors anticipate the continued widespread distribution and use of this manual will promote the implementation of the restoration techniques discussed. Additionally, in an effort to develop common methods for data collection and data storage of information, the authors encourage all anadromous salmonid resource assessment professionals to utilize protocols and database structures presented in this manual.

Readers should also be aware that computer data entry and data summary programs are available upon request for all data collection protocols presented in this manual. Updates to this manual are available on line at http://www.dfg.ca.gov/fish/Resources/HabitatManual.asp.

CALIFORNIA SALMONID STREAM HABITAT RESTORATION MANUAL

TABLE OF CONTENTS

VOLUME I

PREFACE ii

ACKNOWLEDGEMENTS xvii

FOREWORD xviii

PART I. SALMON AND STEELHEAD HABITAT RESTORATION IN CALIFORNIA
DEVELOPMENT OF CALIFORNIA'S FISH HABITAT RESTORATION PROGRAM I-1
ORGANIZATION AND FUNDING OF CALIFORNIA'S FISH HABITAT RESTORATION PROGRAM I-3
FISHERY RESTORATION PLANNING OBJECTIVES I-4

PART II. PRELIMINARY WATERSHED ASSESSMENT
PRELIMINARY WATERSHED ASSESSMENT II-1
WATERSHED OVERVIEW II-1
Tools and Supplies II-2
Instruction for Completing the Watershed Overview Work Sheet II-2
WATERSHED OVERVIEW WORK SHEET II-7
MAPS AND THEIR USE II-8
AERIAL PHOTO INTERPRETATION: HISTORICAL SEQUENCE II-9
HISTORICAL STREAM SURVEY REVIEW II-10
WATER II-10
RIPARIAN ZONE II-11
SEDIMENT SOURCES II-12
Mass Wasting II-13
Surface Erosion II-13
Stream and Channel Erosion II-14
HYDROGRAPHS II-14
REFERENCES II-17

PART III. HABITAT INVENTORY METHODS
HABITAT INVENTORY METHODS III-1
HABITAT INVENTORY FIELD PREPARATION III-1
Tools and Supplies Needed for Two Person Crew III-2
STREAM CLASSIFICATION SYSTEM III-2
Stream Channel Type Definitions III-3
Stream Type Delineation Criteria III-3
STREAM CHANNEL TYPE DESCRIPTIONS AND STRUCTURE SUITABILITY III-8
Stream Channel Types III-8

STREAM CHANNEL TYPE WORK SHEET III-22
Instructions for Completing the Stream Channel Type Work Sheet III-23
STREAM CHANNEL TYPE WORK SHEET (Form) III-26
HABITAT TYPING III-27
Definition of Habitat Types III-29
Level I Habitat Types: III-29
Level II Habitat Types: III-29
Level III and Level IV Habitat Types: III-29
Level IV Habitat Type Descriptions: III-30
Instream Shelter III-43
Instream Shelter Complexity. III-43
Instructions for Completing the Habitat Inventory Data Form III-44
HABITAT INVENTORY DATA FORM III-48a
LARGE WOODY DEBRIS (LWD) III-49
STREAM AND RIPARIAN INVENTORY III-49
Background III-49
LWD INVENTORY METHODOLOGY III-50
Equipment list: III-50
Stream selection III-50
Training III-51
Inventory Procedure III-51
LWD INVENTORY FORM KEY III-53
LWD INVENTORY FORM III-55
ESTIMATE CALIBRATION FORM III-56
REFERENCES III-57

PART IV. FISH SAMPLING METHODS
FISH SAMPLING METHODS IV-1
STREAM BANK OBSERVATION IV-2
UNDERWATER OBSERVATION IV-3
Tools and Supplies Needed IV-3
Instructions for Completing the Stream Bank or Underwater Observation Field Form IV-4
STREAM BANK OR UNDERWATER OBSERVATION FIELD FORM IV-6
SALMON SPAWNER SURVEYS IV-7
Tools and Supplies Needed IV-7
Instructions for Completing the Daily Salmon Spawning Stock Survey Field Form IV-8
DAILY SALMON SPAWNING STOCK SURVEY FIELD FORM IV-11
ELECTROFISHING IV-12
Instructions for Completing the Electrofishing Field Form IV-12
ELECTROFISHING FIELD FORM IV-16
ELECTROFISHING FIELD FORM SUPPLEMENTAL PAGE IV-17
REFERENCES IV-18

CALIFORNIA SALMONID STREAM HABITAT RESTORATION MANUAL

PART V. WORKING WITH THE DATA

WORKING WITH THE DATA V-1
DATA ENTRY V-1
DATA SUMMARY AND ANALYSIS V-2
Data Summary V-2
Data Analysis V-15
GIS FORMAT V-15
Software V-16
Data V-16
Analytical Tools V-16
STREAM REPORTS V-16
DATA MANAGEMENT V-17
Data Storage V-17
Data Distribution V-17
RECOMMENDATIONS V-17
Interpreting Physical Habitat and Biological Inventories and Relating this Information to Critical Habitat Needs V-17
Salmonid Habitat Requirements and Suggestions for Instream Structures to Enhance Critical Habitat V-20
Chinook Salmon V-20
Coho Salmon V-21
Steelhead V-22
Coast Cutthroat Trout V-23
Resident Trout V-23

PART VI. PROJECT PLANNING AND ORGANIZATION

PROJECT PLANNING AND ORGANIZATION VI-1
Permits That May Be Required VI-2
FISH HABITAT RESTORATION CATEGORIES VI-3
Upslope Watershed Treatments VI-3
Riparian Zone Treatments VI-3
Instream Habitat Improvements VI-4
Artificial Propagation VI-4
Watershed Stewardship Training VI-5
INSTREAM STRUCTURE SUITABILITY BY STREAM TYPE VI-5
PROJECT RECOMMENDATION DEVELOPMENT FROM HABITAT INVENTORY DATA VI-6
PROJECT SITE LAYOUT VI-11
Using Basic Hydraulic Analysis For In Channel Design VI-11
Surveying the Longitudinal and Cross Sectional Profiles VI-12
Analysis of Longitudinal Profile VI-14
Analysis of Cross Sectional Profiles VI-15
REFERENCES VI-17

CALIFORNIA SALMONID STREAM HABITAT RESTORATION MANUAL

PART VII. PROJECT IMPLEMENTATION

PROJECT IMPLEMENTATION VII-1
SELECTION OF STABLE SITES VII-1
Gradient VII-1
Stream Width VII-2
Substrate VII-2
Stream Order VII-2
Reach Length VII-2
Channel Sinuosity VII-2
Bank Stability VII-3
Bank Morphology VII-3
HYDRAULIC IMPACTS VII-3
SELECTION OF MATERIALS VII-6
Basic Structural Materials VII-7
Gabions VII-7
Logs VII-7
Root Wads VII-7
Boulders VII-8
Miscellaneous Structural Materials VII-9
Geotextile Fabric VII-9
Wire Fencing VII-9
Concrete VII-10
Wire Rope VII-10
ANCHORING TECHNIQUES VII-10
Cabling to Boulders or Bedrock Using Polyester Resin Adhesive VII-10
Cabling to Logs and Root Wads VII-11
Cabling Logs and/or Root Wads to Boulders or Bedrock VII-12
Log Pinning With Rebar VII-16
Stream Bank Anchors Using Rebar VII-17
Bedrock and Boulder Anchors Using Threaded Rebar VII-18
Threaded Rebar and Cable Anchor to Boulder or Bedrock VII-19
Expansion Bolts VII-20
Trenching VII-21
Deadman VII-22
Unanchored Large Woody Debris VII-23
INSTREAM HABITAT IMPROVEMENTS VII-24
Cover Structures VII-24
Divide Logs VII-25
Digger logs VII-26
Spider Logs VII-27
Log, Root Wad, and Boulder Combinations VII-28
Bolder Structures VII-29
Boulder, weirs VII-29
Vortex Bolder Weir VII-32
Boulder Clusters VII-34
Single and Opposing Boulder Wing-Deflectors VII-35

Log Structures..... VII-36
Log Weirs..... VII-36
Upsurge Weirs..... VII-42
Single and Opposing Log Wing-Deflectors..... VII-43
Hewitt Ramps..... VII-44
Placement of Imported Spawning Gravel..... VII-46
Fish Screens..... VII-46
FISH PASSAGE..... VII-47
Obstructions..... VII-48
Log Jams..... VII-49
Beaver Dams..... VII-49
Waterfalls and Chutes..... VII-50
Landslides..... VII-50
Human-Induced Obstructions..... VII-51
Fishways..... VII-51
Step-and-Pool Fishway..... VII-52
Denil Fishway..... VII-54
Alaskan Steep-pass..... VII-55
Culverts..... VII-56
Back-Flooding Weirs..... VII-56
Culvert Baffles..... VII-57
Washington Baffles..... VII-57
Corrugated Metal Pipe (CMP) Steel Ramp Baffles..... VII-60
WATERSHED AND STREAM BANK STABILITY..... VII-62
Slide Stabilization..... VII-62
Stream Bank Stabilization..... VII-63
Boulder Stream Bank Stabilization Structures..... VII-63
Boulder Riprap..... VII-63
Boulder Wing-Deflectors..... VII-66
Log Stream Bank Stabilization Structures..... VII-67
Cribbing..... VII-67
Live Vegetated Crib Wall..... VII-68
Bank Armor..... VII-69
Log Wing-Deflectors..... VII-71
Tree Revetment..... VII-73
Native Material Revetment..... VII-74
Mulching..... VII-75
Revegetation..... VII-76
Transplanting..... VII-76
Revegetation with Willow Sprigs..... VII-76
Willow Wall Revetment..... VII-78
Brush mattress..... VII-79
Willow Siltation Baffles..... VII-81
Planting Seedlings..... VII-83
Checkdams..... VII-86
Redwood Board Checkdams..... VII-89

Brush Checkdams VII-90
Brush and Rock Checkdam VII-90
Post Brush Checkdam VII-91
Tree Checkdam VII-93
Brush and Rock Mattress Headcut Repair VII-94
Waterbars VII-96
Exclusionary Fencing VII-97
REFERENCES VII-98

PART VIII. PROJECT EVALUATION AND MONITORING
PROJECT EVALUATIONAND MONITORING VIII-1
Pre-Project Assessment and Data Collection VIII-2
Historic Information VIII-2
Pre-Project Information VIII-2
Documentation Immediately Following Project Completion VIII-3
Instructions for Completing the Project Site Completion Form VIII-4
PROJECT SITE COMPLETION FORM VIII-7
Post-Project Evaluation VIII-8
Habitat Project Evaluation Forms VIII-8
Equipment VIII-9
Instructions for Completing the General Project Information Form VIII-9
STREAM HABITAT ENHANCEMENT PROJECT EVALUATION
GENERAL INFORMATION FORM VIII-12
Instructions for Completing the Individual Structure or Site Form VIII-13
STREAM HABITAT ENHANCEMENT PROJECT EVALUATION
INDIVIDUAL STRUCTURE OR SITE FORM VIII-17
Structure objective codes VIII-18
Structure type codes VIII-18
Construction method codes VIII-20
SUMMARY VIII-21

APPENDIX A. POLICY AND REGULATIONS FOR SALMON AND STEELHEAD RESTORATION IN CALIFORNIA A-1

APPENDIX B. COOPERATIVE FISH PRODUCTION IN CALIFORNIA B-1

APPENDIX C. HYDROLOGIC BASIN PLANNING MAPS C-1

APPENDIX D. AERIAL PHOTO SOURCES D-1

APPENDIX E. LIST OF CALIFORNIA FISH SPECIES E-1

APPENDIX F. STATE AND FEDERAL ENDANGERED AND THREATENED SPECIES ASSOCIATED WITH SALMONID HABITAT F-1

CALIFORNIA SALMONID STREAM HABITAT RESTORATION MANUAL

APPENDIX G. **CONVERSIONS, MEASUREMENTS, AND ABBREVIATIONS** G-1

APPENDIX H. **THE MANNING ROUGHNESS COEFFICIENT** H-1

APPENDIX I. **COMPUTER PROGRAMS AND DATABASE STRUCTURES** I-1

APPENDIX J. **STREAM INVENTORY REPORT** J-1

APPENDIX K. **TOOLS** K-1

APPENDIX L. **TWO-PIN METHOD** L-1

APPENDIX M. **SPECIALTY INSTRUMENTS** M-1

APPENDIX N. **PERMITS, AGREEMENTS, AND ENVIRONMENTAL DOCUMENTS** N-1

APPENDIX O. **TEN PERCENT SAMPLING PROTOCOL FOR HABITAT TYPING INVENTORY SURVEYS** O-1

APPENDIX P. **CALIFORNIA SALMONID FISHES** P-1

APPENDIX Q. **GLOSSARY** Q-1

APPENDIX R. **FORMS** R-1

APPENDIX S. **FISH SCREEN CRITERIA** S-1

VOLUME II

PART IX. **FISH PASSAGE EVALUATION AT STREAM CROSSINGS**

PART X. **UPSLOPE ASSESSMENT AND RESTORATION PRACTICES**

PART XI. **RIPARIAN HABITAT RESTORATION**

PART XII . **FISH PASSAGE DESIGN & IMPLEMENTATION**

Exhibit B

WATERWAYS CONSULTING, INC.

Field Engineering Description for Permanente Creek Restoration Plan.

February 1, 2016

1. General. The Permanente Creek Restoration Plan, Draft 70% Design drawings, ("Drawings") were developed with the goal of creating more natural conditions, while maintaining a relatively uniform profile gradient within the proposed limits of disturbance to improve channel stability and enhance ecological function. The Drawings were prepared without full knowledge of subsurface conditions, including the elevation of underlying bedrock or alluvial materials that would indicate the location of the pre-disturbance channel profile in Reaches 18-17 and 13-11. The design approach will employ field engineering and a field directed construction approach to maximize channel stability, while avoiding excavation into native bedrock. The final constructed geometry will be directed by the engineer in the field, pending subsurface conditions, as described below.

1.1 The Rock Pile Area (Reaches 13-11) is expected to be constructed prior to the Material Removal Area. Experience gained from the field directed construction approach at the Rock Pile Area will be used to refine the design for the Material Removal Area.

2. Profile

2.1 General. The finished grade elevation of the flowline will generally fall between the upper and lower limits shown on the drawings, defined there as the "grading envelope," except where the location of existing bedrock requires deviation. The lower limit of the envelope is the optimum "straight grade" uniform profile within the proposed limits of work. The upper limit of the envelope is a best-fit line between identified points of bedrock control, as estimated from recent subsurface investigations. The construction will attempt to follow the lower limit of the envelope, subject to the constraints set forth below.

2.2 Bedrock.

A. General. The qualification of material as "bedrock" will be initially performed by the project geotechnical engineer. If the project geotechnical engineer determines that excavation to bedrock has occurred prior to reaching the lowest elevation at any location within the grading envelope, an independent professional geologist will assess and make the final determination of the existence and extent of any such bedrock. Where bedrock is encountered above the lower limit of the grading envelope, the profile will not be excavated into the bedrock. An inspection trench will be constructed across the channel, within the potential cross section limits (between the adjacent hill slopes), to ensure that bedrock is continuous. The channel alignment will follow the low point of the bedrock, to the extent that this is feasible while maintaining a geomorphically appropriate planform alignment, and while remaining within the lateral limits described below. Upstream of bedrock control points, the lower limit of the profile will be subject to the minimum design profile gradient, as specified below.

B. Minimum Design Profile Gradient. Upstream of bedrock controls, the minimum design profile grade will be set to 4%, to help maintain sediment transport continuity and channel stability.

C. The constructed profile gradient between bedrock outcrops will not exceed 12.0%.

WATERWAYS CONSULTING, INC.

2.3 Alluvial materials. Where the original "pre-disturbance" streambed is identified by the presence of significant alluvial deposits, the design profile will not be constructed below the elevation of these deposits, provided the specified minimum and maximum profile grade criteria are met. Temporary excavations will not extend below the design profile any more than is necessary to construct the engineered streambed material shown on the design drawings.

3. Cross Section geometry

A. Active Channel. The low flow cross section geometry will be informed by regional analogs and refined based on the local profile gradient within each constructed reach. Cross section details will closely resemble the range of typical sections shown on the Drawings, except where influenced by the presence of bedrock as discussed above.

B. Floodplain. The floodplain widths will be maximized within the constraint of maintaining the stability of the adjacent hillside and the need to accommodate roads shown on the Drawings. The stable design slope of the adjacent hillside will be determined by the geotechnical engineer, and will likely vary between 2H:1V and 1.5H:1V, as shown on the Drawings. Exposed bedrock may allow for steeper slopes, subject to approval of the geotechnical engineer. Where the final design profile approaches the lower limit of the grading envelope, the stability of adjacent hillsides will dictate a narrower floodplain width. Slope benching may be incorporated to reduce slope length, control surface runoff and help protect slopes from surface erosion while vegetation becomes established.

C. Where bedrock outcrops constrain the floodplain width, upstream and downstream floodplains will transition rapidly to conform to those restrictions and then return to the standard floodplain widths as described above.

1433924.1

PERMANENTE CREEK RESTORATION PLAN

DRAFT
70% DESIGN SUBMITTAL

SHEET INDEX

C1	COVER SHEET
C2	OVERVIEW
C3	EXISTING CHANNEL PROFILE
C4	SHEET LAYOUT OVERVIEW
C5	CONCRETE CHANNEL SOUTHERN BANK PLANTING PLAN
C6	CHANNEL WIDENING PLAN (1 OF 5)
C7	CHANNEL WIDENING PLAN (2 OF 5)
C8	CHANNEL WIDENING PLAN (3 OF 5)
C9	SEDIMENT REMOVAL AREA AND CULVERT #8 PLAN
C10	CULVERT #8 PROFILE AND SECTION
C11	SEDIMENT REMOVAL AREA PROFILE AND SECTIONS
C12	CHANNEL WIDENING PLAN (4 OF 5)
C13	CHANNEL WIDENING PLAN (5 OF 5)
C14	ROCK PILE AREA PLAN
C15	ROCK PILE AREA SECTIONS
C16	MATERIAL REMOVAL AREA PLAN (1 OF 2)
C17	MATERIAL REMOVAL AREA PLAN (2 OF 2)
C18	MATERIAL REMOVAL AREA SECTIONS (1 OF 2)
C19	MATERIAL REMOVAL AREA SECTIONS (2 OF 2)
C20	ACCESS AND STAGING PLAN (1 OF 2)
C21	ACCESS AND STAGING PLAN (2 OF 2)
C22	DEWATERING DETAILS
C23	MISCELLANEOUS DETAILS
C24	HABITAT LOG DETAILS AND ROCK SPECIFICATIONS
C25	NOTES
L1	RIPARIAN PLANTING SECTIONS (1 OF 3)
L2	RIPARIAN PLANTING SECTIONS (2 OF 3)
L3	RIPARIAN PLANTING SECTIONS (3 OF 3)

VICINITY MAP
N.T.S. (GOOGLE)

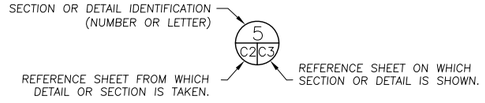
GENERAL NOTES

1. TOPOGRAPHIC MAPPING WAS PERFORMED BY:
   WATERWAYS CONSULTING, INC.
   509 SWIFT STREET, UNIT A
   SANTA CRUZ, CA 95060
   SURVEY DATES; JUNE THROUGH AUGUST 2013, FEBRUARY THROUGH MAY 2014, MARCH 2015.
2. ELEVATION DATUM: NAVD88 BASED ON A FIELD TIE TO SANTA CLARA VALLEY WATER DISTRICT BENCHMARK ID: BM198 WITH AN ELEVATION OF 478.22'.
3. HORIZONTAL DATUM: NAD83 CALIFORNIA STATE PLANE, ZONE 3.
4. AERIAL PHOTO SOURCE:
   AERIAL PHOTOMAPPING SERVICES
   2929 LARKIN AVENUE
   CLOVIS, CA 93612
   PHOTOGRAPH DATE: JUNE 20, 2013
5. ELEVATIONS AND DISTANCES SHOWN ARE IN FEET AND DECIMALS THEREOF. CONTOUR INTERVAL IS 1 FOOT.
6. THIS IS NOT A BOUNDARY SURVEY. PROPERTY LINES, IF SHOWN, WERE COMPILED FROM RECORD INFORMATION AND FROM FIELD TIES TO EXISTING BOUNDARY MONUMENTATION. THE LOCATION OF THESE LINES IS SUBJECT TO CHANGE, PENDING THE RESULTS OF A COMPLETE BOUNDARY SURVEY.
7. TREE DIMENSIONS: TRUNK DIAMETERS SHOWN REPRESENT DIAMETER AT BREAST HEIGHT (DBH), MEASURED IN INCHES. DBH IS MEASURED 4.5 FT ABOVE GROUND FOR SINGLE TRUNKS AND TRUNKS THAT SPLIT INTO SEVERAL STEMS CLOSE TO THE GROUND. EACH TRUNK IS SHOWN AT MULTI-STEM TREES. ONLY THE LABEL OF THE DBH OF THE LARGEST TRUNK IS SHOWN FOR DRAWING CLARITY. WHERE TREES FORK NEAR BREAST HEIGHT, TRUNK DIAMETER IS MEASURED AT THE NARROWEST PART OF THE MAIN STEM BELOW THE FORK. FOR TREES ON A SLOPE, BREAST HEIGHT IS REFERENCED FROM THE UPPER SIDE OF THE SLOPE. FOR LEANING TREES, BREAST HEIGHT IS MEASURED ON THE SIDE THAT THE TREE LEANS TOWARD. TREES WITH DBH LESS THAN 8" ARE TYPICALLY NOT SHOWN.

   12"P = 12" DBH PINE

8. TREE SPECIES ARE IDENTIFIED WHEN KNOWN. HOWEVER, FINAL DETERMINATION SHOULD BE MADE BY A QUALIFIED BOTANIST. REFER TO THE LEGEND FOR TREE SPECIES SYMBOLS.
9. SURVEYED TREES INCLUDE:
   A. OAKS (QUERCUS SPP.) 5 INCHES OR LARGER DBH
   B. ALL OTHER TREES 12 INCHES OR LARGER DBH
   C. ALL MULTI-STEM TREES WITH A COMBINED DIAMETER OF 24 INCHES OR LARGER DBH

SECTION AND DETAIL CONVENTION



ABBREVIATIONS

AVG.	AVERAGE	NTS	NOT TO SCALE
CC	CONCRETE	O.C.	ON CENTER
CY	CUBIC YARDS	O.D.	RELATIVE COMPACTION
DBH	DIAMETER BREST HEIGHT	RSP	ROCK SLOPE PROTECTION
DIA.	DIAMETER	SD	STORM DRAIN
E	EXISTING	SPK	SPIKE
E.G.	EXISTING GROUND	SQ.FT.	SQUARE FOOT
ELEV.	ELEVATION	TBD	TO BE DETERMINED
DI	DRAINAGE INLET	TYP	TYPICAL
FG	FINISHED GRADE	UNK	UNKNOWN
FT	FEET	WSE	WATER SURFACE ELEVATION
INV	INVERT	YR	YEAR
N	NEW		

PROJECT DESCRIPTION

THESE DRAWINGS PROVIDE 70% LEVEL DESIGNS FOR THE CONSTRUCTION OF CHANNEL AND FLOODPLAIN ENHANCEMENTS ON PORTIONS OF PERMANENTE CREEK AT THE PERMANENTE QUARRY PROPERTY IN SANTA CLARA COUNTY, CALIFORNIA.

THE DESIGNS ARE SUBJECT TO CHANGE BASED ON RESOURCE AGENCY COMMENTS, ENVIRONMENTAL REVIEW AND PERMIT ISSUANCE.

TREE REMOVAL NOTES

1. DBH IS THE DIAMETER MEASURED AT BREAST HEIGHT.
2. WILLOWS TO BE REMOVED SHALL BE SALVAGED PER DETAIL 2, SHT. C23. THIS INCLUDES ALL UNMAPPED WILLOWS. WILLOWS TO BE SALVAGED FOR TRANSPLANTING WILL BE FLAGGED IN THE FIELD BY THE PROJECT ARBORIST.
3. ALL OTHER TREES REMOVED DURING CONSTRUCTION SHALL BE SALVAGED WITH ROOTWADS INTACT AND INCORPORATED ON BENCHES AS FLOODPLAIN ROUGHNESS LOGS. BRANCHES SHALL BE PLACED ON FLOODPLAIN BENCHES AND ADJACENT UPPER BANK SLOPES AS SLASH.

TREE ABBREVIATIONS

A	ALDER
B	BAY
BK	BUCKEYE
M	MAPLE
O	OAK
SYC	SYCAMORE
W	WILLOW

WATERWAYS CONSULTING INC.
509A SWIFT ST.
SANTA CRUZ, CA 95060
PH:(831)421-9291 // FAX:(888)819-6847
WWW.WATWAYS.COM

wra
ENVIRONMENTAL CONSULTANTS
LANDSCAPE ARCHITECTS AND PLANNERS
2169-G East Francisco Blvd.
San Rafael, CA 94901
(415) 454-8868 Phone
(415) 454-0129 Fax

PREPARED AT THE REQUEST OF:
LEHIGH HANSON HEIDELBERG CEMENT GROUP

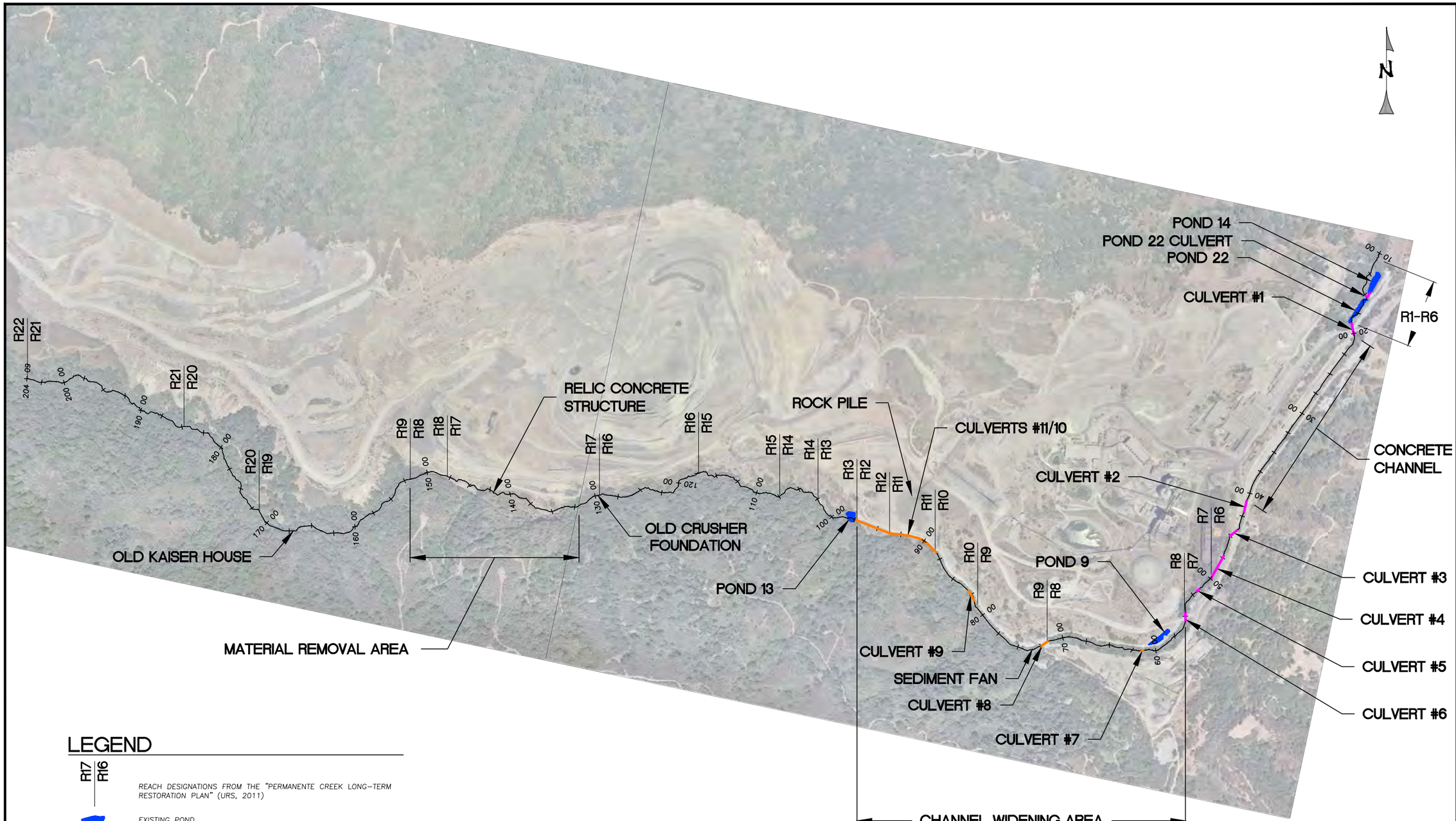
COVER SHEET

PERMANENTE CREEK RESTORATION PLAN
70% DESIGN SUBMITTAL

DESIGNED BY:	–
DRAWN BY:	B.M.S.
CHECKED BY:	M.W.W.
DATE:	04/27/15
JOB NO.:	13-016

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

C1 | 1 OF 25



LEGEND

R17 | R16 — REACH DESIGNATIONS FROM THE "PERMANENTE CREEK LONG-TERM RESTORATION PLAN" (URS, 2011)

EXISTING POND

EXISTING CULVERT TO BE REMOVED

EXISTING CULVERT TO REMAIN

70 00 — THALWEG ALIGNMENT 2013

PROJECT AREA OVERVIEW

SCALE: 1" = 500'

WATERWAYS CONSULTING INC.
509A SWIFT ST.
SANTA CRUZ, CA 95060
PH:(831)421-9291 // FAX:(888)819-6847
WWW.WATWAYS.COM

PRELIMINARY

NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT GROUP

OVERVIEW

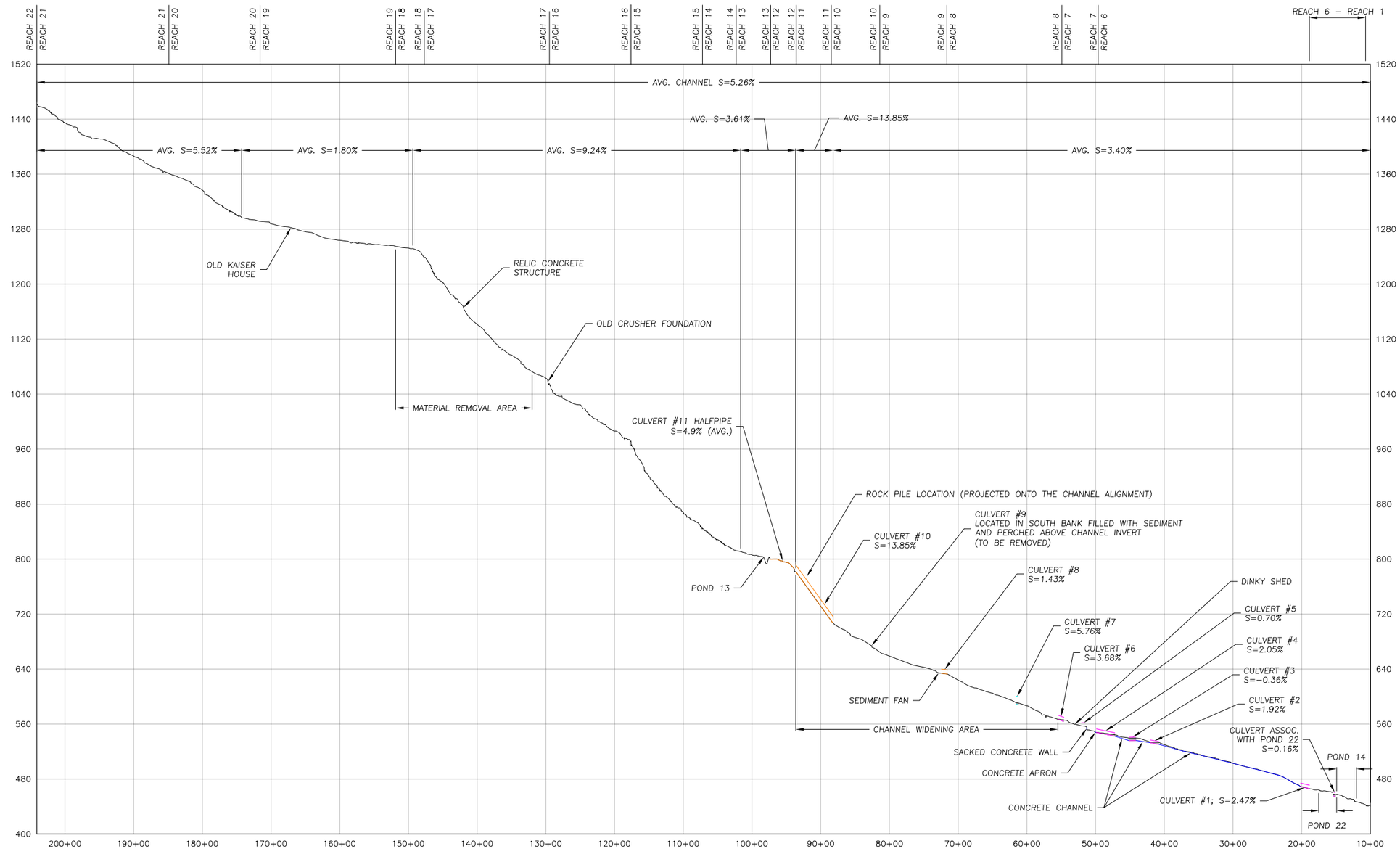
PERMANENTE CREEK RESTORATION PLAN
70% DESIGN SUBMITTAL

DESIGNED BY:	B.M.S.
DRAWN BY:	B.M.S.
CHECKED BY:	M.W.W.
DATE:	04/27/15
JOB NO.:	13-016

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS

0 1"

C2



LEGEND

REACH 7 / REACH 6 — REACH DESIGNATIONS FROM THE "PERMANENTE CREEK LONG-TERM RESTORATION PLAN" (URS, 2011)

EXISTING CULVERT TO BE REMOVED

EXISTING CULVERT TO REMAIN

EXISTING CHANNEL PROFILE

SCALE: H: 1" = 800'; V: 1"=80'

WATERWAYS CONSULTING INC.
509A SWIFT ST.
SANTA CRUZ, CA 95060
PH:(831)421-9291 // FAX:(888)819-6847
WWW.WATWAYS.COM

PRELIMINARY

NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT GROUP

EXISTING CHANNEL PROFILE

PERMANENTE CREEK RESTORATION PLAN
70% DESIGN SUBMITTAL

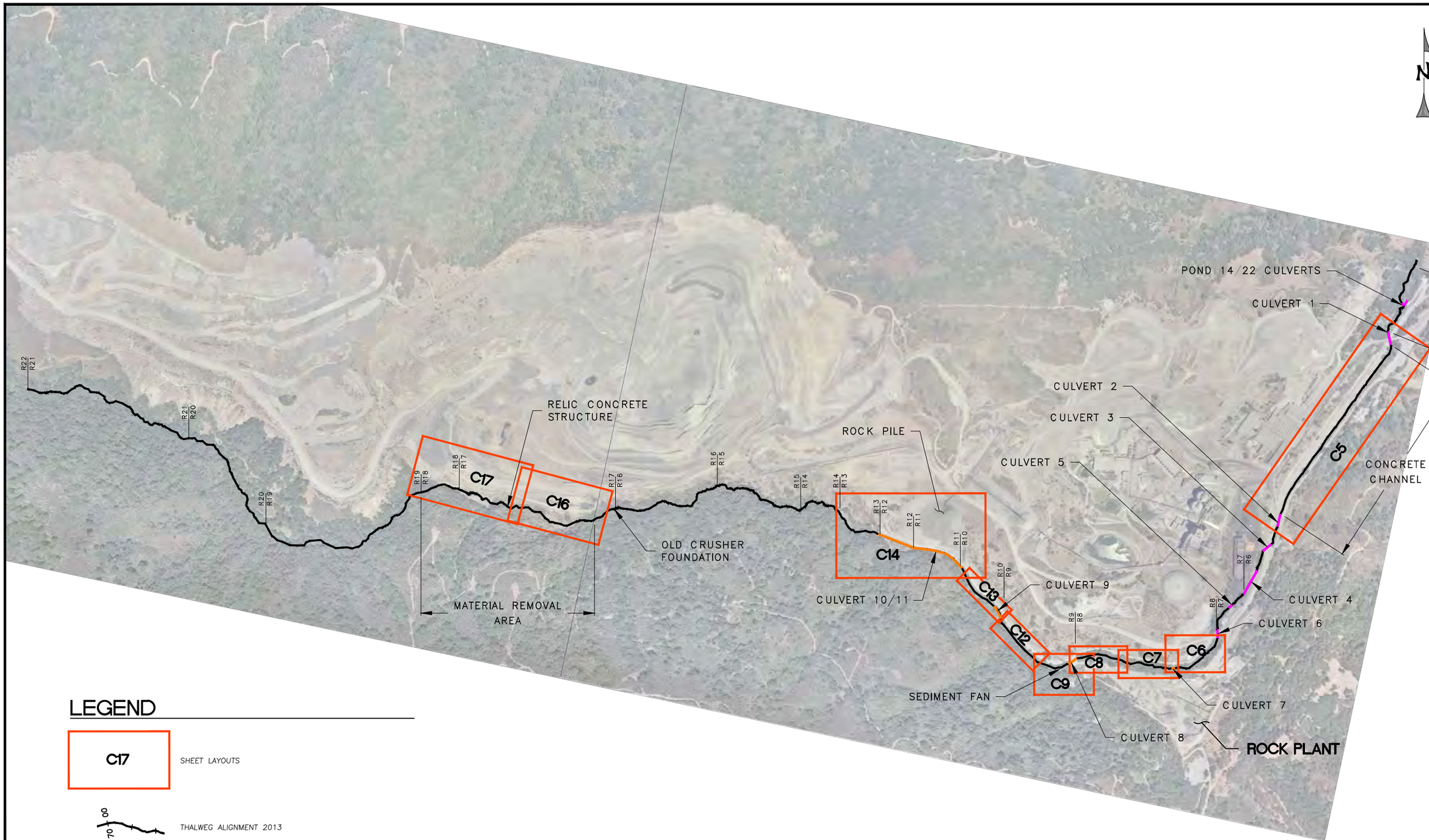
DESIGNED BY:	B.M.S.
DRAWN BY:	B.M.S.
CHECKED BY:	M.W.W.
DATE:	04/27/15
JOB NO.:	13-016

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS

0 1"

C3

Exhibit C, Part 1 of 6



LEGEND

C17 — SHEET LAYOUTS

00 / 70 — THALWEG ALIGNMENT 2013

EXISTING CULVERT TO BE REMOVED

EXISTING CULVERT TO REMAIN

SHEET LAYOUT OVERVIEW
SCALE: 1" = 500'

WATERWAYS CONSULTING INC.
509A SWIFT ST.
SANTA CRUZ, CA 95060
PH:(831)421-9291 // FAX:(888)819-6847
WWW.WATWAYS.COM

PRELIMINARY
NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:
LEHIGH HANSON HEIDELBERG CEMENT GROUP

SHEET LAYOUT OVERVIEW

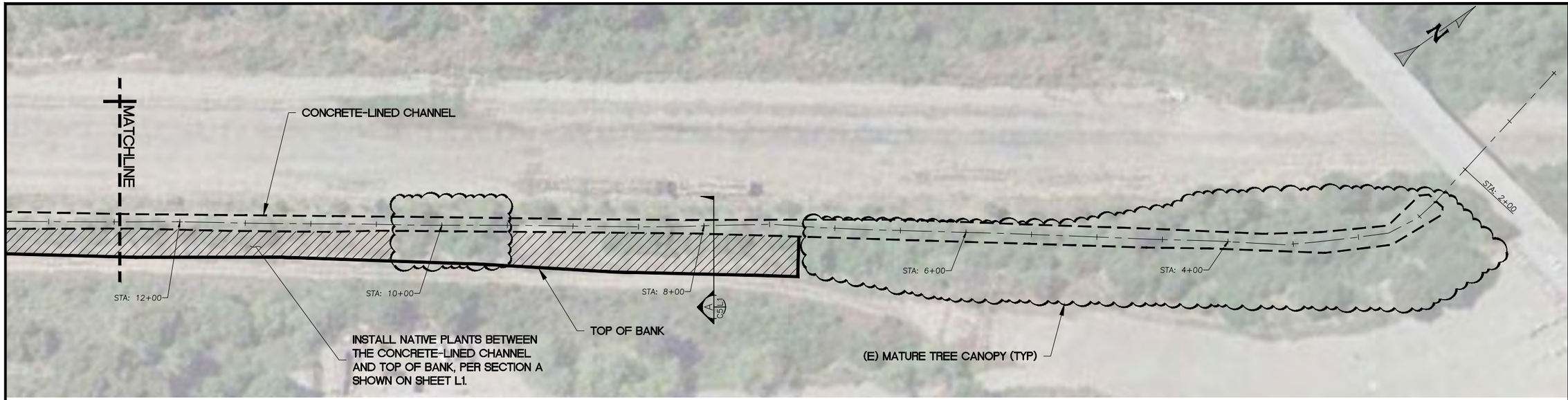
PERMANENTE CREEK RESTORATION PLAN
70% DESIGN SUBMITTAL

DESIGNED BY: B.M.S.
DRAWN BY: B.M.S.
CHECKED BY: M.W.W.
DATE: 04/27/15
JOB NO.: 13-016

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

C4

4 OF 25



NOTES:

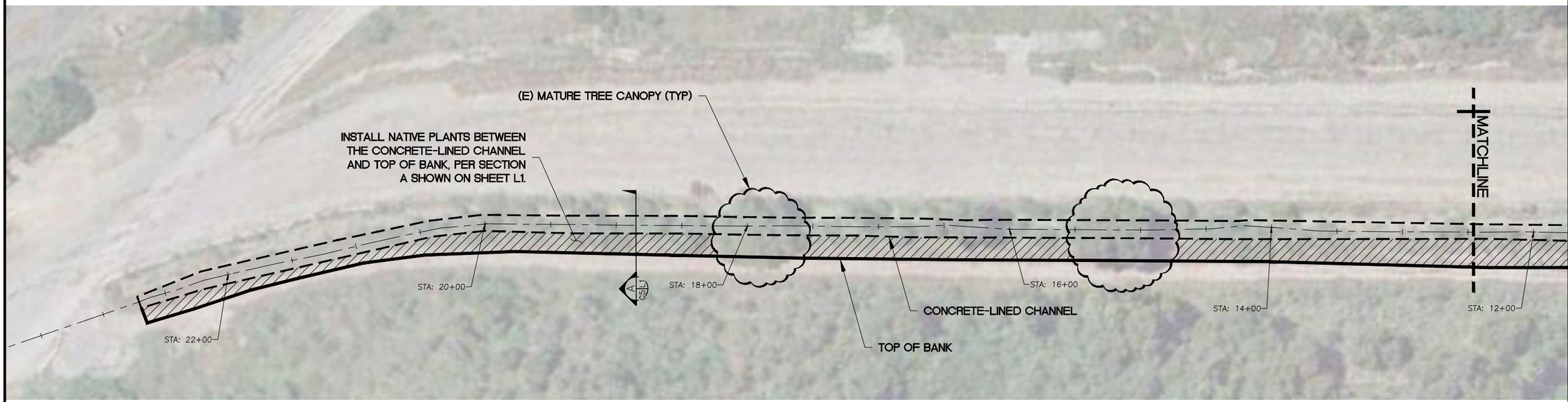
1. ALL EXISTING NATIVE TREES AND SHRUBS SHALL BE PROTECTED IN PLACE. EXISTING PLANT SPECIES INCLUDE, BUT ARE NOT LIMITED TO, PRUNUS ILICIFOLIA, QUERCUS AGRIFOLIA, SALIX LAEVIGATA, SALIX LASIOLEPSIS, AND UMBELLULARIA CALIFORNICA. WEED CONTROL ACTIONS SHALL BE PERFORMED AROUND EXISTING OAK SEEDLINGS, AS DESCRIBED BELOW, TO ENCOURAGE ESTABLISHMENT.
2. A THREE-FOOT DIAMETER AREA SHALL BE CLEARED AND GRUBBED AT EACH PROPOSED PLANTING LOCATION AND AROUND EACH EXISTING OAK SEEDLING. CLEARING AND GRUBBING AROUND OAK SEEDLINGS SHALL OCCUR BY HAND-WEEDING TO AVOID ANY ROOT DISTURBANCE OR PLANT DAMAGE.
3. PLANTING EXCAVATION SHALL NOT OCCUR WITHIN THE DRIP LINE OF EXISTING SHRUBS, WITHIN TEN FEET FROM THE TRUNKS OF EXISTING ESTABLISHED TREES, OR WITHIN FIVE FEET OF EXISTING OAK SEEDLINGS.
4. A QUALIFIED RESTORATION SPECIALIST SHALL CONFIRM THE LOCATION OF PROPOSED PLANTS AND OAK SEEDLINGS PRIOR TO PLANTING AND WEED CONTROL TO CONFIRM AVOIDANCE OF EXISTING VEGETATION.
5. DEPENDING ON THE CONDITION OF EXISTING SOILS, SOIL EXCAVATED FOR PLANTING MAY REQUIRE AMENDMENT WITH GREEN WASTE COMPOST. EXCESS SOIL SHALL BE USED TO FORM A WATERING WELL AROUND THE INSTALLED PLANT.
6. THREE TO FOUR INCHES OF MULCH AND/OR WEED MATS SHALL BE PLACED IN THE CLEARED AND GRUBBED AREA AROUND EACH INSTALLED PLANT OR OAK SEEDLING FOR WEED CONTROL AND MOISTURE RETENTION.

CONCRETE-LINED CHANNEL SOUTHERN BANK PLANTING PLAN

SCALE: 1" = 40'

LEGEND

PROPOSED REVEGETATION AREA = 0.55 ACRES



CONCRETE-LINED CHANNEL SOUTHERN BANK PLANTING PLAN

SCALE: H: 1" = 40'

WATERWAYS CONSULTING INC.
509A SWIFT ST.
SANTA CRUZ, CA 95060
PH:(831)421-9291 // FAX:(888)819-6847
WWW.WATWAYS.COM

PRELIMINARY

NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:

LEHIGH HANSON
HEIDELBERG CEMENT GROUP

CONCRETE CHANNEL SOUTHERN BANK PLANTING PLAN

PERMANENTE CREEK RESTORATION PLAN

70% DESIGN SUBMITTAL

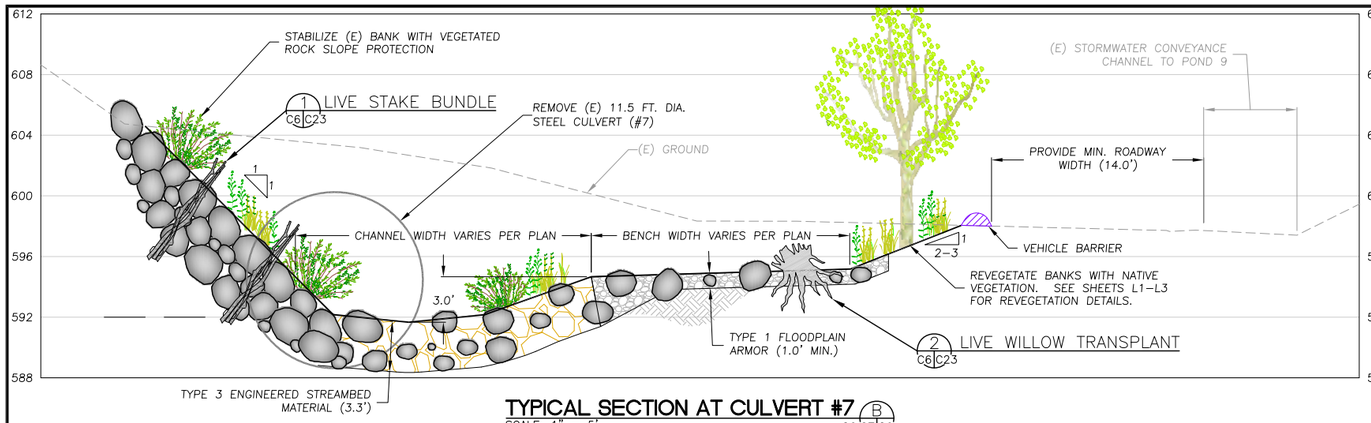
DESIGNED BY:	B.M.Z.
DRAWN BY:	B.M.Z.
CHECKED BY:	M.W.W.
DATE:	04/27/15
JOB NO.:	13-016

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS

0 1"

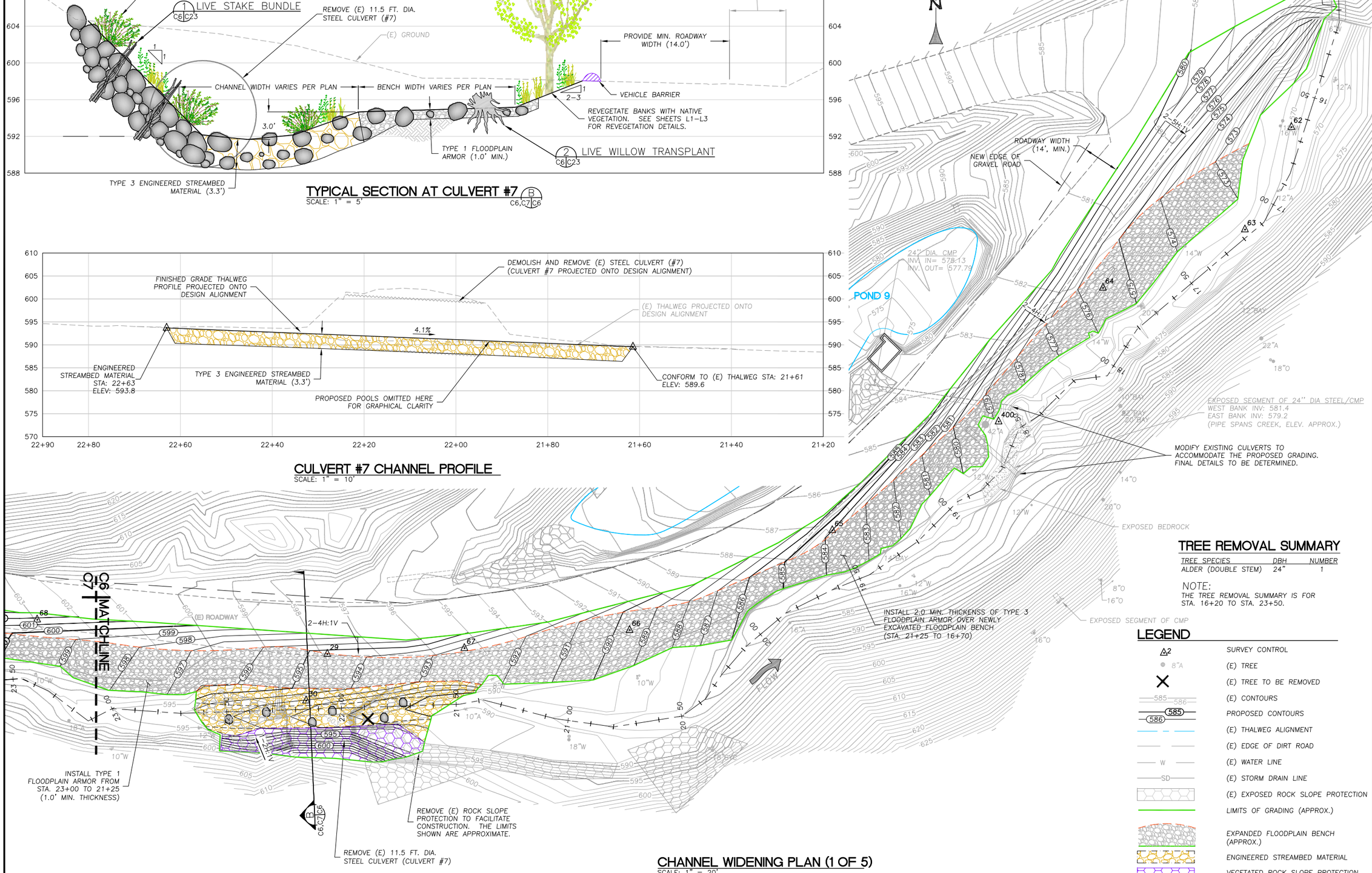
C5

5 OF 25



TYPICAL SECTION AT CULVERT #7 (B)
SCALE: 1" = 5'
C6,C7 C6

CULVERT #7 CHANNEL PROFILE
SCALE: 1" = 10'



CHANNEL WIDENING PLAN (1 OF 5)
SCALE: 1" = 20'

TREE REMOVAL SUMMARY

TREE SPECIES	DBH	NUMBER
ALDER (DOUBLE STEM)	24"	1

NOTE:
THE TREE REMOVAL SUMMARY IS FOR STA. 16+20 TO STA. 23+50.

LEGEND

- SURVEY CONTROL
- (E) TREE
- (E) TREE TO BE REMOVED
- (E) CONTOURS
- PROPOSED CONTOURS
- (E) THALWEG ALIGNMENT
- (E) EDGE OF DIRT ROAD
- (E) WATER LINE
- (E) STORM DRAIN LINE
- (E) EXPOSED ROCK SLOPE PROTECTION
- LIMITS OF GRADING (APPROX.)
- EXPANDED FLOODPLAIN BENCH (APPROX.)
- ENGINEERED STREAMBED MATERIAL
- VEGETATED ROCK SLOPE PROTECTION

WATERWAYS CONSULTING INC.
509A SWIFT ST.
SANTA CRUZ, CA 95060
PH:(831)421-9291 // FAX:(888)819-6847
WWW.WATWAYS.COM

PRELIMINARY
NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT GROUP

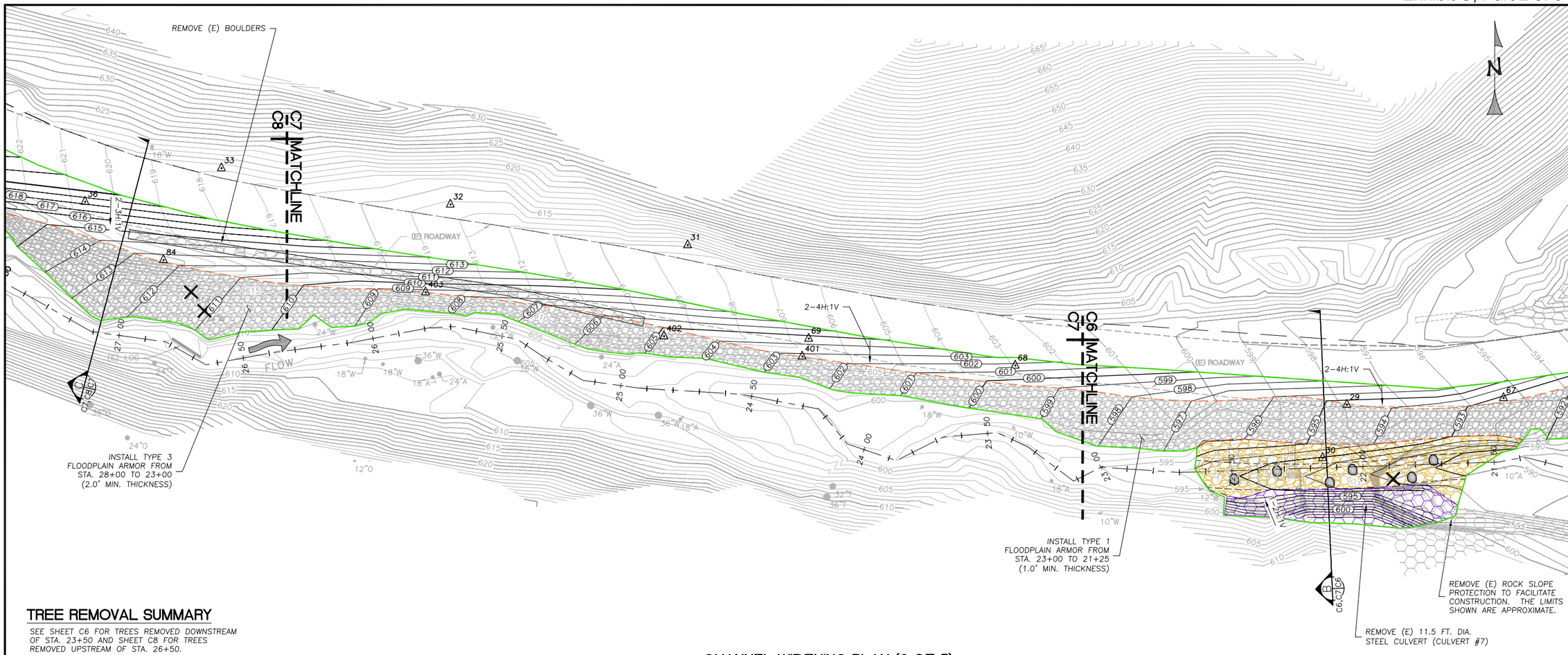
CHANNEL WIDENING PLAN (1 OF 5)

PERMANENTE CREEK RESTORATION PLAN
70% DESIGN SUBMITTAL

DESIGNED BY:	B.Z.
DRAWN BY:	B.M.S.
CHECKED BY:	M.W.W.
DATE:	04/27/15
JOB NO.:	13-016

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

C6 | 6 OF 25



TREE REMOVAL SUMMARY

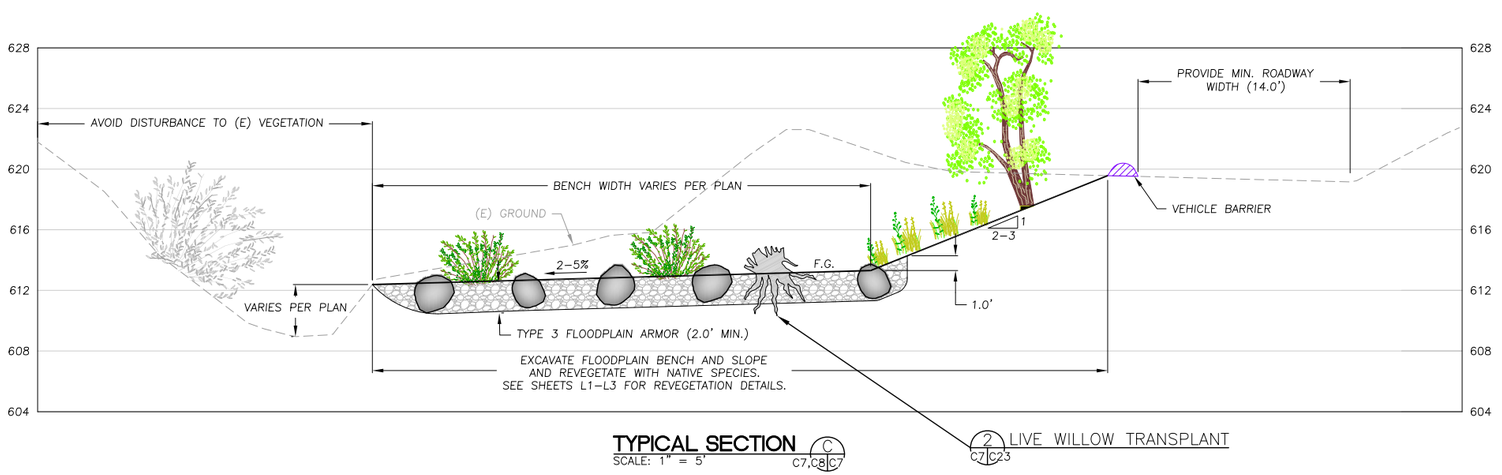
SEE SHEET C6 FOR TREES REMOVED DOWNSTREAM OF STA. 23+50 AND SHEET C8 FOR TREES REMOVED UPSTREAM OF STA. 26+50.

CHANNEL WIDENING PLAN (2 OF 5)

SCALE: 1" = 20'

LEGEND

△2	SURVEY CONTROL
8"A	(E) TREE
X	(E) TREE TO BE REMOVED
585 586	(E) CONTOURS
586 585	PROPOSED CONTOURS
	(E) THALWEG ALIGNMENT
	(E) EDGE OF DIRT ROAD
W	(E) WATER LINE
SD	(E) STORM DRAIN LINE
	(E) EXPOSED ROCK SLOPE PROTECTION
	LIMITS OF GRADING (APPROX.)
	EXPANDED FLOODPLAIN BENCH (APPROX.)
	ENGINEERED STREAMBED MATERIAL
	VEGETATED ROCK SLOPE PROTECTION



TYPICAL SECTION

SCALE: 1" = 5'

C C7,C8,C7

WATERWAYS CONSULTING INC.
509A SWIFT ST.
SANTA CRUZ, CA 95060
PH:(831)421-9291 // FAX:(888)819-6847
WWW.WATWAYS.COM

PRELIMINARY

NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:

LEHIGH HANSON HEIDELBERG CEMENT GROUP

CHANNEL WIDENING PLAN (2 OF 5)

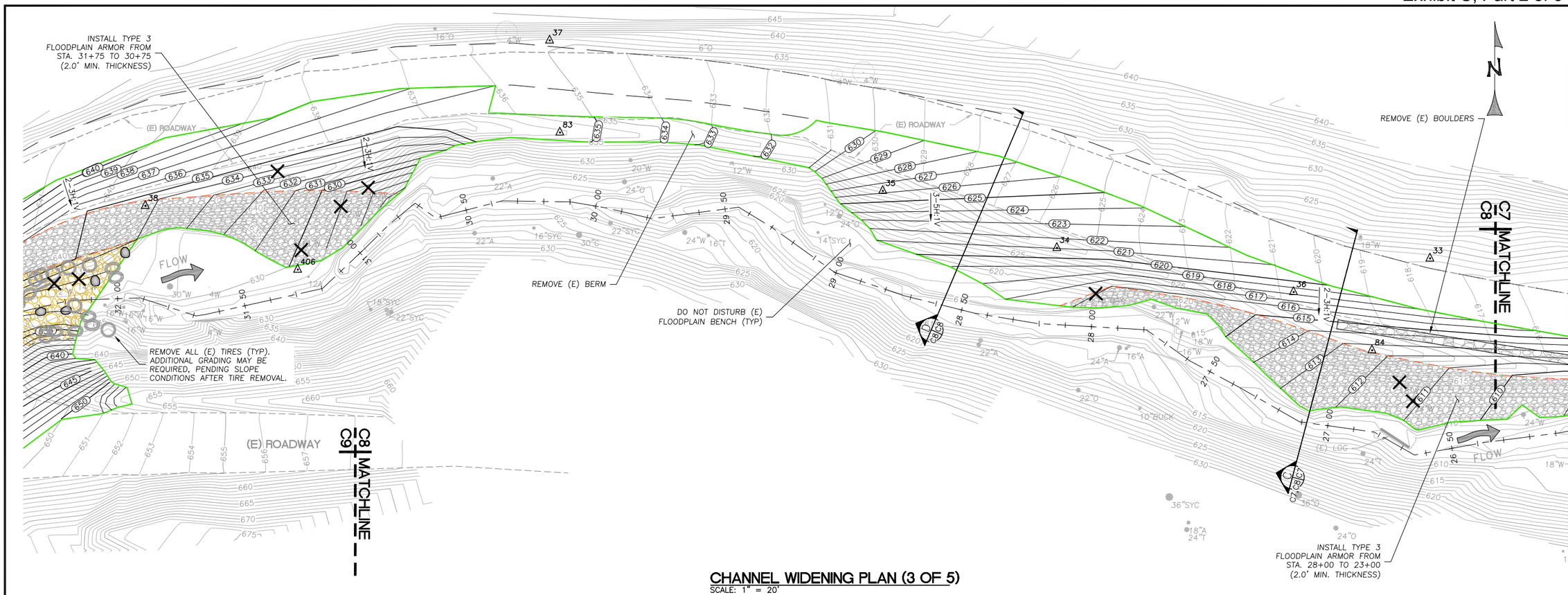
PERMANENTE CREEK RESTORATION PLAN

70% DESIGN SUBMITTAL

DESIGNED BY:	B.M.S.
DRAWN BY:	B.M.S.
CHECKED BY:	M.W.W.
DATE:	04/27/15
JOB NO.:	13-016

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS

0 1"



CHANNEL WIDENING PLAN (3 OF 5)
SCALE: 1" = 20'

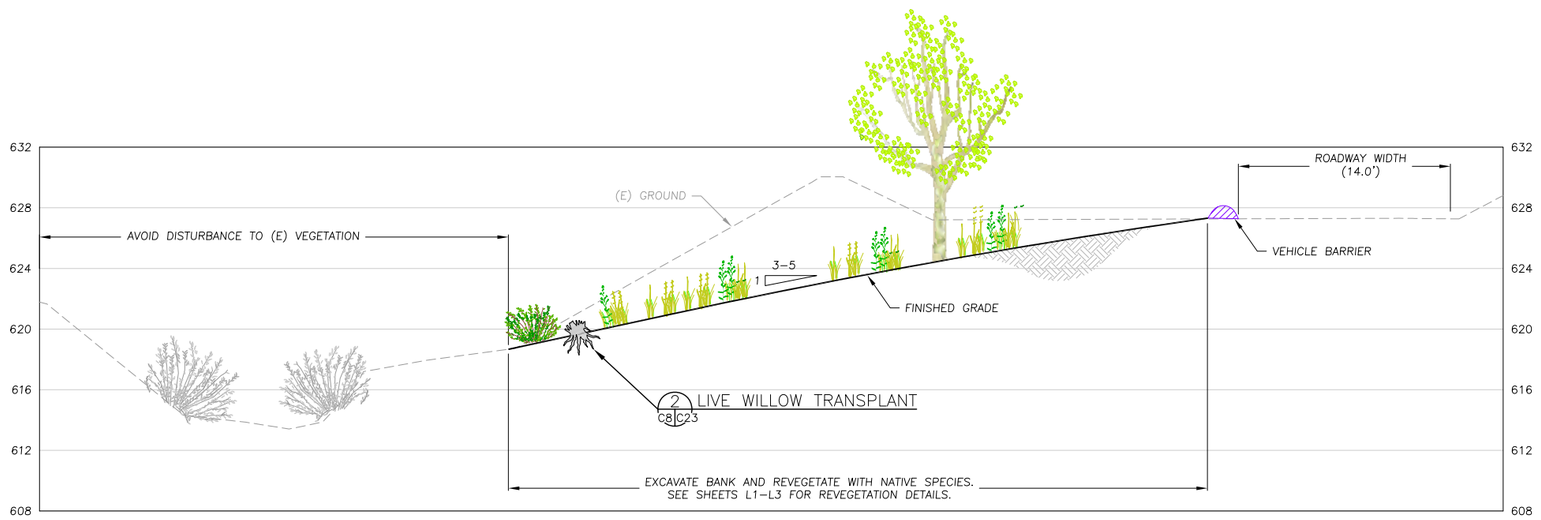
TREE REMOVAL SUMMARY

TREE SPECIES	DBH	NUMBER
WILLOW	14"	1
WILLOW	18"	2
WILLOW	24"	1
WILLOW	22"	1
OAK	10"	1
BAY	16"	1

NOTES:
1. SEE SHEET C9 FOR TREES TO BE REMOVED UPSTREAM OF STA. 31+50. SEE SHEET C7 FOR TREES TO BE REMOVED DOWNSTREAM OF STA. 26+50.

LEGEND

- △2 — SURVEY CONTROL
- 8"A — (E) TREE
- X — (E) TREE TO BE REMOVED
- 585 586 — (E) CONTOURS
- 585 / 586 — PROPOSED CONTOURS
- (E) THALWEG ALIGNMENT
- (E) EDGE OF DIRT ROAD
- W — (E) WATER LINE
- SD — (E) STORM DRAIN LINE
- (E) EXPOSED ROCK SLOPE PROTECTION
- LIMITS OF GRADING (APPROX.)
- EXPANDED FLOODPLAIN BENCH (APPROX.)
- ENGINEERED STREAMBED MATERIAL
- VEGETATED ROCK SLOPE PROTECTION



TYPICAL SECTION
SCALE: 1" = 5'
D C8|C8

WATERWAYS CONSULTING INC.
509A SWIFT ST.
SANTA CRUZ, CA 95060
PH:(831)421-9291 // FAX:(888)819-6847
WWW.WATWAYS.COM

PRELIMINARY
NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:
LEHIGH HANSON HEIDELBERG CEMENT GROUP

CHANNEL WIDENING PLAN (3 OF 5)

PERMANENTE CREEK RESTORATION PLAN
70% DESIGN SUBMITTAL

DESIGNED BY:	B.M.S.
DRAWN BY:	B.M.S.
CHECKED BY:	M.W.W.
DATE:	04/27/15
JOB NO.:	13-016

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

C8 | 8 OF 25

C9 MATCHLINE C12

C8 MATCHLINE C9

REMOVE (E) ROCK CHECK DAMS (TYP)

(E) CONVEYOR

(E) ROADWAY

REMOVE ALL (E) TIRES (TYP). ADDITIONAL GRADING MAY BE REQUIRED, PENDING SLOPE CONDITIONS AFTER TIRE REMOVAL.

FLOW

(E) ALDERS TO REMAIN

REMOVE ALL (E) TRACTOR TIRES (TYP)

CONFORM TO (E) CHANNEL THALWEG

(E) TRIBUTARY THALWEG

DEMOLISH AND REMOVE TWO (E) 72 IN. DIA. CMP CULVERTS (CULVERT #8)

1 C9|C10 CULVERT #8 CHANNEL PROFILE

INSTALL TYPE 1 FLOODPLAIN ARMOR FROM STA. 40+50 TO 31+75 (1.0' MIN. THICKNESS)

LIMITS OF GRADING (APPROX.)

(E) CONVEYOR AND ASSOCIATED INFRASTRUCTURE TO BE REMOVED BY OTHERS PRIOR TO THE START OF CONSTRUCTION

STORAGE AREA

TRIBUTARY PROFILE 2 C9|C11

CONFORM TO (E) CHANNEL

LIMITS OF EXPOSED AND ERODED GRAVEL/FINES IN THE VICINITY OF THE STORAGE AREA (APPROX.)

TREE REMOVAL SUMMARY

TREE SPECIES	DBH	NUMBER
SYCAMORE	32"	1
WILLOW	12"	1
WILLOW	14"	1
WILLOW	18"	1
BAY	12"	1
OAK	10"	1
OAK	8"	2
OAK	6"	1

NOTE:
SEE SHEET C8 FOR TREES REMOVED DOWNSTREAM OF STA. 31+50.

LEGEND

- SURVEY CONTROL
- (E) TREE
- (E) TREE TO BE REMOVED
- (E) CONTOURS
- (E) THALWEG ALIGNMENT
- (E) EDGE OF DIRT ROAD
- (E) WATER LINE
- LIMITS OF GRAVEL/FINES
- LIMITS OF GRADING (APPROX.)
- RETAINING WALL
- EXPANDED FLOODPLAIN BENCH (APPROX.)
- ENGINEERED STREAMBED MATERIAL
- VEGETATED ROCK SLOPE PROTECTION
- (E) TRACTOR TIRE

SEDIMENT REMOVAL AREA AND CULVERT #8 PLAN

SCALE: 1" = 20'

NOTES:
1. BOTTOM OF WALL (BW) GRADES SHOWN ON THIS PLAN REPRESENT FINISHED GRADE AT BOTTOM OF WALL, NOT TOP OF FOOTING ELEVATION.
2. CONTOUR INTERVAL:
   A. 1 FOOT ALONG PERMANENTE CREEK
   B. 5 FEET AT THE SEDIMENT REMOVAL AREA

WATERWAYS CONSULTING INC.
509A SWIFT ST.
SANTA CRUZ, CA 95060
PH:(831)421-9291 // FAX:(888)819-6847
WWW.WATWAYS.COM

PRELIMINARY

NOT FOR CONSTRUCTION

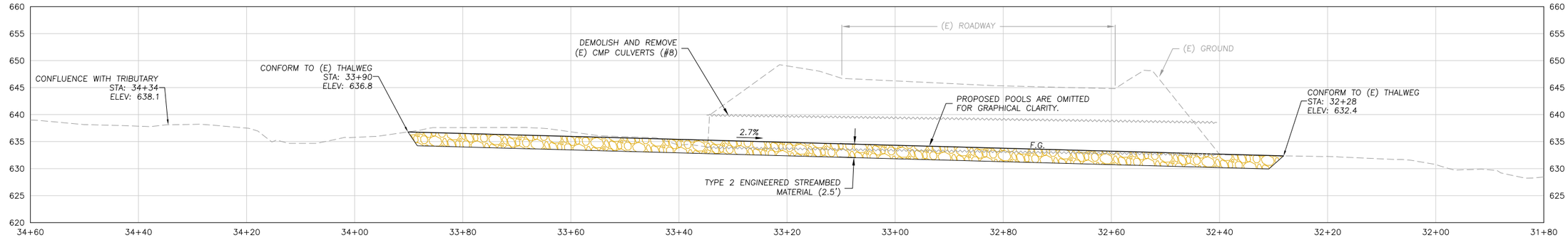
PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT GROUP

SEDIMENT REMOVAL AREA AND CULVERT #8 PLAN

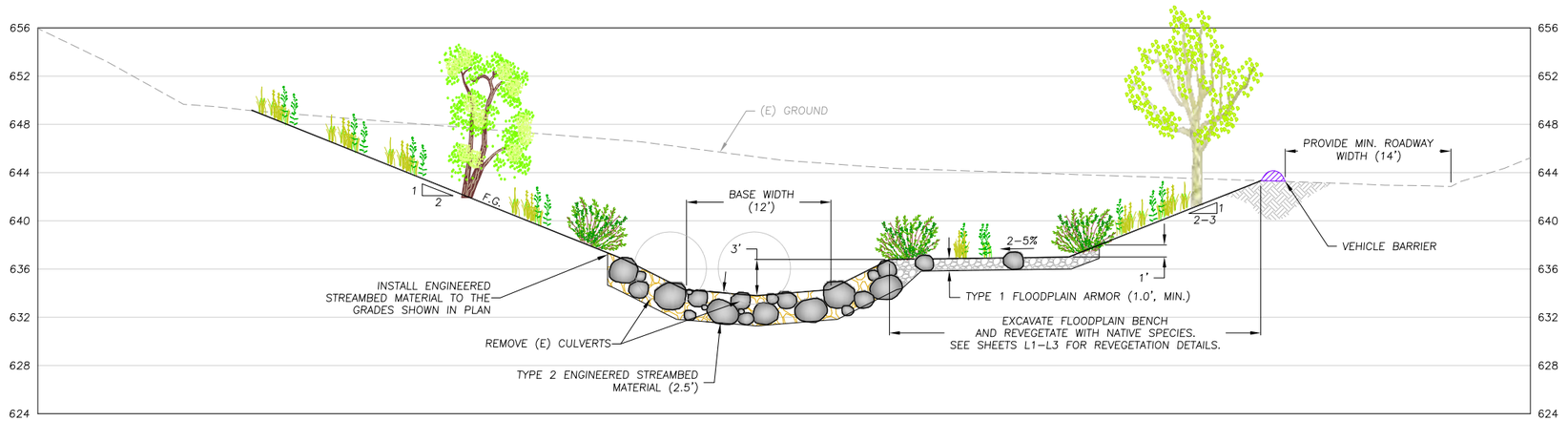
PERMANENTE CREEK RESTORATION PLAN
70% DESIGN SUBMITTAL

DESIGNED BY:	B.Z.
DRAWN BY:	B.M.S.
CHECKED BY:	M.W.W.
DATE:	04/27/15
JOB NO.:	13-016

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"



CULVERT #8 CHANNEL PROFILE (C9|C10)
SCALE: 1" = 10'



CULVERT #8 SECTION (B|C9|C10)
SCALE: 1" = 6'

WATERWAYS CONSULTING INC.
509A SWIFT ST.
SANTA CRUZ, CA 95060
PH:(831)421-9291 // FAX:(888)819-6847
WWW.WATWAYS.COM

PRELIMINARY
NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT
GROUP

CULVERT #8
PROFILE AND
SECTION

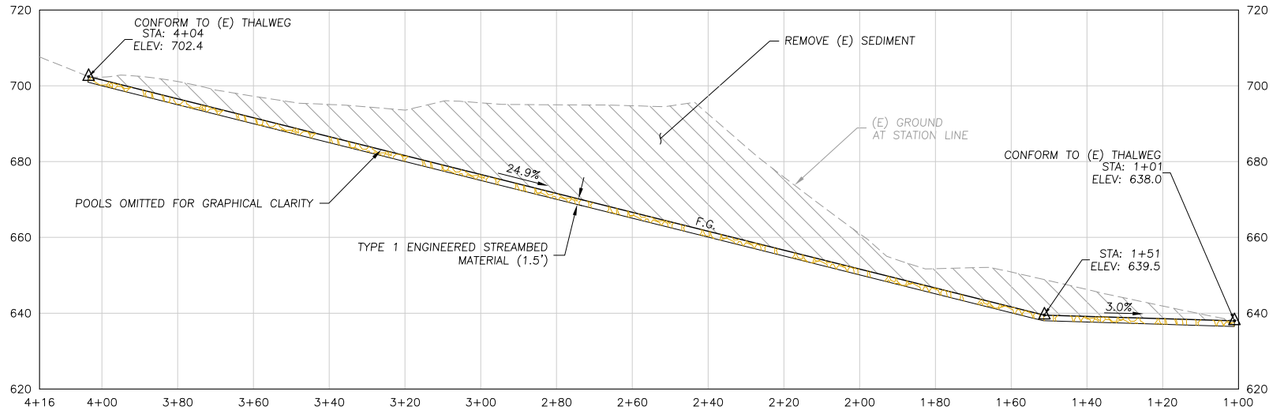
PERMANENTE CREEK
RESTORATION PLAN

70% DESIGN SUBMITTAL

DESIGNED BY:	B.M.Z.
DRAWN BY:	B.M.S.
CHECKED BY:	M.W.W.
DATE:	04/27/15
JOB NO.:	13–016

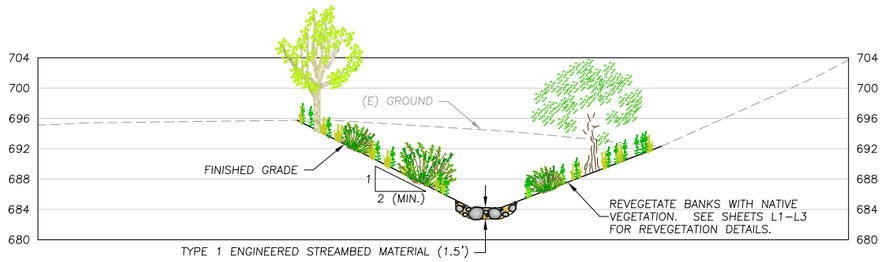
BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

C10 | 10 OF 25

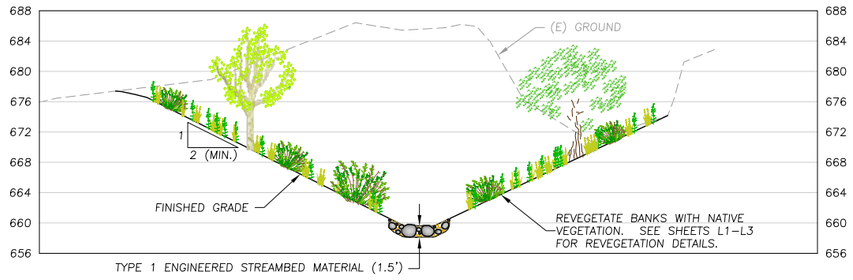


TRIBUTARY PROFILE (2 C9|C11)
SCALE: 1" = 20'

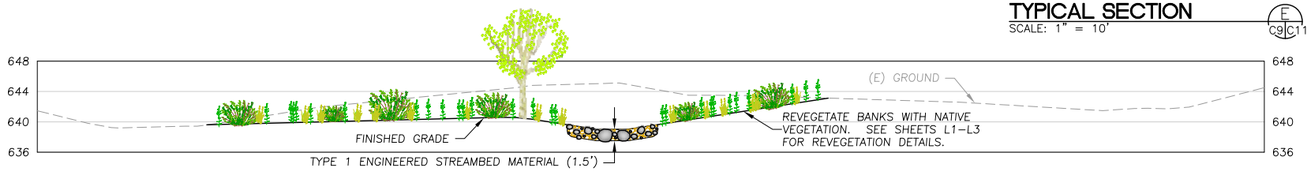
NOTE:
1. FINISHED GRADES SHOWN ARE APPROXIMATE. ALL IMPORTED FILL SHALL BE REMOVED FROM THE CHANNEL BED AND BANKS.
2. CONFORM ENGINEERED STREAMBED MATERIAL TO THE EXISTING CHANNEL AT THE UPSTREAM AND DOWNSTREAM END AS DIRECTED BY THE ENGINEER.



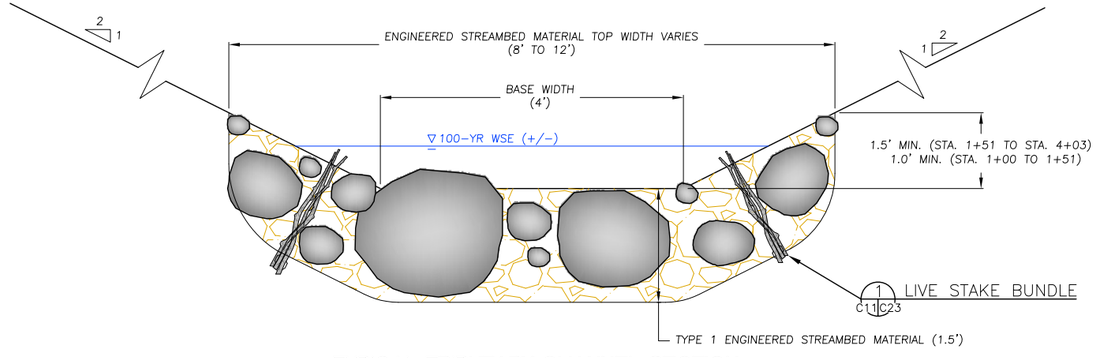
TYPICAL SECTION (D C9|C11)
SCALE: 1" = 10'



TYPICAL SECTION (E C9|C11)
SCALE: 1" = 10'



TYPICAL SECTION (F C9|C11)
SCALE: 1" = 10'



TYPICAL TRIBUTARY CHANNEL SECTION
SCALE: 1" = 1'

WATERWAYS CONSULTING INC.
509A SWIFT ST.
SANTA CRUZ, CA 95060
PH:(831)421-9291 // FAX:(888)819-6847
WWW.WATWAYS.COM

PRELIMINARY
NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT
GROUP

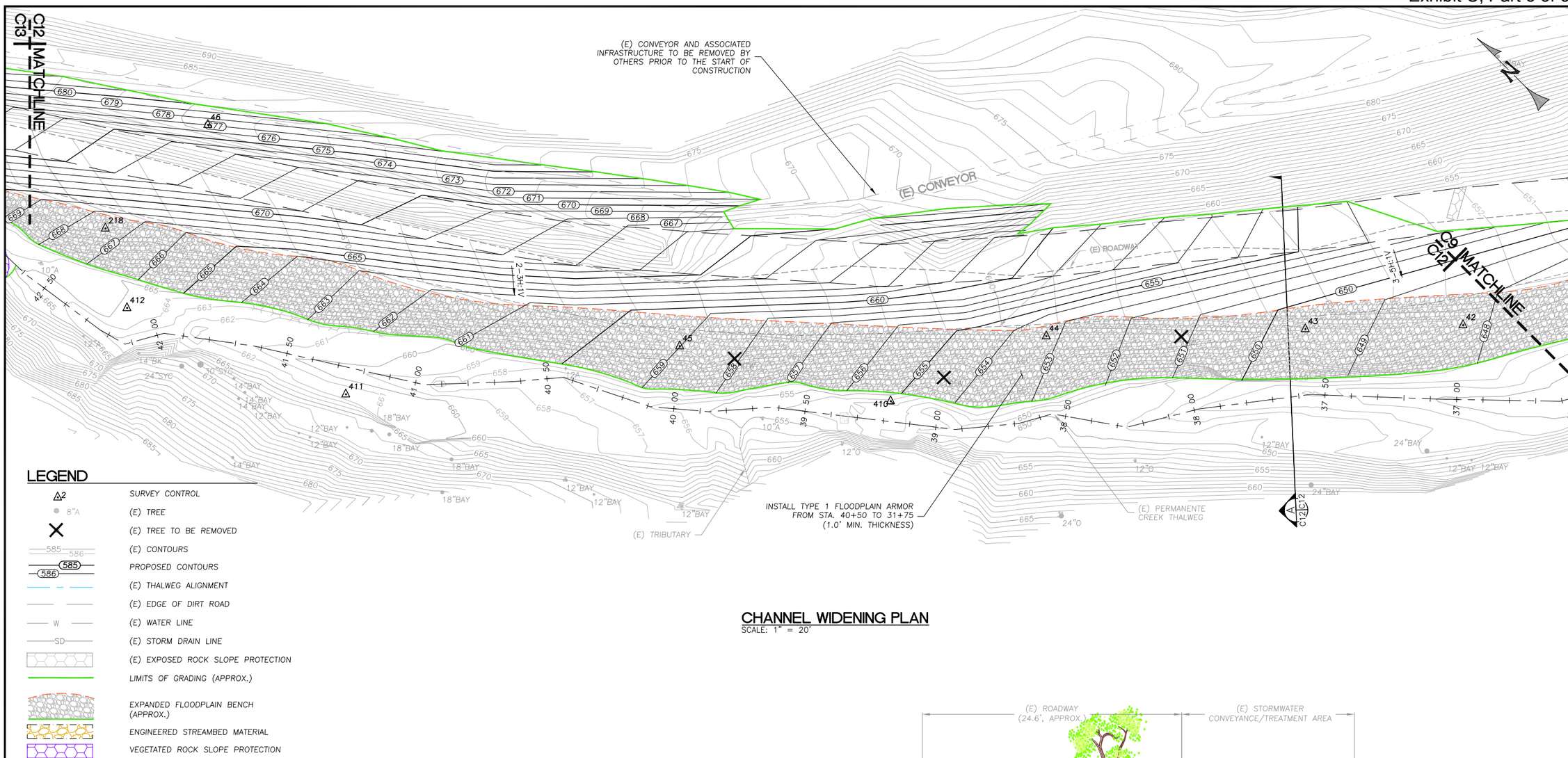
SEDIMENT REMOVAL AREA PROFILE AND SECTIONS

PERMANENTE CREEK RESTORATION PLAN
70% DESIGN SUBMITTAL

DESIGNED BY:	B.Z.
DRAWN BY:	B.S.
CHECKED BY:	M.W.W.
DATE:	04/27/15
JOB NO.:	13-016

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

C11 | 11 OF 25



LEGEND

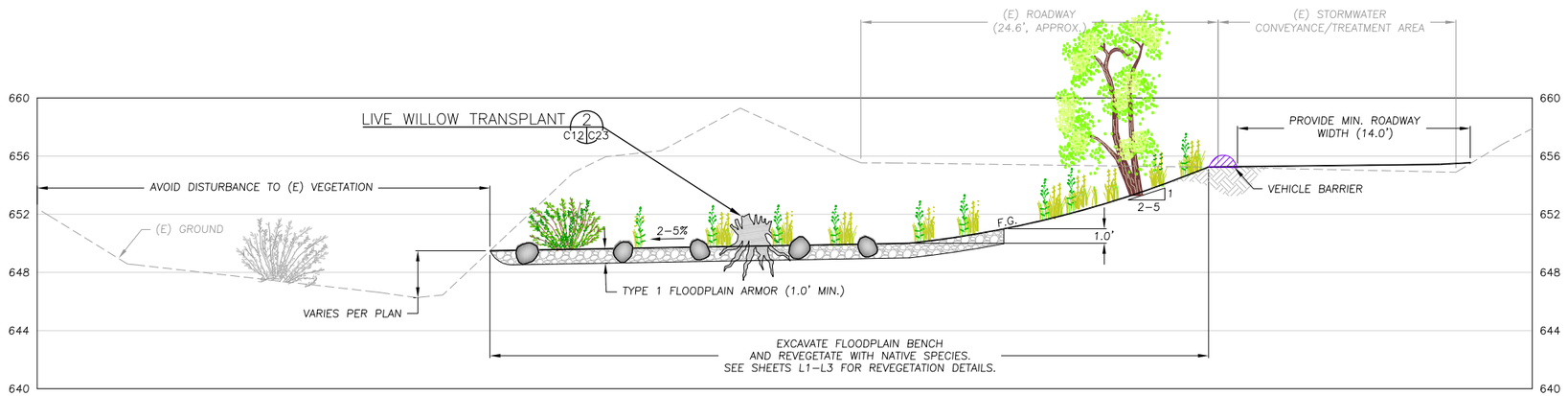
△2	SURVEY CONTROL
8"A	(E) TREE
X	(E) TREE TO BE REMOVED
585 586	(E) CONTOURS
585 586	PROPOSED CONTOURS
	(E) THALWEG ALIGNMENT
	(E) EDGE OF DIRT ROAD
W	(E) WATER LINE
SD	(E) STORM DRAIN LINE
	(E) EXPOSED ROCK SLOPE PROTECTION
	LIMITS OF GRADING (APPROX.)
	EXPANDED FLOODPLAIN BENCH (APPROX.)
	ENGINEERED STREAMBED MATERIAL
	VEGETATED ROCK SLOPE PROTECTION

TREE REMOVAL SUMMARY

TREE SPECIES	DBH	NUMBER
ALDER	18"	1
WILLOW	12"	1
WILLOW	24"	1

CHANNEL WIDENING PLAN

SCALE: 1" = 20'



TYPICAL SECTION

SCALE: 1" = 5'

A C12 C12

WATERWAYS CONSULTING INC.

509A SWIFT ST.
SANTA CRUZ, CA 95060
PH:(831)421-9291 // FAX:(888)819-6847
WWW.WATWAYS.COM

PRELIMINARY

NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:

LEHIGH HANSON HEIDELBERG CEMENT GROUP

CHANNEL WIDENING PLAN (4 OF 5)

PERMANENTE CREEK RESTORATION PLAN

70% DESIGN SUBMITTAL

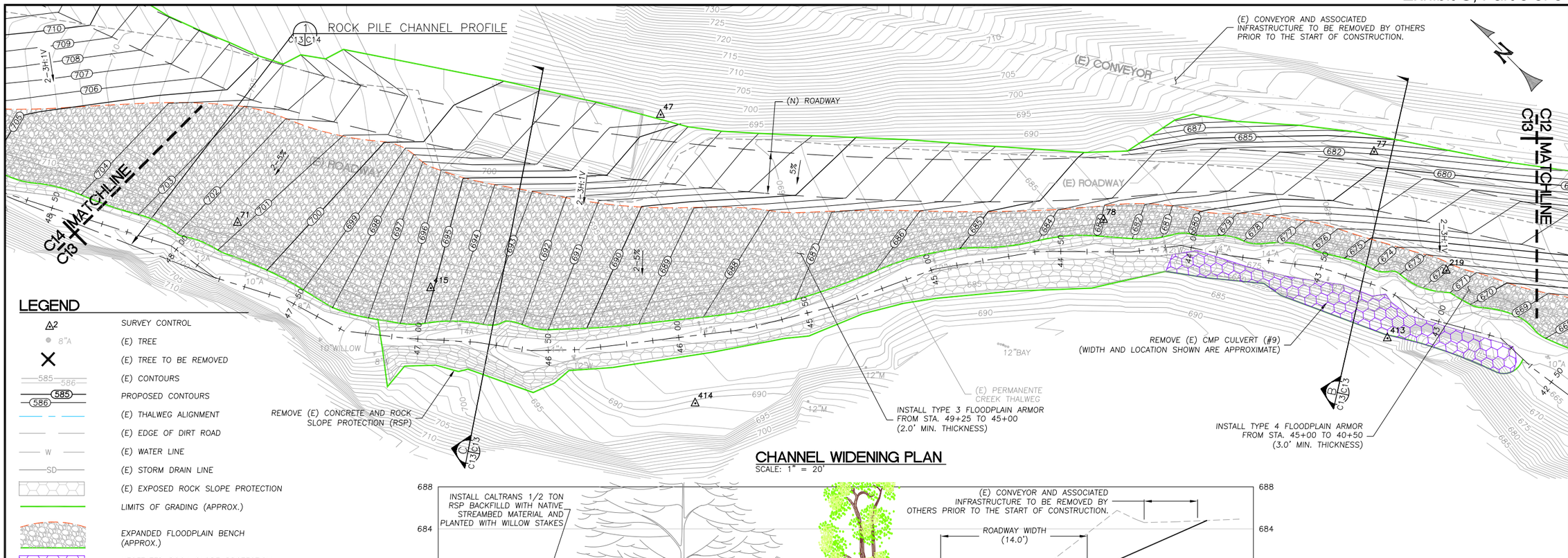
DESIGNED BY: B.Z.
DRAWN BY: B.M.S.
CHECKED BY: M.W.W.
DATE: 04/27/15
JOB NO.: 13-016

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS

0 1"

C12

12 OF 25



LEGEND

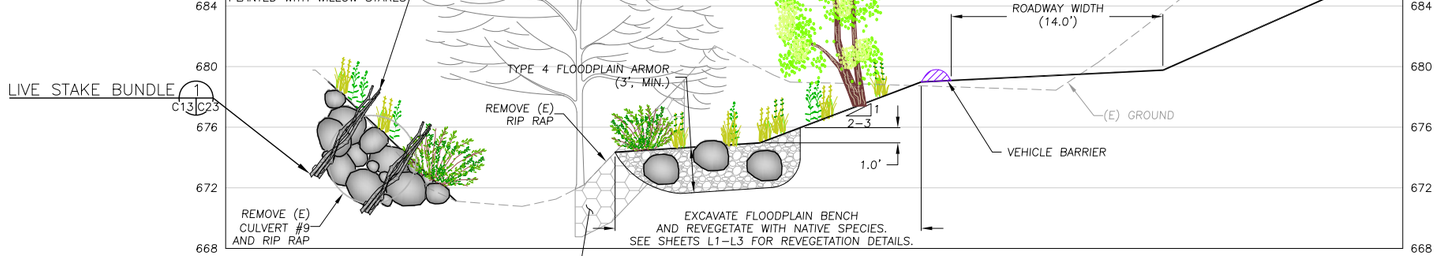
- SURVEY CONTROL
- (E) TREE
- (E) TREE TO BE REMOVED
- (E) CONTOURS
- PROPOSED CONTOURS
- (E) THALWEG ALIGNMENT
- (E) EDGE OF DIRT ROAD
- (E) WATER LINE
- (E) STORM DRAIN LINE
- (E) EXPOSED ROCK SLOPE PROTECTION
- LIMITS OF GRADING (APPROX.)
- EXPANDED FLOODPLAIN BENCH (APPROX.)
- VEGETATED ROCK SLOPE PROTECTION

TREE REMOVAL SUMMARY

TREE SPECIES	DBH	NUMBER
NONE	N/A	N/A

CHANNEL WIDENING PLAN

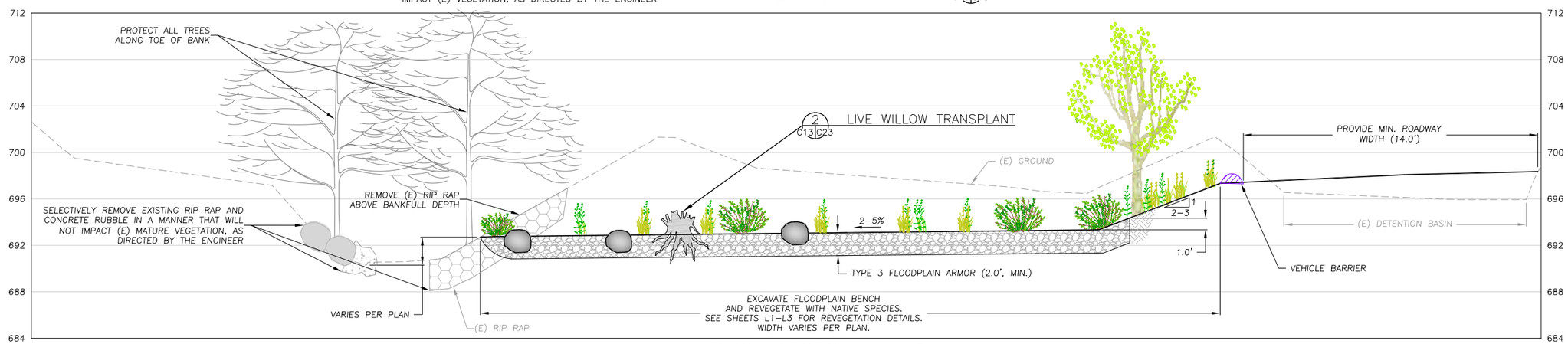
SCALE: 1" = 20'



TYPICAL SECTION

SCALE: 1" = 5'

B C13|C13



TYPICAL SECTION

SCALE: 1" = 5'

C C13|C13

WATERWAYS CONSULTING INC.
509A SWIFT ST.
SANTA CRUZ, CA 95060
PH:(831)421-9291 // FAX:(888)819-6847
WWW.WATWAYS.COM

PRELIMINARY

NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:

LEHIGH HANSON
HEIDELBERG CEMENT GROUP

CHANNEL WIDENING PLAN (5 OF 5)

PERMANENTE CREEK RESTORATION PLAN

70% DESIGN SUBMITTAL

DESIGNED BY:	B.Z.
DRAWN BY:	B.M.S.
CHECKED BY:	M.W.W.
DATE:	04/27/15
JOB NO.:	13-016

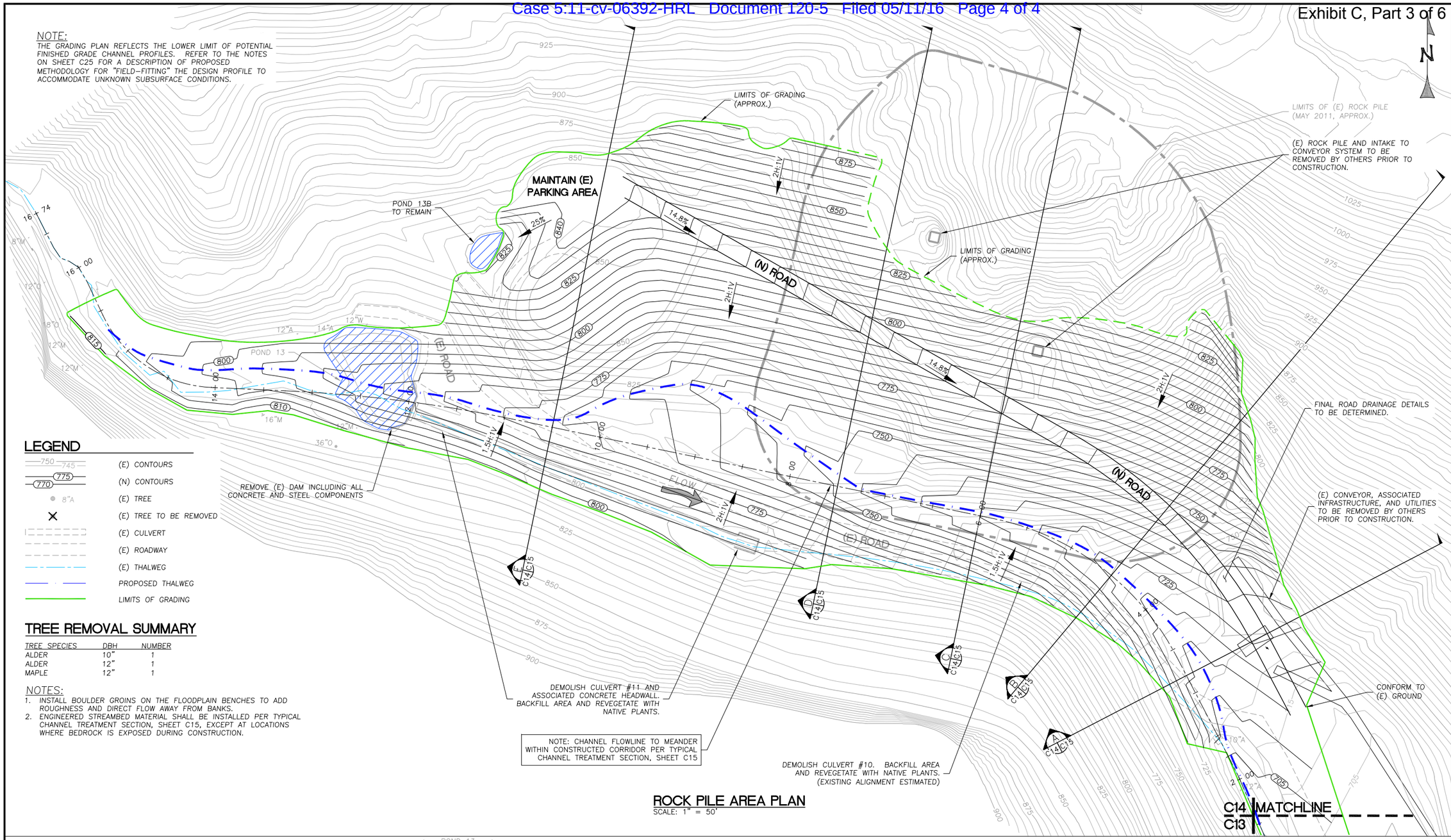
BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS

0 1"

C13

13 OF 25

NOTE:
THE GRADING PLAN REFLECTS THE LOWER LIMIT OF POTENTIAL FINISHED GRADE CHANNEL PROFILES. REFER TO THE NOTES ON SHEET C25 FOR A DESCRIPTION OF PROPOSED METHODOLOGY FOR "FIELD-FITTING" THE DESIGN PROFILE TO ACCOMMODATE UNKNOWN SUBSURFACE CONDITIONS.



LEGEND

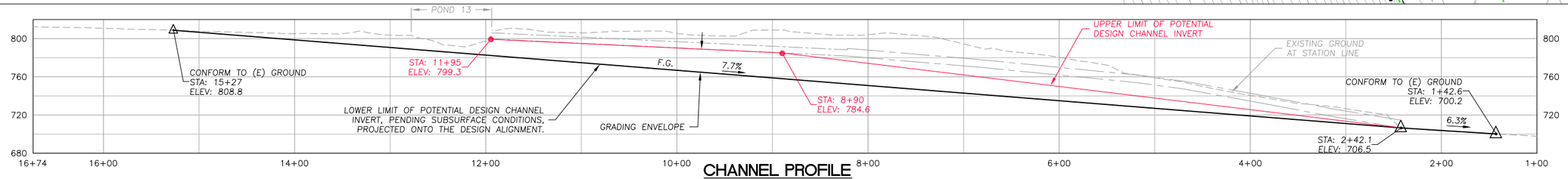
- (E) CONTOURS
- (N) CONTOURS
- (E) TREE
- (E) TREE TO BE REMOVED
- (E) CULVERT
- (E) ROADWAY
- (E) THALWEG
- PROPOSED THALWEG
- LIMITS OF GRADING

TREE REMOVAL SUMMARY

TREE SPECIES	DBH	NUMBER
ALDER	10"	1
ALDER	12"	1
MAPLE	12"	1

NOTES:
1. INSTALL BOULDER GROINS ON THE FLOODPLAIN BENCHES TO ADD ROUGHNESS AND DIRECT FLOW AWAY FROM BANKS.
2. ENGINEERED STREAMBED MATERIAL SHALL BE INSTALLED PER TYPICAL CHANNEL TREATMENT SECTION, SHEET C15, EXCEPT AT LOCATIONS WHERE BEDROCK IS EXPOSED DURING CONSTRUCTION.

ROCK PILE AREA PLAN
SCALE: 1" = 50'



CHANNEL PROFILE
SCALE: 1" = 60'

WATERWAYS CONSULTING INC.
509A SWIFT ST.
SANTA CRUZ, CA 95060
PH:(831)421-9291 // FAX:(888)819-6847
WWW.WATWAYS.COM

PRELIMINARY
NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT GROUP

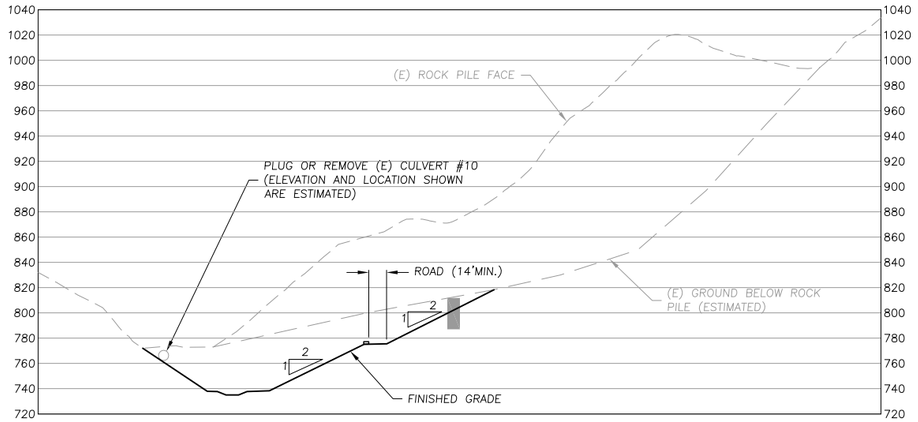
ROCK PILE AREA PLAN

PERMANENTE CREEK RESTORATION PLAN
70% DESIGN SUBMITTAL

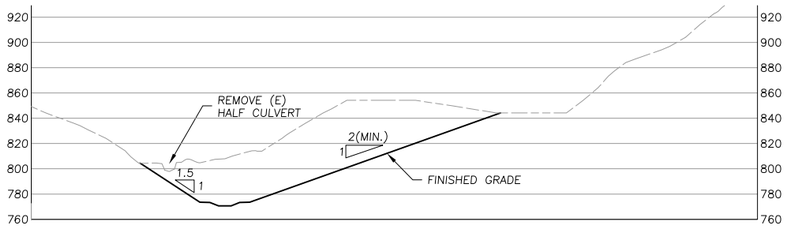
DESIGNED BY: B.Z.
DRAWN BY: B.R.S
CHECKED BY: M.W.W.
DATE: 04/27/15
JOB NO.: 13-016

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

C14 | 14 OF 25

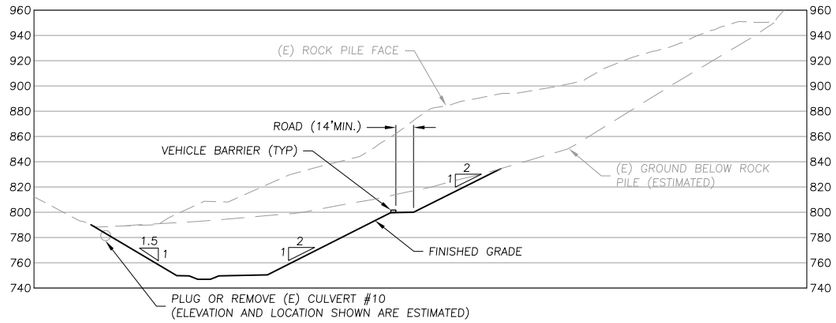


TYPICAL SECTION
SCALE: 1" = 60'
C
C14 C15

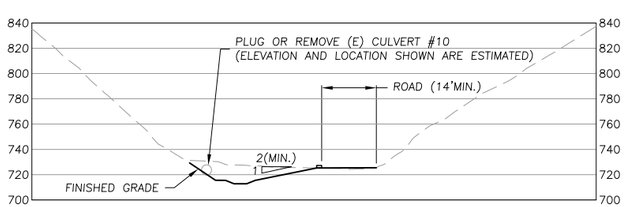


TYPICAL SECTION
SCALE: 1" = 60'
E
C14 C15

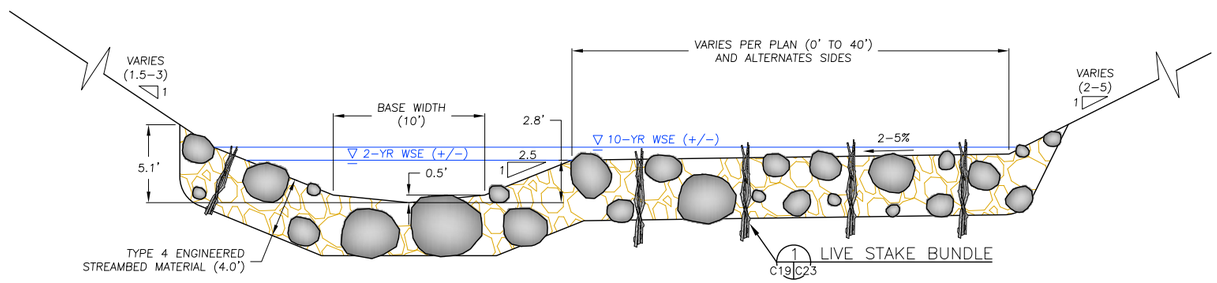
TYPICAL SECTION
SCALE: 1" = 60'
B
C14 C15



TYPICAL SECTION
SCALE: 1" = 60'
D
C14 C15



TYPICAL SECTION
SCALE: 1" = 60'
A
C14 C15



TYPICAL CHANNEL TREATMENT SECTION
SCALE: 1" = 5'

WATERWAYS CONSULTING INC.
509A SWIFT ST.
SANTA CRUZ, CA 95060
PH:(831)421-9291 // FAX:(888)819-6847
WWW.WATWAYS.COM

PRELIMINARY
NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT
GROUP

ROCK PILE
AREA
SECTIONS

PERMANENTE CREEK
RESTORATION PLAN
70% DESIGN SUBMITTAL

DESIGNED BY: B.M.Z.
DRAWN BY: B.R.S.
CHECKED BY: M.W.W.
DATE: 04/27/15
JOB NO.: 13-016

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

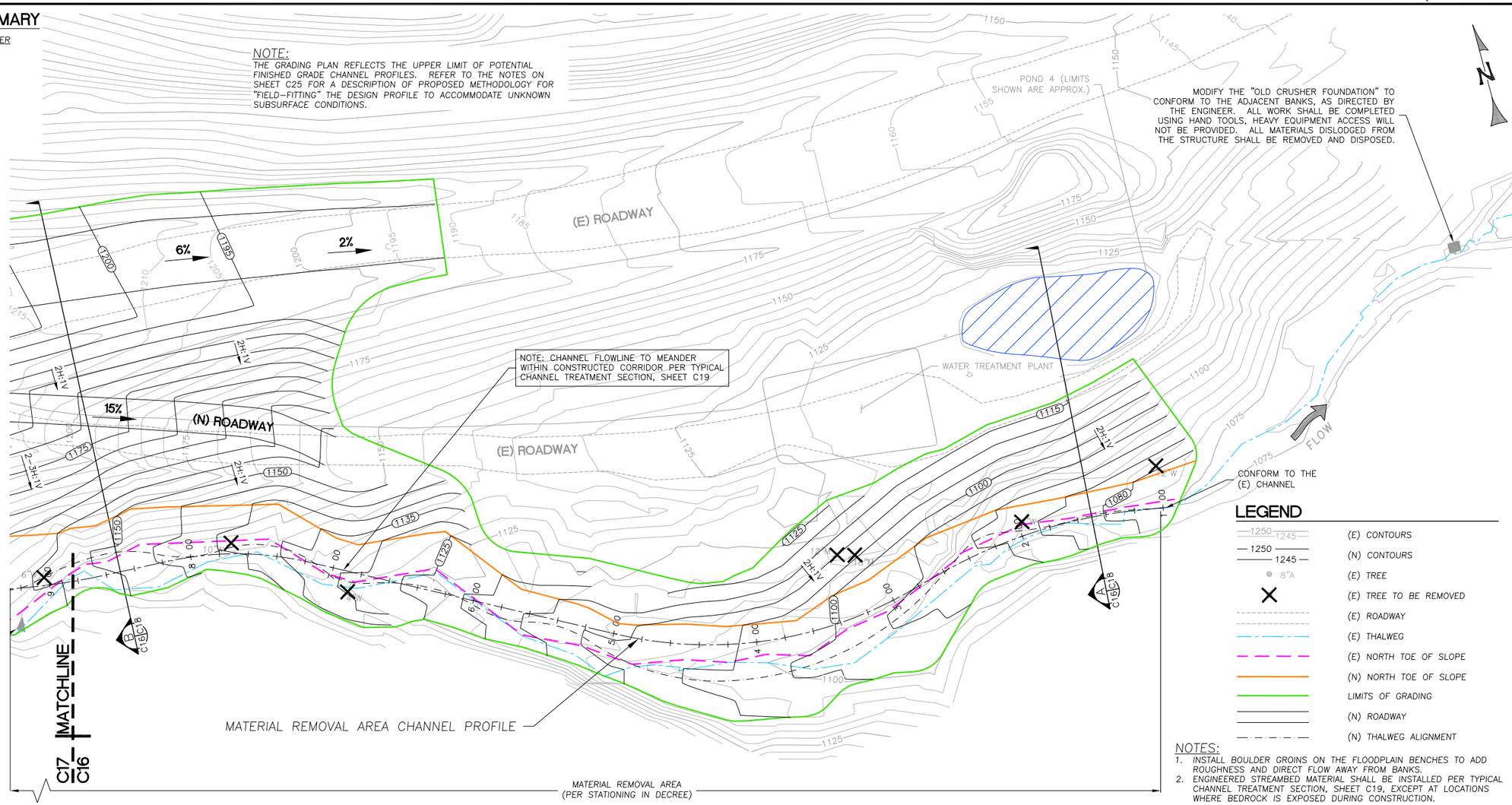
C15

15 OF 25

TREE REMOVAL SUMMARY

TREE SPECIES	DBH	NUMBER
MADRONE	12"	1
MADRONE	18"	1
WILLOW	4"	1
WILLOW	6"	2
WILLOW	10"	1
WILLOW	12"	1

NOTE:
THE GRADING PLAN REFLECTS THE UPPER LIMIT OF POTENTIAL FINISHED GRADE CHANNEL PROFILES. REFER TO THE NOTES ON SHEET C25 FOR A DESCRIPTION OF PROPOSED METHODOLOGY FOR "FIELD-FITTING" THE DESIGN PROFILE TO ACCOMMODATE UNKNOWN SUBSURFACE CONDITIONS.

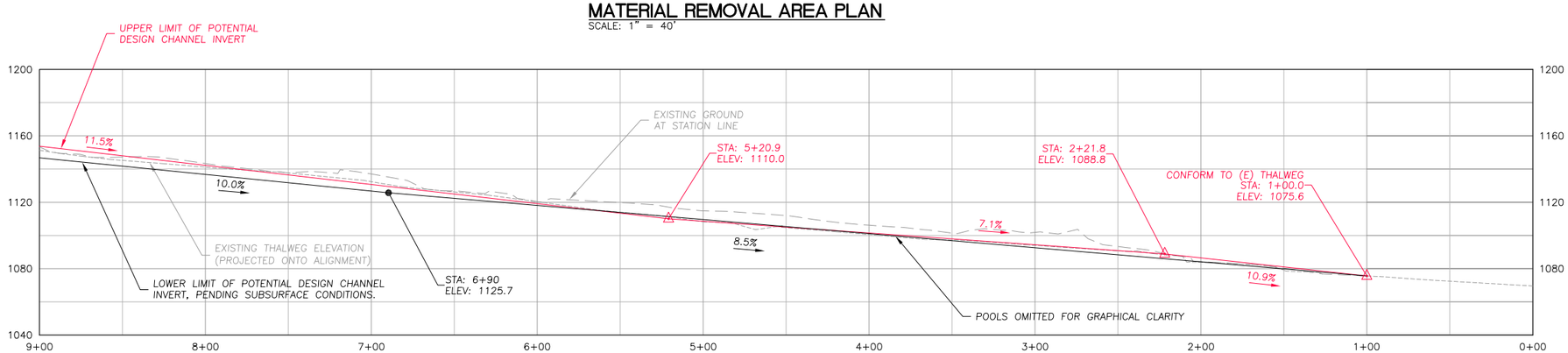


LEGEND

- (E) CONTOURS
- (N) CONTOURS
- (E) TREE
- (E) TREE TO BE REMOVED
- (E) ROADWAY
- (E) THALWEG
- (E) NORTH TOE OF SLOPE
- (N) NORTH TOE OF SLOPE
- LIMITS OF GRADING
- (N) ROADWAY
- (N) THALWEG ALIGNMENT

NOTES:
1. INSTALL BOULDER GROINS ON THE FLOODPLAIN BENCHES TO ADD ROUGHNESS AND DIRECT FLOW AWAY FROM BANKS.
2. ENGINEERED STREAMBED MATERIAL SHALL BE INSTALLED PER TYPICAL CHANNEL TREATMENT SECTION, SHEET C19, EXCEPT AT LOCATIONS WHERE BEDROCK IS EXPOSED DURING CONSTRUCTION.

MATERIAL REMOVAL AREA PLAN
SCALE: 1" = 40'



MATERIAL REMOVAL AREA CHANNEL PROFILE
SCALE: 1" = 40'

WATERWAYS CONSULTING INC.
509A SWIFT ST.
SANTA CRUZ, CA 95060
PH:(831)421-9291 // FAX:(888)819-6847
WWW.WATWAYS.COM

PRELIMINARY
NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT GROUP

MATERIAL REMOVAL AREA PLAN (1 OF 2)

PERMANENTE CREEK RESTORATION PLAN
70% DESIGN SUBMITTAL

DESIGNED BY: B.M.Z.
DRAWN BY: B.M.S.
CHECKED BY: M.W.W.
DATE: 04/27/15
JOB NO.: 13-016

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

C16 | 16 OF 25

LEGEND

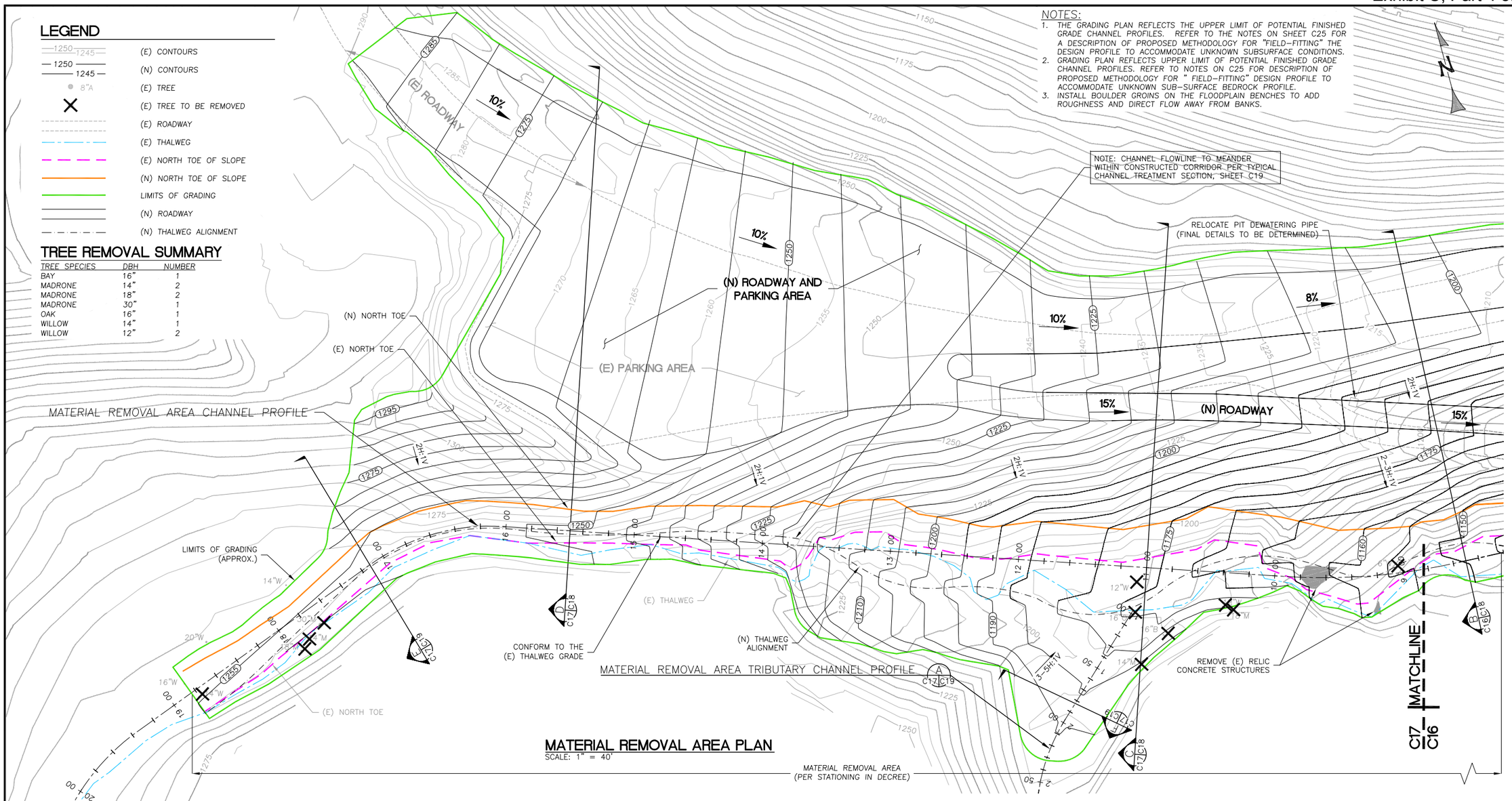
- (E) CONTOURS
- (N) CONTOURS
- (E) TREE
- (E) TREE TO BE REMOVED
- (E) ROADWAY
- (E) THALWEG
- (E) NORTH TOE OF SLOPE
- (N) NORTH TOE OF SLOPE
- LIMITS OF GRADING
- (N) ROADWAY
- (N) THALWEG ALIGNMENT

TREE REMOVAL SUMMARY

TREE SPECIES	DBH	NUMBER
BAY	16"	1
MADRONE	14"	2
MADRONE	18"	2
MADRONE	30"	1
OAK	16"	1
WILLOW	14"	1
WILLOW	12"	2

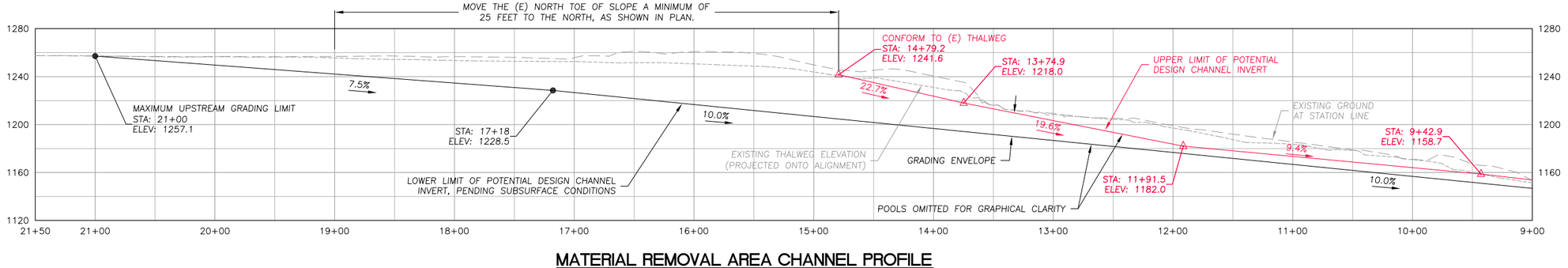
NOTES:

1. THE GRADING PLAN REFLECTS THE UPPER LIMIT OF POTENTIAL FINISHED GRADE CHANNEL PROFILES. REFER TO THE NOTES ON SHEET C25 FOR A DESCRIPTION OF PROPOSED METHODOLOGY FOR "FIELD-FITTING" THE DESIGN PROFILE TO ACCOMMODATE UNKNOWN SUBSURFACE CONDITIONS.
2. GRADING PLAN REFLECTS UPPER LIMIT OF POTENTIAL FINISHED GRADE CHANNEL PROFILES. REFER TO NOTES ON C25 FOR DESCRIPTION OF PROPOSED METHODOLOGY FOR " FIELD-FITTING" DESIGN PROFILE TO ACCOMMODATE UNKNOWN SUB-SURFACE BEDROCK PROFILE.
3. INSTALL BOULDER GROINS ON THE FLOODPLAIN BENCHES TO ADD ROUGHNESS AND DIRECT FLOW AWAY FROM BANKS.



MATERIAL REMOVAL AREA PLAN

SCALE: 1" = 40'



MATERIAL REMOVAL AREA CHANNEL PROFILE

SCALE: 1" = 50'

WATERWAYS CONSULTING INC.
509A SWIFT ST.
SANTA CRUZ, CA 95060
PH:(831)421-9291 // FAX:(888)819-6847
WWW.WATWAYS.COM

PRELIMINARY

NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT GROUP

MATERIAL REMOVAL AREA PLAN (2 OF 2)

PERMANENTE CREEK RESTORATION PLAN

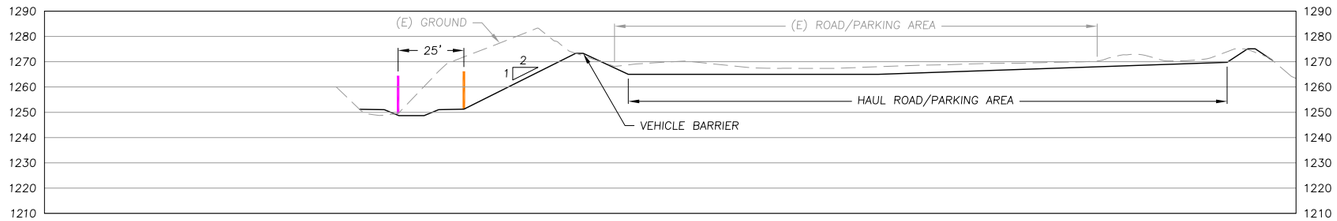
70% DESIGN SUBMITTAL

DESIGNED BY:	B.Z.
DRAWN BY:	B.M.S.
CHECKED BY:	M.W.W.
DATE:	04/27/15
JOB NO.:	13-016

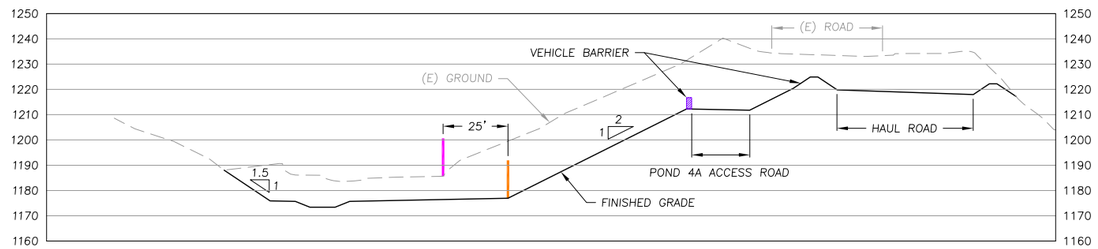
BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS

0 1"

C17 | 17 OF 25

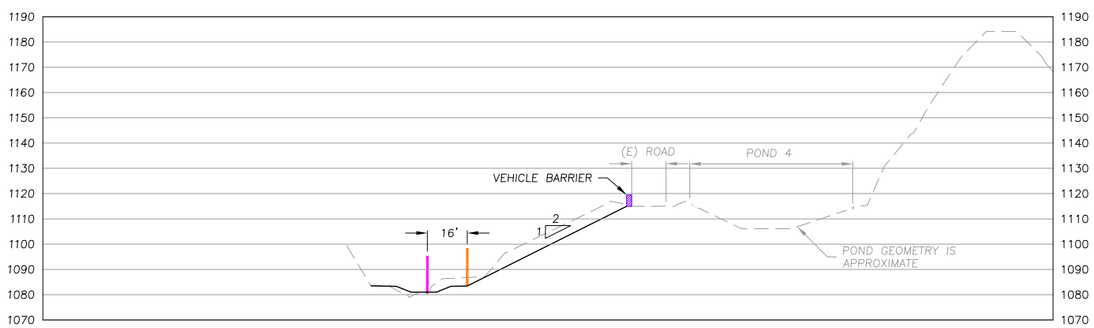


TYPICAL SECTION (D) C17 C18
SCALE: 1" = 30'



TYPICAL SECTION (C) C17 C18
SCALE: 1" = 30'

TYPICAL SECTION (B) C17 C18
SCALE: 1" = 30'



TYPICAL SECTION (A) C17 C18
SCALE: 1" = 30'

LEGEND

(E) NORTH SLOPE TOE

PROPOSED NORTH SLOPE TOE

WATERWAYS CONSULTING INC.
509A SWIFT ST.
SANTA CRUZ, CA 95060
PH:(831)421-9291 // FAX:(888)819-6847
WWW.WATWAYS.COM

PRELIMINARY

NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT GROUP

MATERIAL REMOVAL AREA SECTIONS (1 OF 2)

PERMANENTE CREEK RESTORATION PLAN

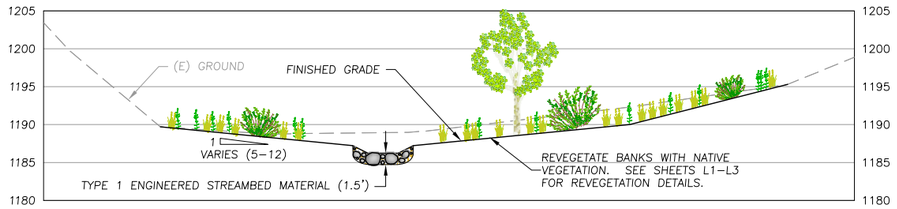
70% DESIGN SUBMITTAL

DESIGNED BY: B.M.Z.
DRAWN BY: B.M.S.
CHECKED BY: M.W.W.
DATE: 04/27/15
JOB NO.: 13-016

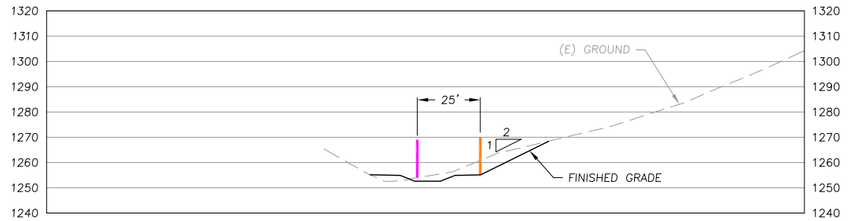
BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

C18

18 OF 25



TYPICAL SECTION
SCALE: 1" = 10'
F C17|C19

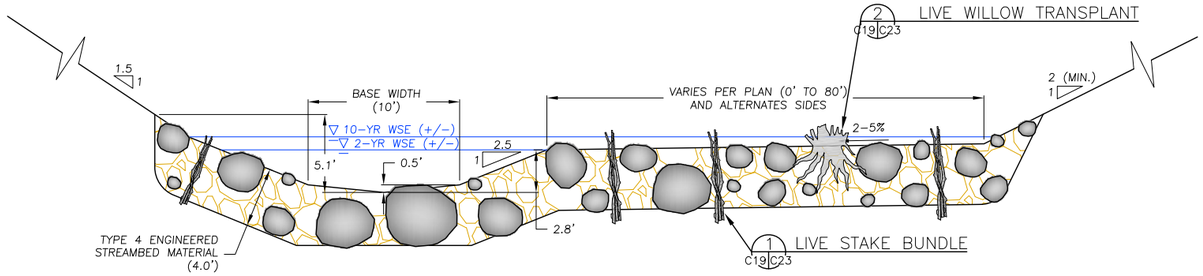


TYPICAL SECTION
SCALE: 1" = 30'
E C17|C19

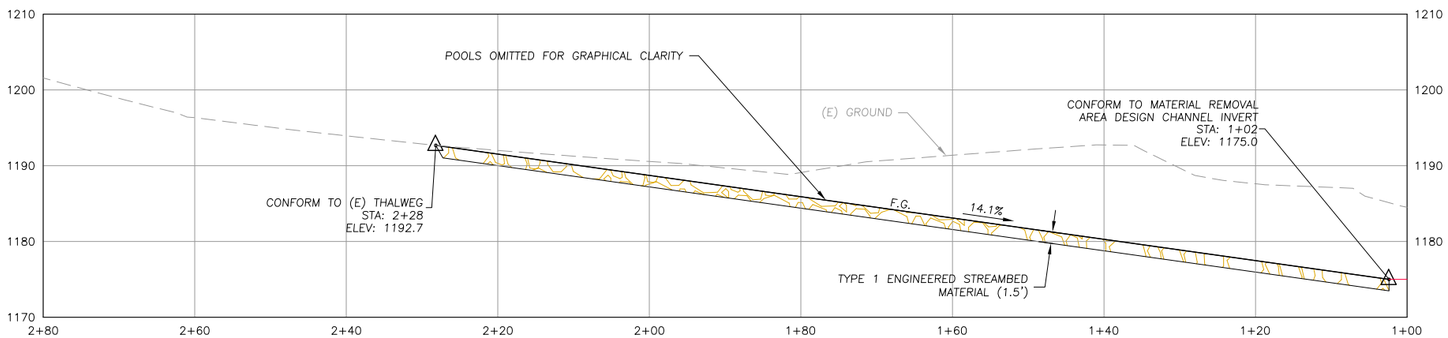
LEGEND

(E) NORTH SLOPE TOE

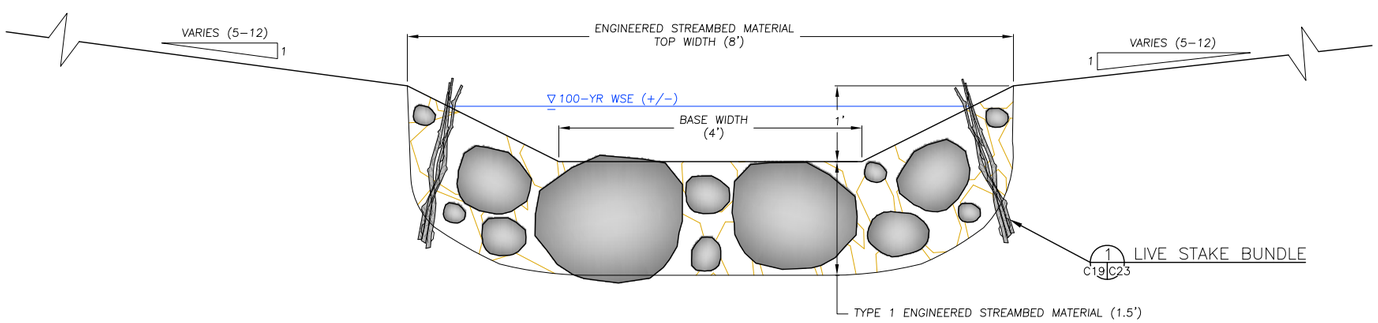
PROPOSED NORTH SLOPE TOE



TYPICAL CHANNEL TREATMENT SECTION
SCALE: 1" = 5'



MATERIAL REMOVAL AREA TRIBUTARY CHANNEL PROFILE
SCALE: 1" = 10'
A C17|C19



TYPICAL TRIBUTARY CHANNEL TREATMENT SECTION
SCALE: 1" = 1'

WATERWAYS CONSULTING INC.
509A SWIFT ST.
SANTA CRUZ, CA 95060
PH:(831)421-9291 // FAX:(888)819-6847
WWW.WATWAYS.COM

PRELIMINARY
NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT GROUP

MATERIAL REMOVAL AREA SECTIONS (2 OF 2)

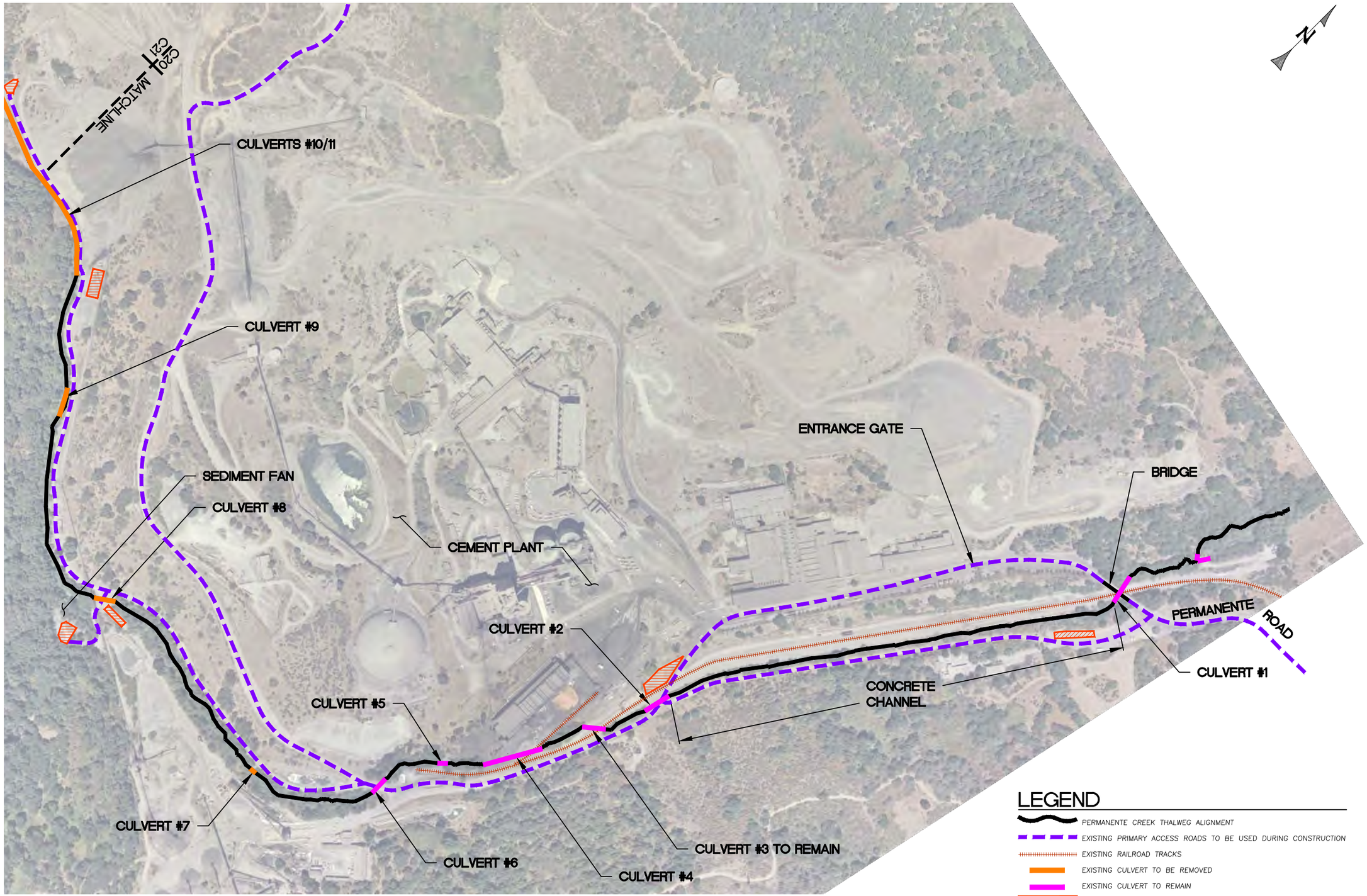
PERMANENTE CREEK RESTORATION PLAN
70% DESIGN SUBMITTAL

DESIGNED BY: B.Z.
DRAWN BY: B.M.S.
CHECKED BY: M.W.W.
DATE: 04/27/15
JOB NO.: 13-016

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

C19

19 OF 25



ACCESS AND STAGING PLAN
SCALE: 1"=200'

WATERWAYS CONSULTING INC.
509A SWIFT ST.
SANTA CRUZ, CA 95060
PH:(831)421-9291 // FAX:(888)819-6847
WWW.WATWAYS.COM

PRELIMINARY
NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT GROUP

ACCESS AND STAGING PLAN (1 OF 2)

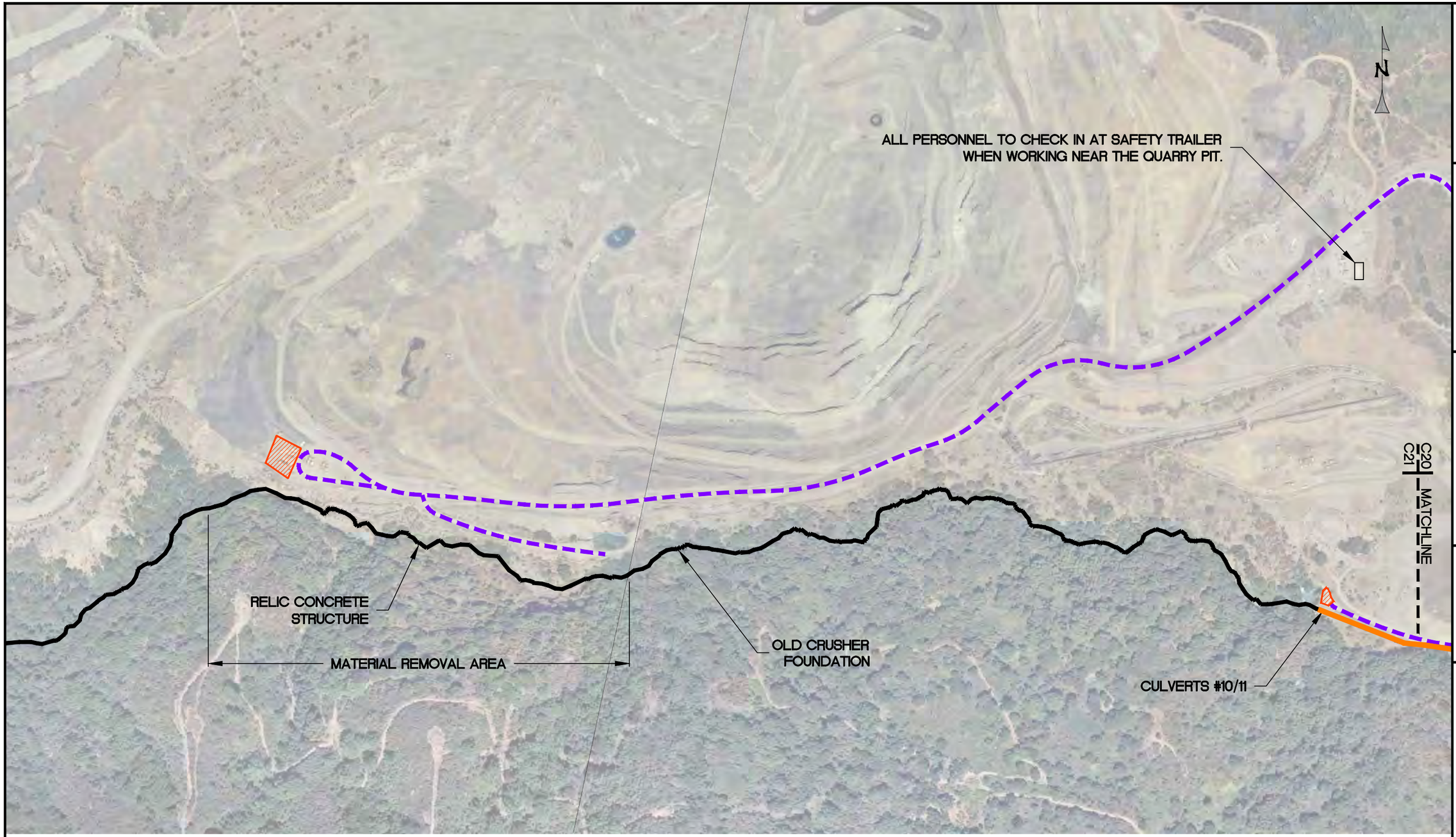
PERMANENTE CREEK RESTORATION PLAN
70% DESIGN SUBMITTAL

DESIGNED BY: B.M.S.
DRAWN BY: B.M.S.
CHECKED BY: M.W.W.
DATE: 04/27/15
JOB NO.: 13-016

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

C20

20 OF 25



LEGEND

- PERMANENTE CREEK THALWEG ALIGNMENT
- EXISTING PRIMARY ACCESS ROADS TO BE USED DURING CONSTRUCTION
- EXISTING RAILROAD TRACKS
- EXISTING CULVERT TO BE REMOVED
- EXISTING CULVERT TO REMAIN
- STAGING AND STOCKPILE AREAS

ACCESS AND STAGING PLAN
SCALE: 1" = 200'

WATERWAYS CONSULTING INC.
509A SWIFT ST.
SANTA CRUZ, CA 95060
PH:(831)421-9291 // FAX:(888)819-6847
WWW.WATWAYS.COM

PRELIMINARY

NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT GROUP

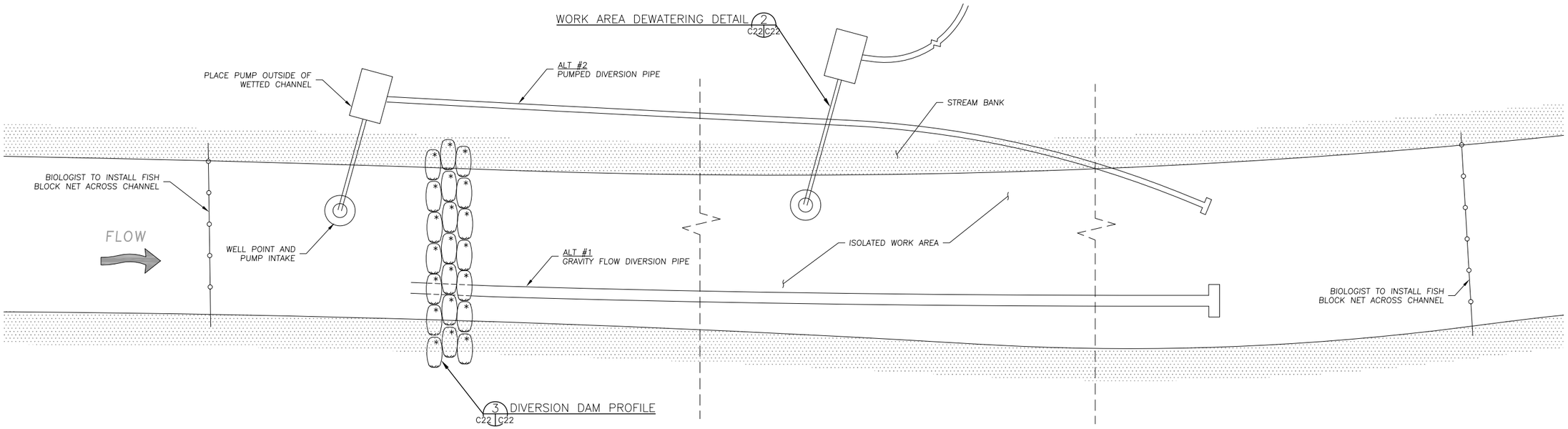
ACCESS AND STAGING PLAN (2 OF 2)

PERMANENTE CREEK RESTORATION PLAN
70% DESIGN SUBMITTAL

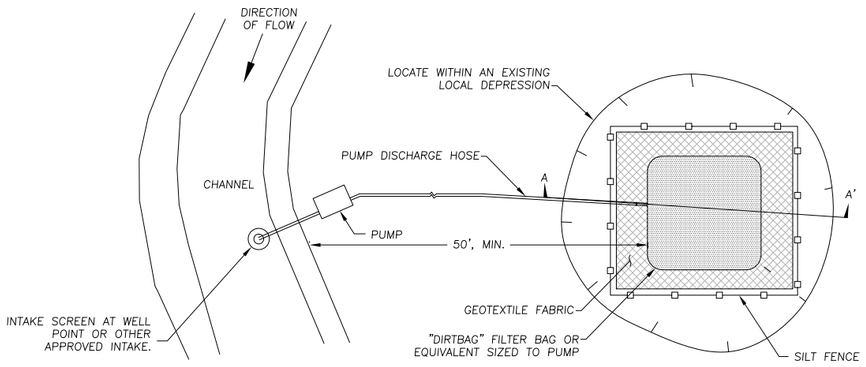
DESIGNED BY: B.M.S.
DRAWN BY: B.M.S.
CHECKED BY: M.W.W.
DATE: 04/27/15
JOB NO.: 13-016

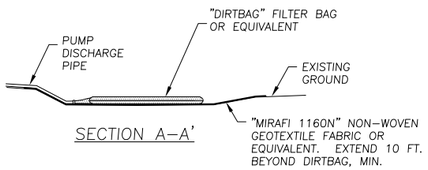
BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

C21 | 21 OF 25



TYPICAL DEWATERING PLAN
N.T.S. 1 C22 C22



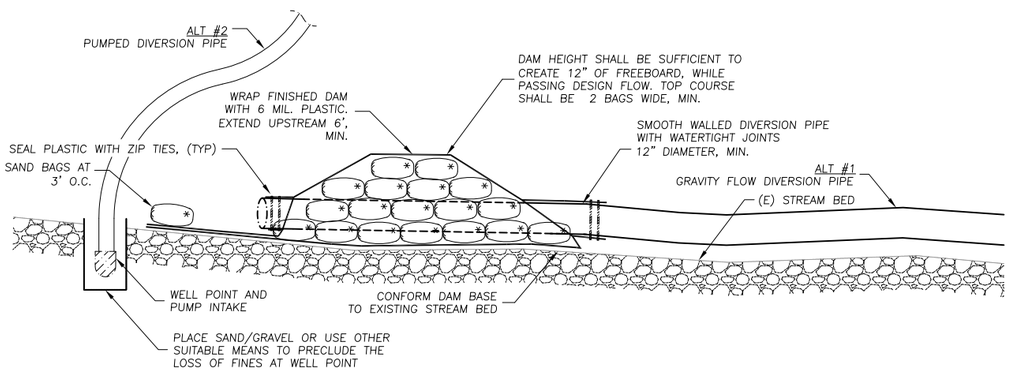


SECTION A–A'

DEWATERING DISCHARGE AREA NOTES:
1. DEWATERING SHALL COMPLY WITH ALL PROJECT PERMITS.
2. THIS DETAIL REPRESENTS A POTENTIAL OPTION FOR DEWATERING OF WORK AREAS.
3. PROPOSED FILTRATION METHODS WILL BE FIELD–FIT TO EXISTING CONDITIONS AT THE TIME OF CONSTRUCTION, AS APPROVED BY THE ENGINEER.
4. TURBID WATER SHALL BE DISCHARGED AT A LOCATION WHERE THERE IS AN EXISTING DEPRESSION AT A MINIMUM OF 50 FEET FROM THE EXISTING CHANNEL. EXACT LOCATION TO BE APPROVED BY THE ENGINEER. WHERE NATURAL DEPRESSION CANNOT BE FOUND, FILTER BAGS, "BAKER TANKS" OR OTHER APPROVED MEANS SHALL BE EMPLOYED.
5. NO OVERLAND FLOW SHALL BE ALLOWED TO DRAIN FROM A DISCHARGE AREA TO AN EXISTING OR PROPOSED CHANNEL.

WORK AREA DEWATERING DETAIL
N.T.S. 2 C22 C22

DIVERSION NOTES
1. THE DIVERSION PLAN SHOWN IS SCHEMATIC. CONTRACTOR SHALL SUBMIT A SITE DIVERSION/DEWATERING PLAN FOR APPROVAL BY THE ENGINEER. THE BASIC REQUIREMENTS OF THE DIVERSION PLAN ARE SPECIFIED IN THE SPECIAL PROVISIONS.
2. THE TYPICAL DEWATERING PLAN SHOWN DEPICTS TWO SEPARATE TYPES OF DIVERSION STRUCTURES TO BE INSTALLED AND MAINTAINED DURING CONSTRUCTION. THESE STRUCTURES MAY BE USED SEPARATELY OR IN TANDEM AS NECESSARY TO MEET WATER QUALITY REQUIREMENTS.
3. DIVERSION PIPES MAY BE RELOCATED DURING CONSTRUCTION.



DIVERSION DAM PROFILE
N.T.S. 3 C22 C22

NOTE: CONTRACTOR MAY USE ALTERNATE DAM DETAIL, SUBJECT TO APPROVAL OF THE ENGINEER AND THE PERMITTING AGENCIES.

WATERWAYS CONSULTING INC.
509A SWIFT ST.
SANTA CRUZ, CA 95060
PH:(831)421-9291 // FAX:(888)819-6847
WWW.WATWAYS.COM

PRELIMINARY
NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT GROUP

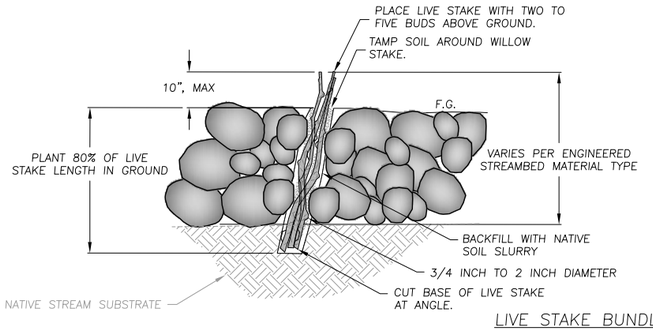
DEWATERING DETAILS

PERMANENTE CREEK RESTORATION PLAN
70% DESIGN SUBMITTAL

DESIGNED BY:	–
DRAWN BY:	B.M.S.
CHECKED BY:	M.W.W.
DATE:	04/27/15
JOB NO.:	13-016

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

C22 | 22 OF 25

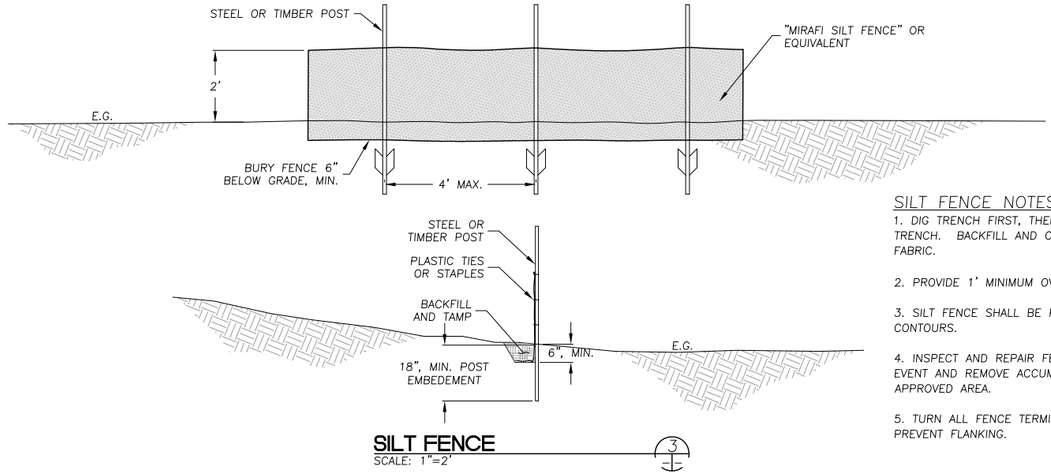


LIVE STAKE BUNDLE

N.T.S. 1

LIVE STAKE BUNDLE NOTES:

1. LIVE STAKE BUNDLES TO BE INSTALLED WITHIN ENGINEERED STREAMBED MATERIAL ON EXCAVATED FLOODPLAINS AND WITHIN FLOODPLAIN ARMOR AT 7' ON-CENTER SPACING.
2. LIVE STAKE BUNDLES SHALL CONTACT NATIVE SOIL.
3. LIVE STAKE BUNDLES TO CONSIST OF LIVE STAKES 3/4"-2" IN DIA. AT THE BASAL END.
4. TOP ENDS OF STAKES SHALL BE BLUNT AND BASAL ENDS SHALL BE ANGLED AT 45 DEGREES.
5. PLACE LIVE STAKE BUNDLES COINCIDENT WITH THE ENGINEERED STREAMBED MATERIAL AND FLOODPLAIN ARMOR.
6. AFTER PLACEMENT, BACKFILL AND WATER-JET ALL VOIDS AROUND LIVE STAKE BUNDLES TO REMOVE AIR POCKETS.
7. AFTER INSTALLATION CLEANLY CUT EACH STAKE TO LEAVE 10" EXPOSED, MAX.

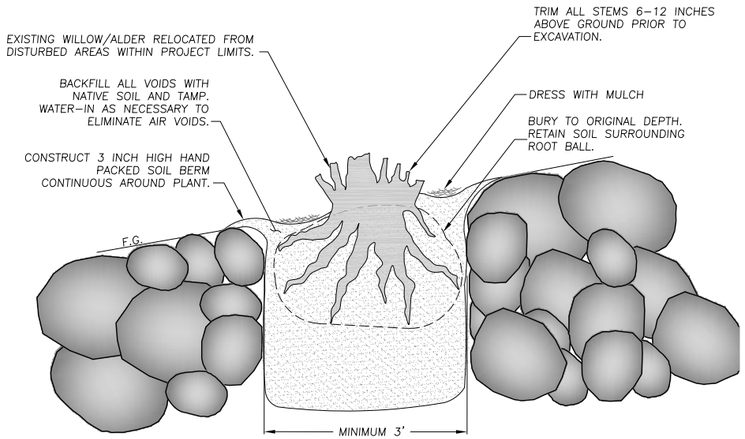


SILT FENCE

SCALE: 1"=2' 3

SILT FENCE NOTES

1. DIG TRENCH FIRST, THEN ERECT FENCE IN TRENCH. BACKFILL AND COMPACT SOIL TO SECURE FABRIC.
2. PROVIDE 1' MINIMUM OVERLAP AT FENCE SPLICES.
3. SILT FENCE SHALL BE PLACED ON SLOPE CONTOURS.
4. INSPECT AND REPAIR FENCE AFTER EACH STORM EVENT AND REMOVE ACCUMULATED SEDIMENT, TO AN APPROVED AREA.
5. TURN ALL FENCE TERMINATIONS UPSLOPE TO PREVENT FLANKING.



WILLOW TRANSPLANT DETAIL

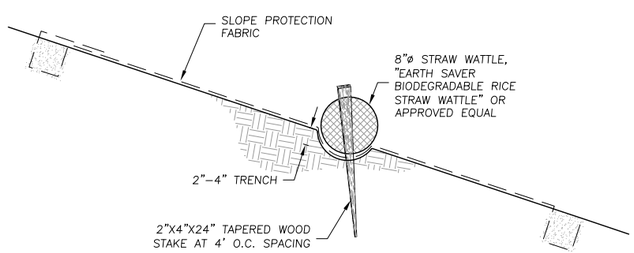
SCALE: N.T.S. 2

WILLOW TRANSPLANT NOTES:

1. SALVAGE:
   - 1.1. LIVE SHRUBS TO BE SALVAGED FOR TRANSPLANTING WILL BE FLAGGED IN THE FIELD BY THE ENGINEER.
   - 1.2. PRIOR TO REMOVAL, LOP BRANCHES TO 6-12 INCHES ABOVE THE ROOT CROWN, USING SHARP, CLEAN TOOLS.
   - 1.3. REMOVE THE ROOTWAD AND A MINIMUM EIGHTEEN INCH LAYER (AT SIDES AND BASE) OF ROOTS AND SOIL FROM THE GROUND AND EITHER TRANSPORT DIRECTLY TO THE PROPOSED LOCATION FOR INSTALLATION, OR STORE AS OUTLINED BELOW. PERFORM SALVAGE AND RELOCATION IN SUCH A MANNER AS TO MINIMIZE HANDLING AND ASSOCIATED DISTURBANCE TO THE SOIL BOUND BY THE ROOTS.
   - 1.4. IMMEDIATELY COVER LIVE SHRUBS WITH A SINGLE LAYER OF SATURATED BURLAP TO PREVENT DESICCATION OF THE ROOTS, AND PLACED UNDER SHADE COVERING IF THE LIVE SHRUB IS NOT PLANTED WITHIN FIFTEEN MINUTES OF SALVAGE. CONTRACTOR SHALL MAINTAIN SATURATION OF THE BURLAP AND SOIL MASS UNTIL PLANTED.
   - 1.5. DO NOT STACK LIVE SHRUBS ON TOP OF ONE ANOTHER DURING STORAGE.
   - 1.6. IN NO EVENT SHALL SALVAGED ROOTWADS BE STORED FOR PERIODS EXCEEDING 72 HOURS, WITHOUT PRIOR WRITTEN PERMISSION OF THE ENGINEER.
2. INSTALLATION
   - 2.1. PLACE LIVE SHRUBS AT FLOODPLAIN LOCATIONS FLAGGED IN THE FIELD BY THE ENGINEER.
   - 2.2. PLACE THE EXCAVATED ROOTWAD IN A PRE-PREPARED HOLE. FILL THE HOLE WITH WATER IMMEDIATELY PRIOR TO PLANTING. SCARIFY THE SIDES OF THE PLANTING HOLE PRIOR TO PLANTING.
   - 2.3. REMOVE BURLAP PRIOR TO PLANTING. BACKFILL THE HOLE HALF WAY WITH NATIVE SOIL AND JET WITH WATER TO REMOVE VOIDS AFTER PLACEMENT. CONTINUE TO ADD SOIL AND WATER UNTIL THE SATURATED BACKFILL MATERIAL COVERS THE TOP OF THE ROOT CROWN TO THE APPROXIMATE ORIGINAL DEPTH OF SOIL, PRIOR TO SALVAGE.

BOUNDARY FENCE DETAIL

SCALE: 1"=3' 4



FIBER ROLL

SCALE: 1"=1' 5

WATERWAYS CONSULTING INC.

509A SWIFT ST.
SANTA CRUZ, CA 95060
PH:(831)421-9291 // FAX:(888)819-6847
WWW.WATWAYS.COM

PRELIMINARY

NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT
GROUP

MISCELLANEOUS DETAILS

PERMANENTE CREEK
RESTORATION PLAN
70% DESIGN SUBMITTAL

DESIGNED BY:	-
DRAWN BY:	B.M.S.
CHECKED BY:	M.W.W.
DATE:	04/27/15
JOB NO.:	13-016

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS

0 1"

C23

23 OF 25

ROCK SPECIFICATIONS

THERE SHALL BE THREE CLASSES OF ROCK SPECIFIED ON THIS PROJECT;
(1) – ENGINEERED STREAMBED MATERIAL
(2) – FLOODPLAIN ARMOR
(3) – ROCK SLOPE PROTECTION (R.S.P.)

ALL IMPORTED ROCK SHALL CONFORM TO THE FOLLOWING QUALITY REQUIREMENTS:

1) ROCK SHALL BE RESISTANT TO WEATHERING AND WATER ACTION AND FREE OF ORGANIC OR OTHER UNSUITABLE MATERIAL. DO NOT USE SHALE, ROCK WITH SHALE SEAMS, OR OTHER FISSILE OR FISSURED ROCK THAT MAY BREAK INTO SMALLER PIECES IN THE PROCESS OF HANDLING AND PLACING.
2) ROCK SHALL BE SUB–ROUNDED TO SUB–ANGULAR IN SHAPE.
3) ROCK SHALL BE GRANITE OR HAVE A SPECIFIC GRAVITY EQUAL TO OR GREATER THAN THAT OF GRANITE.
4) COLOR AND TEXTURE SHALL BE CONSTANT THROUGHOUT THE STOCKPILE.

SAMPLES OF ALL IMPORTED ROCK SHALL BE PROVIDED TO THE ENGINEER FOR APPROVAL, PRIOR TO STOCKPILING ON SITE.

INDIVIDUAL ROCK CLASSES AND PLACEMENT METHODS ARE FURTHER DEFINED AS FOLLOWS:

1 – ENGINEERED STREAMBED MATERIAL

ENGINEERED STREAMBED MATERIAL SHALL CONSIST OF SANDS, GRAVELS, COBBLES, AND BOULDERS FREE OF ORGANIC MATTER, AND MEETING THE FOLLOWING GRADATION SPECIFICATIONS (REFER TO DRAWINGS FOR TYPE LOCATIONS):

TYPE 1 GRADATION:

U.S. SIEVE SIZE	PERCENT PASSING (BY WEIGHT)
18"	100
12"	60–85
8"	40–60
4"	25–40
0.6"	10–20
No. 4	5–10

TYPE 2 GRADATION:

U.S. SIEVE SIZE	PERCENT PASSING (BY WEIGHT)
30"	100
24"	60–85
12"	40–60
4"	25–40
0.6"	10–20
No. 4	5–10

TYPE 3 GRADATION:

U.S. SIEVE SIZE	PERCENT PASSING (BY WEIGHT)
40"	100
30"	60–85
16"	40–60
8"	25–40
4"	15–25
0.6"	10–15
No. 4	5–10

TYPE 4 GRADATION:

U.S. SIEVE SIZE	PERCENT PASSING (BY WEIGHT)
48"	100
36"	60–85
20"	40–60
10"	25–40
4"	15–25
0.6"	10–15
No. 4	5–10

A) ENGINEERED STREAMBED MATERIAL SHALL BE PLACED TO THE LINES, GRADES AND DEPTHS SHOWN ON THE DRAWINGS, OR AS DIRECTED BY THE ENGINEER. UNIFORMLY DISTRIBUTE LARGE STONES TO PRODUCE THE REQUIRED GRADATION OF ROCK. PREVENT CONTAMINATION OF ROCK MATERIALS BY EXCAVATION AND/OR EARTH MATERIALS.

B) FOLLOWING PLACEMENT, ROCK SURFACE SHALL BE JETTED WITH WATER TO IMPROVE COMPACTION AND EMBED THE FINES WITHIN THE MIX. JETTING SHALL START AT THE UPSTREAM LIMITS OF PLACEMENT AND PROGRESS DOWNSTREAM. JETTING SHALL CONTINUE UNTIL THE TURBIDITY LEVELS OF RUNOFF PRODUCED FROM THE JETTING PROCESS HAVE REACHED AN ACCEPTABLE LEVEL AS DETERMINED BY THE ENGINEER. ALL SEDIMENT–LADEN RUNOFF GENERATED BY THE JETTING OPERATIONS SHALL BE PUMPED TO A SETTLING TANK OR SIMILAR DEVICE TO REDUCE TURBIDITY TO ACCEPTABLE LEVELS, IN COMPLIANCE WITH PERMIT CONDITIONS, PRIOR TO DISCHARGE TO THE CREEK.

2 – FLOODPLAIN ARMOR

FLOODPLAIN ARMOR MATERIAL SHALL CONSIST OF SANDS, GRAVELS, COBBLES, AND BOULDERS FREE OF ORGANIC MATTER, AND MEETING THE FOLLOWING GRADATION SPECIFICATIONS (REFER TO DRAWINGS FOR TYPE LOCATIONS):

TYPE 1 GRADATION:

TYPE 1 FLOODPLAIN ARMOR SHALL COMPLY WITH THE ENGINEERED STREAMBED MATERIAL TYPE 1 GRADATION.

TYPE 2 GRADATION:

U.S. SIEVE SIZE	PERCENT PASSING (BY WEIGHT)
24"	100
18"	60–85
12"	40–60
6"	25–40
3"	10–25
No. 4	5–15
No. 10	0–5

TYPE 3 GRADATION:

U.S. SIEVE SIZE	PERCENT PASSING (BY WEIGHT)
30"	100
24"	60–85
18"	40–60
6"	25–40
3"	10–25
No. 4	5–15
No. 10	0–5

TYPE 4 GRADATION:

TYPE 4 FLOODPLAIN ARMOR SHALL COMPLY WITH THE ENGINEERED STREAMBED MATERIAL TYPE 4 GRADATION.

A) FLOODPLAIN ARMOR MATERIAL SHALL BE PLACED TO THE LINES, GRADES AND DEPTHS SHOWN ON THE DRAWINGS, OR AS DIRECTED BY THE ENGINEER. UNIFORMLY DISTRIBUTE LARGE STONES TO PRODUCE THE REQUIRED GRADATION OF ROCK. PREVENT CONTAMINATION OF ROCK MATERIALS BY EXCAVATION AND/OR EARTH MATERIALS.

B) FOLLOWING PLACEMENT, ROCK SURFACE SHALL BE JETTED WITH WATER TO IMPROVE COMPACTION AND EMBED THE FINES WITHIN THE MIX. JETTING SHALL START AT THE UPSTREAM LIMITS OF PLACEMENT AND PROGRESS DOWNSTREAM. JETTING SHALL CONTINUE UNTIL THE TURBIDITY LEVELS OF RUNOFF PRODUCED FROM THE JETTING PROCESS HAVE REACHED AN ACCEPTABLE LEVEL AS DETERMINED BY THE ENGINEER. ALL SEDIMENT–LADEN RUNOFF GENERATED BY THE JETTING OPERATIONS SHALL BE PUMPED TO A SETTLING TANK OR SIMILAR DEVICE TO REDUCE TURBIDITY TO ACCEPTABLE LEVELS, IN COMPLIANCE WITH PERMIT CONDITIONS, PRIOR TO DISCHARGE TO THE CREEK.

3 – ROCK SLOPE PROTECTION

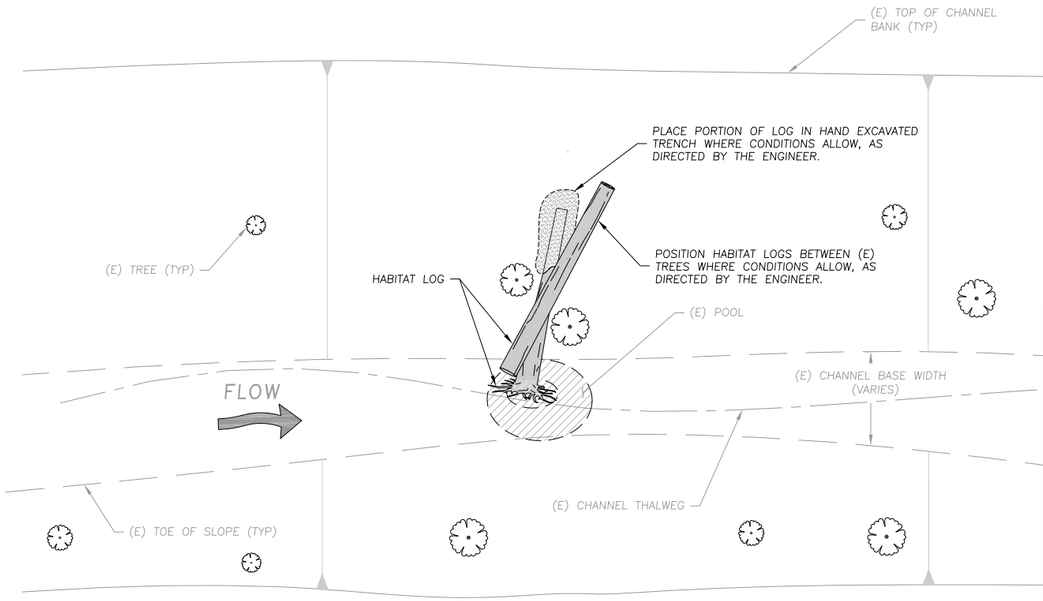
A) ROCK SLOPE PROTECTION SHALL CONFORM TO SECTION 72–2.02 MATERIALS OF THE STANDARD SPECIFICATIONS FOR 1/2 TON ROCK.

B) BACKFILL MATERIAL CONSISTING OF GRANULAR NATIVE STREAMBED MATERIAL SHALL BE USED TO BACKFILL VOIDS WITHIN THE ROCK SLOPE PROTECTION. IF GRANULAR NATIVE MATERIAL IS NOT AVAILABLE CONTRACTOR SHALL BLEND SAND, GRAVELS, AND NATIVE SOILS TO THE SATISFACTION OF THE ENGINEER FOR USE IN BACKFILLING THE RSP VOIDS.

C) BACKFILL MATERIAL SHALL BE PLACED TO MATCH THE FINISHED SURFACE OF THE RSP AND WATER JETTED TO FILL ALL VOIDS, AS DIRECTED BY THE ENGINEER.

ROCK SLOPE PROTECTION FABRIC
1. GEOTEXTILE FABRIC SHALL BE PLACED BELOW ROCK SLOPE PROTECTION.
2. GEOTEXTILE FABRIC SHALL BE NON–WOVEN, GEOTEX 1601, AS MANUFACTURED BY SYNTHETIC INDUSTRIES; OR MIRAFI 1160N, AS MANUFACTURED BY TC MIRAFI; OR APPROVED EQUAL.

INSTALLATION
1. PREPARE SURFACE TO RECEIVE THE GEOTEXTILE TO A RELATIVELY SMOOTH CONDITION, FREE OF OBSTRUCTIONS, DEPRESSIONS, DEBRIS, AND SOFT OR LOW DENSITY POCKETS OF MATERIAL.
2. PLACE AND SECURE A LAYER OF GEOTEXTILE FABRIC BELOW THE FIRST ROCK LAYER. AT THE TIME OF INSTALLATION, THE GEOTEXTILE SHALL BE REJECTED IF IT HAS DEFECTS, RIPS, HOLES, FLAWS, DETERIORATION, OR DAMAGE INCURRED DURING MANUFACTURE, TRANSPORTATION, OR STORAGE.
3. PLACE GEOTEXTILE WITH THE LONG DIMENSION PARALLEL TO FLOW AND LAID SMOOTH AND FREE OF TENSION, STRESS, FOLDS, WRINKLES, OR CREASES.



HABITAT LOG PLAN

SCALE: 1" = 5'

HABITAT LOG NOTES:

1. GENERAL

1.1. PLACE TWO HABITAT LOGS AT FOUR LOCATIONS PER REACH IN REACHES R14 TO R16 AND R19 TO R21 (SEE SHEET C2 FOR REACH LOCATIONS).

1.2. HABITAT LOGS SHALL BE LOCALLY SOURCED FROM EXISTING LIVE AND DEAD TREES. TREES TO BE SALVAGE WILL BE FLAGGED IN THE FIELD AT THE TIME OF CONSTRUCTION BY THE PROJECT ENGINEER AND ARBORIST. SALVAGE DOWNED TREES WHERE POSSIBLE, PREFERABLY WITH THE ROOTWAD INTACT. IF DOWNED LOGS ARE NOT AVAILABLE, THE PROJECT ARBORIST WILL IDENTIFY TREES TO BE FELLED. LOGS SHALL BE OAK, WILLOW, OR ALDER.

1.3. LOCATIONS FOR HABITAT LOG PLACEMENT WILL BE DETERMINED BY THE ENGINEER AND FISHERIES BIOLOGIST AT THE TIME OF CONSTRUCTION. FINAL LOCATIONS SHALL BE BASED ON LOCAL GEOMORPHIC CONDITIONS AND THE AVAILABILITY OF EXISTING POOLS AND SUITABLE LOGS, MEETING THE CRITERIA BELOW.

1.4. INCORPORATE HABITAT LOGS INTO EXISTING POOLS WHEN LOCALLY AVAILABLE.

2. LOG PLACEMENT AND DIMENSIONS

2.1. HABITAT LOG DESIGNS ARE SHOWN CONCEPTUALLY DUE TO THE INHERENT VARIABILITY OF MATERIAL PROPERTIES. THE DESIGN REQUIRES THAT THE ENGINEER OBSERVE INSTALLATION OF THE HABITAT LOGS TO ENSURE THE INTENT OF THE DESIGN IS MET. OBSERVATIONS WILL INCLUDE LOG SELECTION, PLACEMENT, AND ANCHORING STABILIZATION.

2.2. HABITAT LOGS SHALL BE A MINIMUM OF 12 FT. IN LENGTH AND 1 FT. IN DIAMETER, ALONG THE LENGTH OF THE LOG.

2.3. POSITION HABITAT LOGS BETWEEN EXISTING TREES WITH A PORTION OF THE LOG BURIED IN A TRENCH WHERE CONDITIONS ALLOW. CABLING WILL NOT BE EMPLOYED THEREFORE, LOGS MAY BE MOBILIZED DURING LARGE FLOODING EVENTS.

WATERWAYS CONSULTING INC.
509A SWIFT ST.
SANTA CRUZ, CA 95060
PH:(831)421-9291 // FAX:(888)819-6847
WWW.WATWAYS.COM

PRELIMINARY
NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT GROUP

HABITAT LOG DETAILS AND ROCK SPECIFICATIONS

PERMANENTE CREEK RESTORATION PLAN
70% DESIGN SUBMITTAL

DESIGNED BY: B.M.Z.
DRAWN BY: B.M.Z.
CHECKED BY: M.W.W.
DATE: 04/27/15
JOB NO.: 13-016

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

C24

24 OF 25

GENERAL NOTES CONTINUED

1. ALL CONSTRUCTION AND MATERIALS SHALL CONFORM TO THE MAY 2010 EDITION OF THE STATE OF CALIFORNIA STANDARD SPECIFICATIONS, ISSUED BY THE DEPARTMENT OF TRANSPORTATION (HEREAFTER REFERRED TO AS "STANDARD SPECIFICATIONS").

2. THE ENGINEER SHALL BE NOTIFIED AT LEAST 48 HOURS PRIOR TO CONSTRUCTION. THE ENGINEER OR A DESIGNATED REPRESENTATIVE SHALL MONITOR THE CONSTRUCTION PROCESS, AS NECESSARY, TO ENSURE PROPER INSTALLATION PROCEDURES.

3. EXISTING UNDERGROUND UTILITY LOCATIONS:

   A. PRIOR TO BEGINNING WORK, THE CONTRACTOR SHALL CONTACT ALL UTILITIES COMPANIES WITH REGARD TO WORKING OVER, UNDER, OR AROUND EXISTING FACILITIES AND TO OBTAIN INFORMATION REGARDING RESTRICTIONS THAT ARE REQUIRED TO PREVENT DAMAGE TO THE FACILITIES.

   B. LOCATIONS SHOWN ARE COMPILED FROM INFORMATION SUPPLIED BY THE APPROPRIATE UTILITY AGENCIES AND FROM FIELD MEASUREMENTS TO ABOVE GROUND FEATURES READILY VISIBLE AT THE TIME OF SURVEY. LOCATIONS SHOWN ARE APPROXIMATE. THE CONTRACTOR IS CAUTIONED THAT ONLY ACTUAL EXCAVATION WILL REVEAL THE DIMENSIONS, SIZES, MATERIALS, LOCATIONS, AND DEPTH OF UNDERGROUND UTILITIES.

   C. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR THE LOCATION AND/OR PROTECTION OF ALL EXISTING AND PROPOSED PIPING, UTILITIES, TRAFFIC SIGNAL EQUIPMENT (BOTH ABOVE GROUND AND BELOW GROUND), STRUCTURES, AND ALL OTHER EXISTING IMPROVEMENTS THROUGHOUT CONSTRUCTION.

   D. PRIOR TO COMMENCING FABRICATION OR CONSTRUCTION, CONTRACTOR SHALL DISCOVER OR VERIFY THE ACTUAL DIMENSIONS, SIZES, MATERIALS, LOCATIONS, AND ELEVATIONS OF ALL EXISTING UTILITIES AND POTHOLE THOSE AREAS WHERE POTENTIAL CONFLICTS ARE LIKELY OR DATA IS OTHERWISE INCOMPLETE.

   E. CONTRACTOR SHALL TAKE APPROPRIATE MEASURES TO PROTECT EXISTING UTILITIES DURING CONSTRUCTION OPERATIONS, AND SHALL BE SOLELY RESPONSIBLE FOR THE COST OF REPAIR/REPLACEMENT OF ANY EXISTING UTILITIES DAMAGED DURING CONSTRUCTION. CONTRACTOR TO CALL UNDERGROUND SERVICE ALERT (1-800-642-2444) TO LOCATE ALL UNDERGROUND UTILITY LINES PRIOR TO COMMENCING CONSTRUCTION.

   F. UPON LEARNING OF THE EXISTENCE AND/OR LOCATIONS OF ANY UNDERGROUND FACILITIES NOT SHOWN OR SHOWN INACCURATELY ON THE PLANS OR NOT PROPERLY MARKED BY THE UTILITY OWNER, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE UTILITY OWNER AND THE CITY BY TELEPHONE AND IN WRITING.

   G. UTILITY RELOCATIONS REQUIRED FOR THE CONSTRUCTION OF THE PROJECT FACILITIES WILL BE PERFORMED BY THE UTILITY COMPANY, UNLESS OTHERWISE NOTED.

12. SHOULD THE CONTRACTOR DISCOVER ANY DISCREPANCIES BETWEEN THE CONDITIONS EXISTING IN THE FIELD AND THE INFORMATION SHOWN ON THESE DRAWINGS, HE SHALL NOTIFY THE ENGINEER PRIOR TO PROCEEDING WITH CONSTRUCTION.

13. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO BE FULLY INFORMED OF AND TO COMPLY WITH ALL LAWS, ORDINANCES, CODES, REQUIREMENTS AND STANDARDS WHICH IN ANY MANNER AFFECT THE COURSE OF CONSTRUCTION OF THIS PROJECT, THOSE ENGAGED OR EMPLOYED IN THE CONSTRUCTION AND THE MATERIALS USED IN THE CONSTRUCTION.

14. ANY TESTS, INSPECTIONS, SPECIAL OR OTHERWISE, THAT ARE REQUIRED BY THE BUILDING CODES, LOCAL BUILDING DEPARTMENTS, OR THESE PLANS, SHALL BE DONE BY AN INDEPENDENT INSPECTION COMPANY. JOB SITE VISITS BY THE ENGINEER DO NOT CONSTITUTE AN OFFICIAL INSPECTION. OBSERVATION AND TESTING SERVICES ARE REQUIRED BY THE GEOTECHNICAL ENGINEER AS OUTLINED IN THE GEOTECHNICAL REPORT. IT IS THE CONTRACTORS RESPONSIBILITY TO ENSURE THAT THE WORK IS COORDINATED WITH THE GEOTECHNICAL ENGINEER AND THAT REQUIRED TESTS AND INSPECTIONS ARE PERFORMED.

15. PROJECT SCHEDULE: PRIOR TO COMMENCEMENT OF WORK, CONTRACTOR SHALL PROVIDE ENGINEER A DETAILED CONSTRUCTION SCHEDULE FOR APPROVAL. THE CONTRACTOR SHALL NOT BEGIN ANY CONSTRUCTION WORK UNTIL THE PROJECT SCHEDULE AND WORK PLAN IS APPROVED BY THE ENGINEER. ALL CONSTRUCTION SHALL BE CLOSELY COORDINATED WITH THE ENGINEER SO THAT THE QUALITY OF WORK CAN BE CHECKED FOR APPROVAL. THE CONTRACTOR SHALL PURSUE WORK IN A CONTINUOUS AND DILIGENT MANNER TO ENSURE A TIMELY COMPLETION OF THE PROJECT.

16. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DESIGN, PERMITTING, INSTALLATION, AND MAINTENANCE OF ANY AND ALL TRAFFIC CONTROL MEASURES DEEMED NECESSARY.

17. THE CONTRACTOR SHALL BE RESPONSIBLE FOR GENERAL SAFETY DURING CONSTRUCTION. ALL WORK SHALL CONFORM TO PERTINENT SAFETY REGULATIONS AND CODES. THE CONTRACTOR SHALL BE SOLELY AND COMPLETELY RESPONSIBLE FOR FURNISHING, INSTALLING, AND MAINTAINING ALL WARNING SIGNS AND DEVICES NECESSARY TO SAFEGUARD THE GENERAL PUBLIC AND THE WORK, AND PROVIDE FOR THE PROPER AND SAFE ROUTING OF VEHICULAR AND PEDESTRIAN TRAFFIC DURING THE PERFORMANCE OF THE WORK. THE CONTRACTOR SHALL BE SOLELY AND COMPLETELY RESPONSIBLE FOR COMPLIANCE WITH ALL APPLICABLE PROVISIONS OF OSHA IN THE CONSTRUCTION PRACTICES FOR ALL EMPLOYEES DIRECTLY ENGAGED IN THE CONSTRUCTION OF THIS PROJECT.

18. CONSTRUCTION CONTRACTOR AGREES THAT IN ACCORDANCE WITH GENERALLY ACCEPTED CONSTRUCTION PRACTICES, CONSTRUCTION CONTRACTOR WILL BE REQUIRED TO ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THE PROJECT, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY; THAT THIS REQUIREMENT SHALL BE MADE TO APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS, AND CONSTRUCTION CONTRACTOR FURTHER AGREES TO DEFEND, INDEMNIFY AND HOLD DESIGN PROFESSIONAL HARMLESS FROM ANY AND ALL LIABILITY, REAL OR ALLEGED, IN CONNECTION WITH THE PERFORMANCE OF WORK ON THIS PROJECT, EXCEPTION LIABILITY ARISING FROM THE SOLE NEGLIGENCE OF DESIGN PROFESSIONAL. NEITHER THE PROFESSIONAL ACTIVITIES OF CONSULTANT NOR THE PRESENCE OF CONSULTANT OR HIS OR HER EMPLOYEES OR SUB-CONSULTANTS AT A CONSTRUCTION SITE SHALL RELIEVE THE CONTRACTOR AND ITS SUBCONTRACTORS OF THEIR RESPONSIBILITIES INCLUDING, BUT NOT LIMITED TO, CONSTRUCTION MEANS, METHODS, SEQUENCE, TECHNIQUES OR PROCEDURES NECESSARY FOR PERFORMING, SUPERINTENDING OR COORDINATING ALL PORTIONS OF THE WORK OF CONSTRUCTION IN ACCORDANCE WITH THE CONTRACT DOCUMENTS AND APPLICABLE HEALTH OR SAFETY REQUIREMENTS OF ANY REGULATORY AGENCY OR OF STATE LAW.

19. THE CONTRACTOR SHALL MAINTAIN A CURRENT, COMPLETE, AND ACCURATE RECORD OF ALL AS-BUILT DEVIATIONS FROM THE CONSTRUCTION AS SHOWN ON THESE DRAWINGS AND SPECIFICATIONS, FOR THE PURPOSE OF PROVIDING THE ENGINEER OF RECORD WITH A BASIS FOR THE PREPARATION OF RECORD DRAWINGS.

20. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING THE SITE IN A NEAT AND ORDERLY MANNER THROUGHOUT THE CONSTRUCTION PROCESS. ALL MATERIALS SHALL BE STORED WITHIN APPROVED STAGING AREAS.

21. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION AND PRESERVATION OF ALL SURVEY MONUMENTS OR PROPERTY CORNERS. DISTURBED MONUMENTS SHALL BE RESTORED BACK TO THEIR ORIGINAL LOCATION AND SHALL BE CERTIFIED BY A REGISTERED CIVIL ENGINEER OR LAND SURVEYOR AT THE EXPENSE OF THE CONTRACTOR.

DEMOLITION NOTES

1. THE REMOVAL OF EXISTING IMPROVEMENTS SHALL BE PERFORMED IN ACCORDANCE WITH SECTION 15 OF THE STANDARD SPECIFICATIONS.

2. EXISTING IMPROVEMENTS, ADJACENT PROPERTY, TREES AND PLANTS, UTILITIES AND OTHER FACILITIES THAT ARE NOT REMOVED SHALL BE PROTECTED FROM INJURY OR DAMAGE RESULTING FROM THE CONTRACTOR'S OPERATIONS IN ACCORDANCE WITH SECTION 15.1 OF THE STANDARD SPECIFICATIONS.

EARTHWORK NOTES

1. GRADING SUMMARY:
   TOTAL CUT VOLUME = 420,000 CY
   TOTAL FILL VOLUME = 5,000 CY

THE ABOVE QUANTITIES ARE APPROXIMATE IN-PLACE VOLUMES CALCULATED AS THE DIFFERENCE BETWEEN EXISTING GROUND AND THE PROPOSED FINISH GRADE, PREPARED FOR PERMITTING PURPOSES ONLY. EXISTING GROUND IS DEFINED BY THE TOPOGRAPHIC CONTOURS AND/OR SPOT ELEVATIONS ON THE PLAN. PROPOSED FINISH GRADE IS DEFINED AS THE DESIGN SURFACE ELEVATION OF EARTH TO BE CONSTRUCTED, AS SHOWN ON THE DRAWINGS. THE QUANTITIES HAVE NOT BEEN FACTORED TO INCLUDE ALLOWANCES FOR BULKING, CLEARING AND GRUBBING, SUBSIDENCE, SHRINKAGE, OVER EXCAVATION, AND RECOMPACTION, UNDERGROUND UTILITY AND SUBSTRUCTURE SPOILS AND CONSTRUCTION METHODS. QUANTITIES ARE SUBJECT TO CHANGE, PENDING EXCAVATION AND INSPECTION OF SUBSURFACE CONDITIONS AT THE "ROCK PILE" AND "OVERBURDEN REMOVAL" AREAS, WHICH WILL ULTIMATELY DETERMINE FINISH GRADE AT THESE TWO AREAS.

THE CONTRACTOR SHALL PERFORM AN INDEPENDENT EARTHWORK ESTIMATE FOR THE PURPOSE OF PREPARING BID PRICES FOR EARTHWORK. THE BID PRICE SHALL INCLUDE COSTS FOR ANY NECESSARY IMPORT AND PLACEMENT OF EARTH MATERIALS OR THE EXPORT AND PROPER DISPOSAL OF EXCESS OR UNSUITABLE EARTH MATERIALS.

2. ALL EXCESS SOILS SHALL BE REMOVED TO AN APPROVED DUMP SITE OR DISPOSED OF ON SITE AT A LOCATION TO BE APPROVED BY THE ENGINEER, IN A MANNER THAT WILL NOT CAUSE EROSION,

3. CLEARING AND GRUBBING, SUBGRADE PREPARATION AND EARTHWORK SHALL BE PERFORMED IN ACCORDANCE WITH SECTION 19 OF THE STANDARD SPECIFICATIONS, THESE DRAWINGS, AND THE TECHNICAL SPECIFICATIONS.

4. UNSUITABLE SOIL OR MATERIALS, NOT TO BE INCLUDED IN THE WORK INCLUDE:

   A. ORGANIC MATERIALS SUCH AS PEAT, MULCH, ORGANIC SILT OR SOD.
   B. SOILS CONTAINING EXPANSIVE CLAYS.
   C. MATERIAL CONTAINING EXCESSIVE MOISTURE.
   D. POORLY GRADED COURSE MATERIAL, PARTICLE SIZE IN EXCESS OF 6 INCHES.
   E. MATERIAL WHICH WILL NOT ACHIEVE SPECIFIED DENSITY OR BEARING.

5. FINE GRADING ELEVATIONS AND SLOPES NOT SHOWN SHALL BE DETERMINED BY THE CONTRACTOR IN THE FIELD TO OBTAIN DRAINAGE IN THE DIRECTION INDICATED. ALL FINAL GRADING SHALL BE SUBJECT TO APPROVAL OF THE ENGINEER.

6. THE TOP 6" OF SUBGRADE UNDER ALL PAVED SURFACES SUBJECT TO VEHICULAR USE SHALL BE COMPACTED TO A MINIMUM OF 95% RELATIVE COMPACTION, IN ACCORDANCE WITH ASTM-D1557 STANDARD. ALL OTHER FILL TO BE COMPACTED TO A MINIMUM OF 90% MAXIMUM DENSITY AS DETERMINED BY ASTM-D1557 AND SO CERTIFIED BY TESTS AND REPORTS FROM THE ENGINEER IN CHARGE OF THE GRADING CERTIFICATION.

7. FILL MATERIAL SHALL BE SPREAD IN LIFTS OF APPROXIMATELY 8 INCHES, MOISTENED OR DRIED TO NEAR OPTIMUM MOISTURE CONTENT AND RECOMPACTED. THE MATERIALS FOR ENGINEERED FILL SHALL BE APPROVED BY A REGISTERED GEOTECHNICAL ENGINEER. ANY IMPORTED MATERIALS MUST BE APPROVED BEFORE BEING BROUGHT TO THE SITE. THE MATERIALS USED SHALL BE FREE OF ORGANIC MATTER AND OTHER DELETERIOUS MATERIALS.

8. ALL CONTACT SURFACES BETWEEN ORIGINAL GROUND AND RECOMPACTED FILL SHALL BE EITHER HORIZONTAL OR VERTICAL. ALL ORGANIC MATERIAL SHALL BE REMOVED AND THE REMAINING SURFACE SCARIFIED TO A DEPTH OF AT LEAST 12 INCHES, UNLESS DEEPER EXCAVATION IS REQUIRED BY THE ENGINEER.

GENERAL EROSION CONTROL NOTES

1. A DETAILED EROSION AND SEDIMENT CONTROL PLAN WILL BE PREPARED BY THE ENGINEER, PRIOR TO FINALIZATION OF THE CONSTRUCTION DOCUMENTS.

2. CONTRACTOR SHALL BE FAMILIAR WITH THE CONDITIONS OF APPROVAL OF ALL REQUIRED PROJECT PERMITS AND SHALL IMPLEMENT ALL REQUIRED BMP'S PRIOR TO COMMENCING GRADING OPERATIONS

3. CONTRACTOR SHALL UTILIZE ONLY THE APPROVED HAUL ROADS AND ACCESS POINTS (AS SHOWN ON THE DRAWINGS) FOR TRANSPORT OF MATERIALS AND EQUIPMENT.

4. BETWEEN OCTOBER 15 AND APRIL 15, EXPOSED SOIL SHALL BE PROTECTED FROM EROSION AT ALL TIMES. DURING CONSTRUCTION, SUCH PROTECTION MAY CONSIST OF MULCHING AND/OR PLANTING OF NATIVE VEGETATION OF ADEQUATE DENSITY. BEFORE COMPLETION OF THE PROJECT, ANY EXPOSED SOIL ON DISTURBED SLOPES SHALL BE PERMANENTLY PROTECTED FROM EROSION.

5. A STANDBY CREW SHALL BE AVAILABLE AT ALL TIMES FOR EMERGENCY WORK THAT MAY BE REQUIRED DURING THE RAINY SEASON (OCTOBER 15 THROUGH APRIL 15). NECESSARY MATERIALS SHALL BE AVAILABLE AND STOCKPILED AT CONVENIENT LOCATIONS TO FACILITATE RAPID CONSTRUCTION OF TEMPORARY DEVICES.

6. CONSTRUCT TEMPORARY EROSION CONTROL MEASURES AS SHOWN ON THE DRAWINGS AND/OR AS DIRECTED BY THE ENGINEER TO CONTROL DRAINAGE WHICH HAS BEEN AFFECTED BY GRADING AND/OR TRENCHING OPERATIONS.

7. CONSTRUCT AND MAINTAIN EROSION CONTROL MEASURES TO PREVENT THE DISCHARGE OF EARTHEN MATERIALS TO THE CREEK FROM DISTURBED AREAS UNDER CONSTRUCTION AND FROM COMPLETED CONSTRUCTION AREAS.

8. INSTALL ALL PROTECTIVE DEVICES AT THE END OF EACH WORK DAY WHEN THE FIVE-DAY RAIN PROBABILITY EQUALS OR EXCEEDS 50 PERCENT AS DETERMINED FROM THE NATIONAL WEATHER SERVICE FORECAST OFFICE: WWW.SRH.NOAA.GOV.

9. AFTER A RAINSTORM, ALL SILT AND DEBRIS SHALL BE REMOVED FROM SEDIMENT CONTROL MEASURES.

10. THE CONTRACTOR IS RESPONSIBLE TO KEEP IN FORCE ALL EROSION CONTROL DEVICES AND TO MODIFY THOSE DEVICES AS SITE PROGRESS DICTATES.

11. THE CONTRACTOR SHALL MONITOR THE EROSION CONTROL DEVICES DURING STORMS AND MODIFY THEM IN ORDER TO PREVENT PROGRESS OF ANY ONGOING EROSION.

12. THE CONTRACTOR SHALL CONTACT THE ENGINEER IN THE EVENT THAT THE EROSION CONTROL PLAN AS DESIGNED REQUIRES ANY SUBSTANTIAL REVISIONS.

DIVERSION NOTES

1. GENERAL
   1.1. DIVERSION SYSTEMS SHALL BE INSTALLED TO DEWATER THE INDIVIDUAL PROJECT AREAS TO FACILITATE IN-STREAM CONSTRUCTION AND TO REDUCE THE POTENTIAL IMPACTS TO WATER QUALITY DOWNSTREAM OF THE PROJECT SITES.
   1.2. THE CONTRACTOR SHALL CONFIRM THAT A FAVORABLE LONG TERM WEATHER FORECAST (1 WEEK MIN.) IS OBSERVED PRIOR TO PLACEMENT OF DIVERSION STRUCTURE.
   1.3. PRIOR TO PLACEMENT OF DIVERSION STRUCTURE, FISH SHALL BE REMOVED FROM THE DIVERTED REACH, IN ACCORDANCE WITH SECTION 2.
   1.4. DIVERSION SYSTEM INSTALLATION SHALL NORMALLY BEGIN IN THE DOWNSTREAM AREA AND CONTINUE IN AN UPSTREAM DIRECTION. THE FLOW SHALL BE DIVERTED ONLY WHEN THE DIVERSION CONSTRUCTION IS COMPLETE.
   1.5. FOLLOWING ENGINEER'S APPROVAL OF THE COMPLETED WORK, DIVERSION SHALL BE REMOVED IMMEDIATELY, IN AN UPSTREAM DIRECTION.
2. FISH REMOVAL
   2.1. FISH SHALL BE REMOVED FROM THE DIVERTED REACHES BY A QUALIFIED FISHERIES BIOLOGIST, LICENSED FOR SUCH ACTIVITIES BY THE NATIONAL MARINE FISHERIES SERVICE AND THE CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE.
   2.2. BLOCK NETS SHALL BE PROVIDED AND INSTALLED BY THE FISHERIES BIOLOGIST. BLOCK NETS SHALL BE MAINTAINED BY THE CONTRACTOR BOTH UPSTREAM AND DOWNSTREAM OF THE WORK AREA, THROUGHOUT THE PERIOD OF CONSTRUCTION. MAINTENANCE INCLUDES PERIODIC REMOVAL OF ACCUMULATED DEBRIS, AS NECESSARY TO ENSURE FUNCTION. BLOCK NETS SHALL BE REMOVED BY THE FISHERIES BIOLOGIST AFTER THE DIVERSION IS REMOVED AND THE IN CHANNEL WORK AREA IS RE-WATERED.
3. DIVERSION SYSTEM
   3.1. THE CONTRACTOR SHALL INSTALL A TEMPORARY SEALED SANDBAG DAM TO CAPTURE AND DIVERT STREAM FLOW UPSTREAM OF THE PROJECT SITE. THE DAM AND METHOD OF SEALING SHALL BE PLACED AT AN APPROPRIATE DEPTH TO CAPTURE SUBSURFACE STREAM FLOW, AS NEEDED TO DEWATER THE STREAMBED.
   3.2. THE CONTRACTOR SHALL MAINTAIN THE DIVERSION DAM DURING THE COURSE OF CONSTRUCTION WORK.
   3.3. THE DIVERSION STRUCTURE SHALL BE CONSTRUCTED AS SHOWN ON THE DRAWINGS, OR AS DIRECTED BY THE ENGINEER IN THE FIELD.
   3.4. IN THE EVENT OF A SIGNIFICANT STORM, THE CONTRACTOR SHALL BE PREPARED TO TAKE NECESSARY MEASURES TO INSURE SAFE PASSAGE OF STORM WATER FLOW THROUGH THE PROJECT AREA, WITHOUT DAMAGE TO EXISTING STRUCTURES, OR INTRODUCTION OF EXCESSIVE SEDIMENT. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL TEMPORARY EROSION CONTROL B.M.P.'S.
4. DEWATERING OF CONSTRUCTION AREAS
   4.1. ANY DEWATERING ACTIVITIES WHICH MAY BE REQUIRED FOR CONSTRUCTION PURPOSES SHALL BE CONDUCTED IN A MANNER WHICH DOES NOT RESULT IN AN EXCEEDANCE OF ANY WATER QUALITY REQUIREMENTS ESTABLISHED BY THE CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD.
   4.2. DISCHARGE OF WATER FROM THE DEWATERED CONSTRUCTION SITE, EITHER BY GRAVITY OR PUMPING, SHALL BE PERFORMED IN A MANNER TO PREVENT EXCESSIVE TURBIDITY FROM ENTERING THE RECEIVING WATERWAYS AND TO PREVENT SCOUR AND EROSION OUTSIDE OF THE CONSTRUCTION SITE. PUMPED WATER SHOULD BE PRE-FILTERED WITH SAND/GRAVEL PACK AROUND SUMPS FOR SUBSURFACE FLOWS AND A SILT FENCE OR HAY BALES AROUND PUMPS FOR SURFACE FLOW. PUMPED WATER SHALL BE DISCHARGED INTO ISOLATED LOCAL DEPRESSIONS, FILTER BAGS, SETTLING (BAKER) TANKS, OR TEMPORARY SEDIMENT BASINS, AS NECESSARY TO MEET WATER QUALITY REQUIREMENTS. WHERE WATER TO BE DISCHARGED INTO THE CREEK WILL CREATE EXCESSIVE TURBIDITY, THE WATER SHALL BE ROUTED THROUGH A SEDIMENT INTERCEPTOR OR OTHER FACILITIES TO REMOVE SEDIMENT FROM WATER.
   4.3. CONTRACTOR SHALL SUPPLY ALL NECESSARY PUMPS, PIPING, FILTERS, SHORING, AND OTHER TOOLS AND MATERIALS NECESSARY FOR DEWATERING.

WATERWAYS CONSULTING INC.
509A SWIFT ST.
SANTA CRUZ, CA 95060
PH:(831)421-9291 // FAX:(888)819-6847
WWW.WATWAYS.COM

PRELIMINARY

NOT FOR CONSTRUCTION

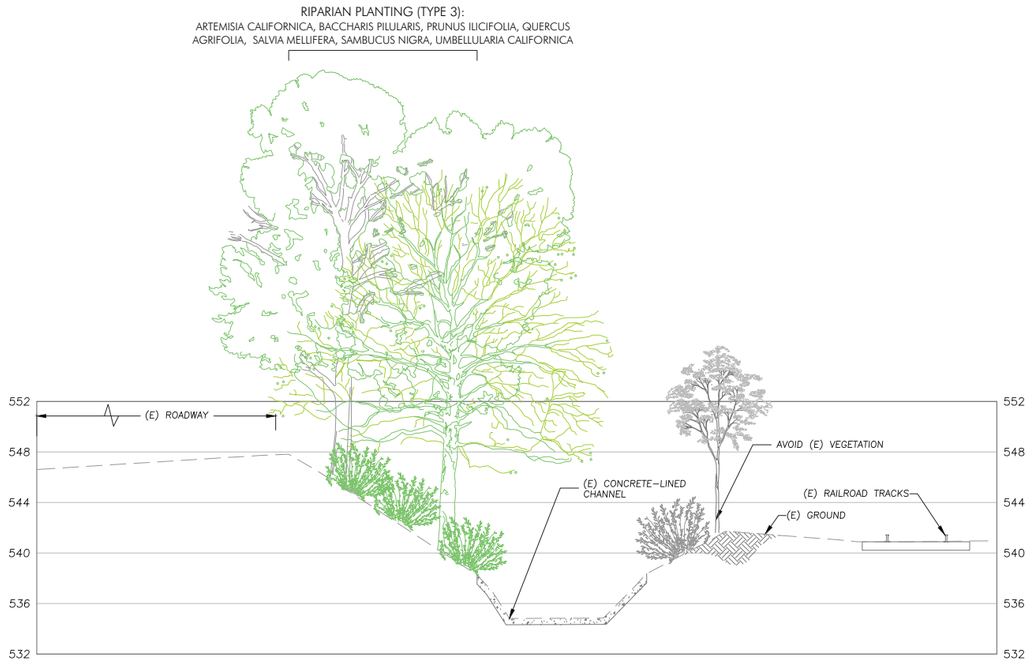
PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT GROUP

NOTES

PERMANENTE CREEK
RESTORATION PLAN
70% DESIGN SUBMITTAL

DESIGNED BY:	-
DRAWN BY:	B.M.S.
CHECKED BY:	M.W.W.
DATE:	04/27/15
JOB NO.:	13-016

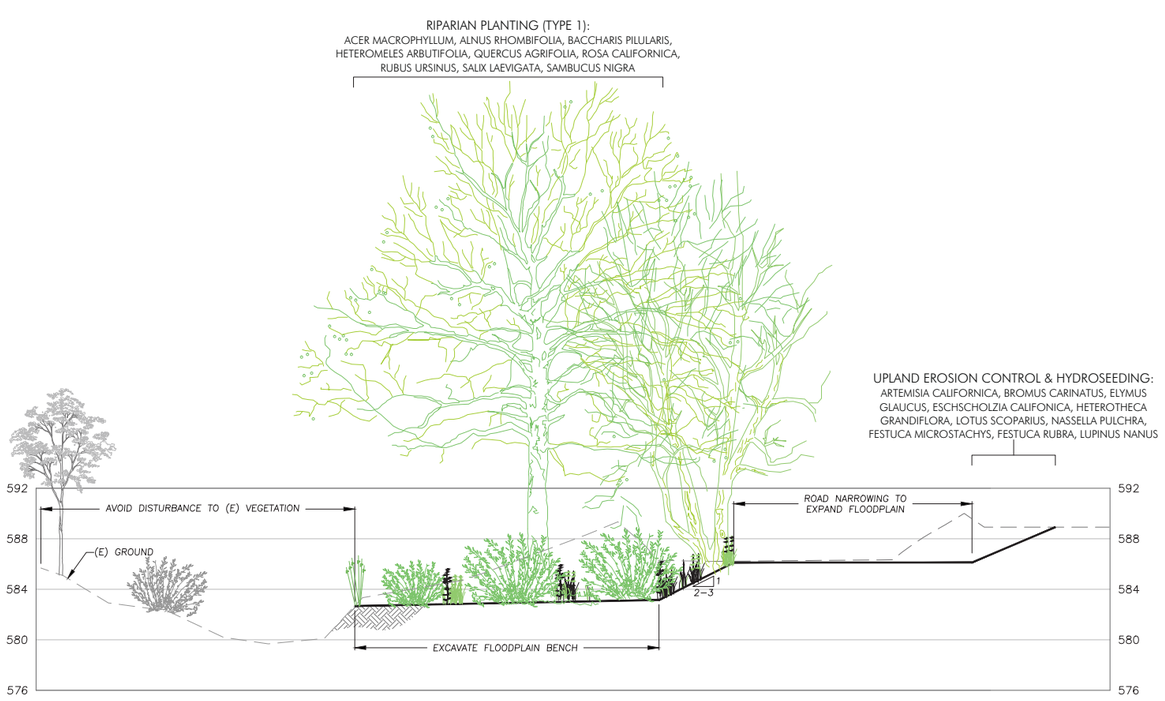
BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"



TYPICAL CONCRETE-LINED CHANNEL BANK PLANTING SECTION A

PER SHEET C5

SCALE: 1" = 10'



TYPICAL CHANNEL WIDENING (ROAD NARROWING) RIPARIAN PLANTING SECTION

STATIONS 16+20 TO 29+20 AND 30+50 TO 49+30: PER SHEETS C6 TO C9, C12 AND C13

SCALE: 1" = 10'

NOTE: WHEREVER POSSIBLE, EXISTING TREES IN THE CHANNEL WIDENING AREA THAT CAN BE SAVED WILL BE FLAGGED BY A BIOLOGIST FOR PROTECTION PRIOR TO GRADING.

RIPARIAN PLANT LEGEND - TYPE 1

SYMBOL	BOTANICAL NAME	COMMON NAME	SIZE	SPACING (OC FEET)	ELEVATION RANGE
ACE MAC	*ACER MACROPHYLLUM*	BIG LEAF MAPLE	16' DEEPOT	25	+2.7' AND ABOVE
AES CAL	*AESCULUS CALIFORNICA*	CALIFORNIA BUCKEYE	16' DEEPOT	15	+2.7' AND ABOVE
ALN RUB	*ALNUS RHOMBIFOLIA*	WHITE ALDER	16' DEEPOT	20	+2.7' TO +5.0'
BAC PIL	*BACCHARIS PILULARIS*	COYOTE BRUSH	1 GAL	8	+4.0' AND ABOVE
HET ARB	*HETEROMELES ARBUTIFOLIA*	TOYON	1 GAL	8	+4.0' AND ABOVE
QUE AGR	*QUERCUS AGRIFOLIA*	COAST LIVE OAK	16' DEEPOT, 5 GAL	12	+4.0' AND ABOVE
ROS CAL	*ROSA CALIFORNICA*	CALIFORNIA WILD ROSE	16' DEEPOT, 1 GAL	6	+4.0' AND ABOVE
RUB URS	*RUBUS URSINUS*	CALIFORNIA BLACKBERRY	1 GAL	5	+4.0' AND ABOVE
SAL LAE	*SALIX LAEVIGATA*	RED WILLOW	POLE CUTTINGS, 16' DEEPOT	12	+2.7' TO +6.0'
SAL MEL	*SALVIA MELLIFERA*	BLACK SAGE	1 GAL	5	+5.0' AND ABOVE
SAM NIG	*SAMBUCUS NIGRA SSP. CAERULEA*	BLUE ELDERBERRY	16' DEEPOT, 1 GAL	10	+4.0' AND ABOVE

NOTES:
1. RELATIVE ELEVATION DATUM: THALWEG OF STREAM = 0.
2. Q2 WATER LINE IS APPROXIMATELY 2.7' ABOVE THALWEG

RIPARIAN PLANT LEGEND - TYPE 2

SYMBOL	BOTANICAL NAME	COMMON NAME	SIZE	SPACING (OC FEET)	ELEVATION RANGE
ACE MAC	*ACER MACROPHYLLUM*	BIG LEAF MAPLE	16' DEEPOT	25	+2.3' AND ABOVE
ARB MEN	*ARBUTUS MENZESII*	PACIFIC MADRONE	16' DEEPOT	12	+5.0' AND ABOVE
ART CAL	*ARTEMISIA CALIFORNICA*	CALIFORNIA SAGEBRUSH	1 GAL	3	+4.0' AND ABOVE
BAC PIL	*BACCHARIS PILULARIS*	COYOTE BRUSH	1 GAL	8	+4.0' AND ABOVE
QUE AGR	*QUERCUS AGRIFOLIA*	COAST LIVE OAK	16' DEEPOT, 5 GAL	12	+4.0' AND ABOVE
SAL LAE	*SALIX LAEVIGATA*	RED WILLOW	POLE CUTTINGS, 16' DEEPOT	12	+2.3' TO +6.0'
SAL MEL	*SALVIA MELLIFERA*	BLACK SAGE	1 GAL	5	+6.0' AND ABOVE
SAM NIG	*SAMBUCUS NIGRA SSP. CAERULEA*	BLUE ELDERBERRY	16' DEEPOT, 1 GAL	10	+4.0' AND ABOVE

NOTES:
1. RELATIVE ELEVATION DATUM: THALWEG OF STREAM = 0
2. Q2 WATER LINE IS APPROXIMATELY 2.7' ABOVE THALWEG

RIPARIAN PLANT LEGEND - TYPE 3

SYMBOL	BOTANICAL NAME	COMMON NAME	SIZE	SPACING (OC FEET)	ELEVATION RANGE
ART CAL	*ARTEMISIA CALIFORNICA*	CALIFORNIA SAGEBRUSH	1 GAL	3	+4.0' AND ABOVE
BAC PIL	*BACCHARIS PILULARIS*	COYOTE BRUSH	1 GAL	8	+4.0' AND ABOVE
PRU ILI	*PRUNUS ILICIFOLIA*	HOLLYLEAF CHERRY	2 GAL	10	+4.0' AND ABOVE
QUE AGR	*QUERCUS AGRIFOLIA*	COAST LIVE OAK	16' DEEPOT, 5 GAL	12	+4.0' AND ABOVE
SAL MEL	*SALVIA MELLIFERA*	BLACK SAGE	1 GAL	5	+6.0' AND ABOVE
SAM NIG	*SAMBUCUS NIGRA SSP. CAERULEA*	BLUE ELDERBERRY	16' DEEPOT, 1 GAL	10	+4.0' AND ABOVE
UMB CAL	*UMBELLULARIA CALIFORNICA*	CALIFORNIA BAY	16' DEEPOT, 1 GAL	12	+4.0' AND ABOVE

NOTES:
1. RELATIVE ELEVATION DATUM: THALWEG OF STREAM = 0
2. Q2 WATER LINE IS APPROXIMATELY 2.7' ABOVE THALWEG

UPLAND HYDROSEED MIX

BOTANICAL NAME	COMMON NAME	RATE OF APPLICATION PLS LBS / ACRE
ARTEMISIA CALIFORNICA	CALIFORNIA SAGEBRUSH	0.5
BROMUS CARINATUS	CALIFORNIA BROME	12.0
ELYMUS GLAUCUS	BLUE WILDRYE	10.0
ESCHSCHOLZIA CALIFORNICA	CALIFORNIA POPPY	1.5
HETEROTHECA GRADIFLORA	TELEGRAPH WEED	0.5
LOTUS SCOPARIUS	DEERWEED	3.0
NASELLA PULCHRA	PURPLE NEEDLEGRASS	5.0
FESTUCA MICROSTACHYS	THREE WEEKS FESCUE	6.0
FESTUCA RUBRA	RED FESCUE	5.0
LUPINUS NANUS	LUPINE	4.0
	TOTAL	47.5

wra
ENVIRONMENTAL CONSULTANTS
2169-G East Francisco Blvd.
San Rafael, CA 94901
(415) 454-8868 Phone
(415) 454-0129 Fax

PRELIMINARY
NOT FOR
CONSTRUCTION

PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT GROUP

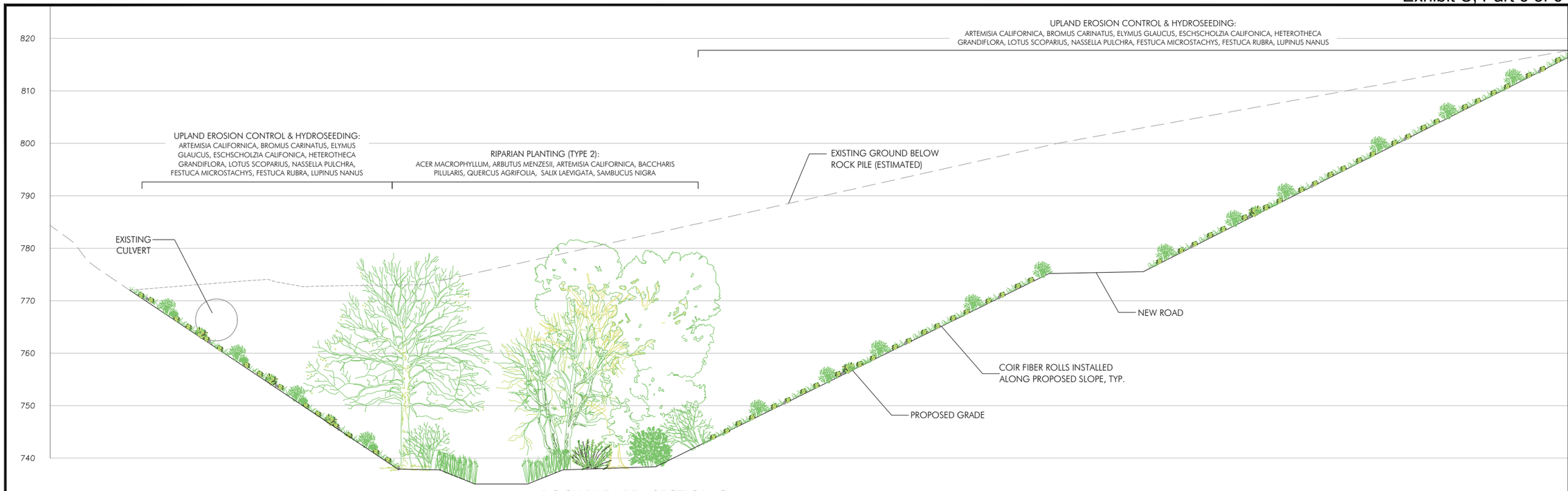
RIPARIAN PLANTING SECTIONS

PERMANENTE CREEK RESTORATION PLAN
70% SUBMITTAL

DESIGNED BY:
DRAWN BY: CES,GMG
CHECKED BY: MWS
DATE: 04/27/15
JOB NO.: 16143-5

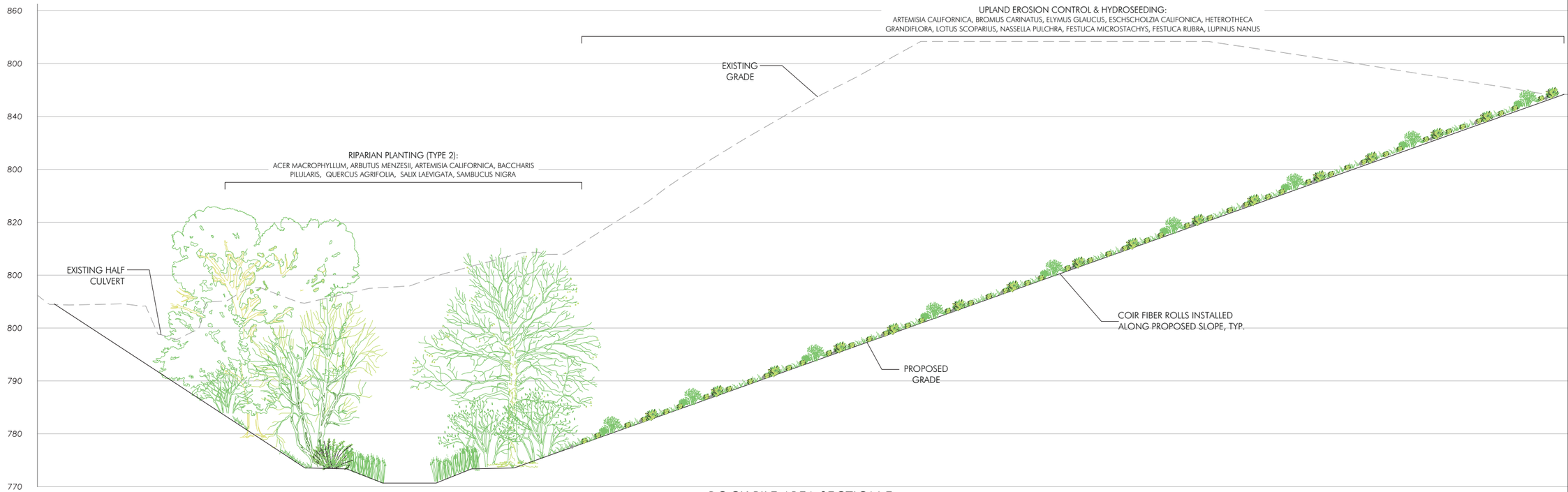
BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

L1 | 1 OF 3



ROCK PILE AREA SECTION C

PER SHEET C14 AND C15
SCALE: 1" = 10'



ROCK PILE AREA SECTION E

PER SHEET C14 AND C15
SCALE: 1" = 10'

wra
ENVIRONMENTAL CONSULTANTS
2169-G East Francisco Blvd.
San Rafael, CA 94901
(415) 454-8868 Phone
(415) 454-0129 Fax

PRELIMINARY
NOT FOR
CONSTRUCTION

PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT GROUP

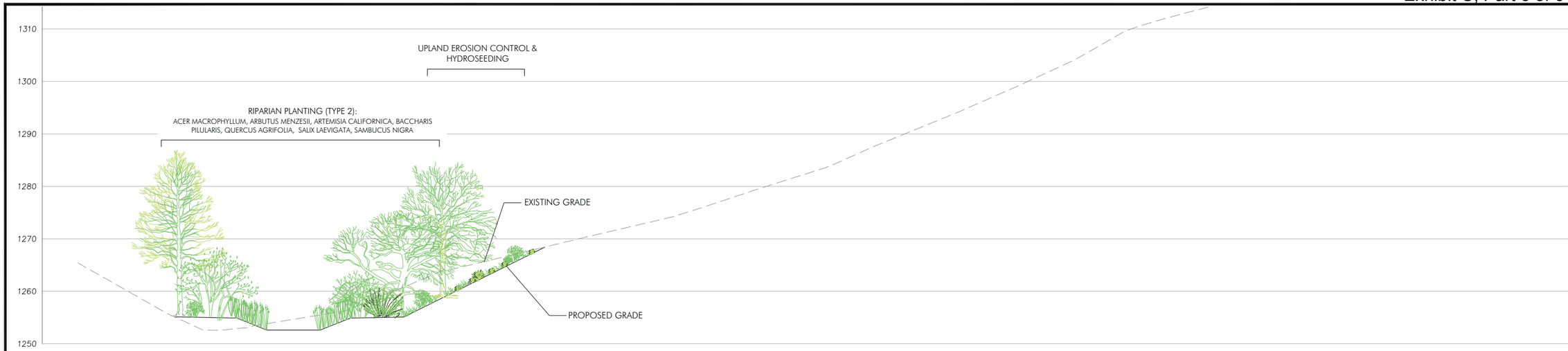
RIPARIAN PLANTING SECTIONS

PERMANENTE CREEK RESTORATION PLAN
70% SUBMITTAL

DESIGNED BY:
DRAWN BY: CES,GMG
CHECKED BY: MWS
DATE: 04/27/15
JOB NO.: 16143-5

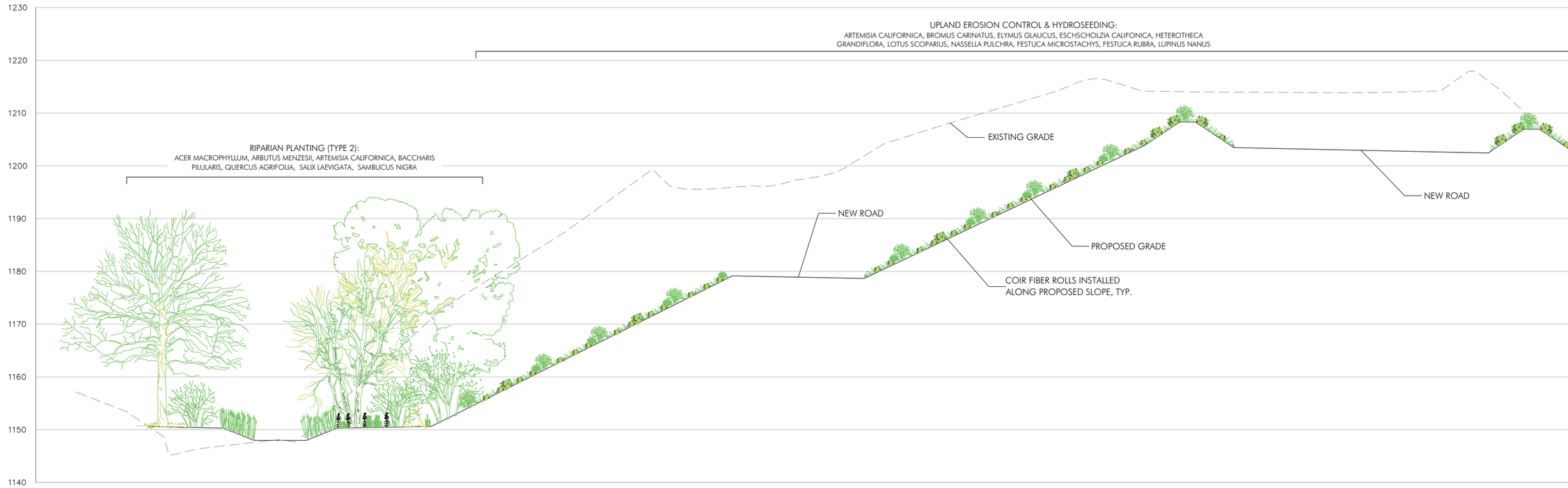
BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

L2



OVERBURDEN REMOVAL AREA SECTION E

PER SHEETS C16 T0 C19
SCALE: 1" = 10'



OVERBURDEN REMOVAL AREA SECTION B

PER SHEETS C16 TO C19
SCALE: 1" = 10'

wra ENVIRONMENTAL CONSULTANTS
2169-G East Francisco Blvd.
San Rafael, CA 94901
(415) 454-8868 Phone
(415) 454-0129 Fax

PRELIMINARY
NOT FOR
CONSTRUCTION

PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT GROUP

RIPARIAN PLANTING SECTIONS

PERMANENTE CREEK RESTORATION PLAN
70% SUBMITTAL

DESIGNED BY:
DRAWN BY: CES,GMG
CHECKED BY: MWS
DATE: 04/27/15
JOB NO.: 16143-5

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

L3 | 3 OF 3

Exhibit D -- including March 1, 2016 Surety Rider

PERFORMANCE GUARANTEE

Bond No. 09098099

KNOW ALL MEN BY THESE PRESENTS, that we, **Lehigh Southwest Cement Company and Hanson Permanente Cement, Inc.,** as Principal, and **Fidelity and Deposit Company of Maryland**, licensed to do business in the State of **California**, as Surety, are held and firmly bound unto **The United States District Court for the Northern District of California** (Obligee), in the penal sum of **Twelve million and no/100** Dollars (**$12,000,000.00**) lawful money of the United States of America (Surety Bond), for the payment of which sum, well and truly to be made, the Principal and Surety do bind themselves, their heirs, executors, administrators, and successors and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, that whereas the above bounden Principal has entered into a certain written Consent Decree with the **Sierra Club**, lodged with the Court on the **24th day of April, 2013**, which Consent Decree is made a part hereof and incorporated herein by reference, except that nothing said therein shall alter, enlarge, expand, or otherwise modify the term of the bond as set out below.

IN PARTICULAR, the Principal and Surety agree to convey all Surety Bond funds to the Permanente Creek Restoration escrow account within fourteen (14) days of Sierra Club providing notice of a Work Takeover pursuant to Paragraph 70 of the Consent Decree.

NOW, THEREFORE, if Principal, its executors, administrators, successors and assigns shall promptly and faithfully perform the Consent Decree, according to the terms, stipulations or conditions thereof, then this obligation shall become null and void, otherwise to remain in full force and effect. This bond is executed by the Surety and accepted by the Obligee subject to the following express condition:

Notwithstanding the provisions of the Consent Decree, the term of this bond shall apply from **June 28, 2013** until **June 27, 2014**, and will automatically renew for subsequent terms of one (1) year, subject to revision pursuant to Paragraph 68 of the Consent Decree. Such annual renewal shall include an adjustment to the value of the original penal sum above by the percentage increase or decrease in construction costs as set forth in the applicable Engineering News-Record construction cost index for the Bay Area or, if unavailable, a comparable cost index. In the event the Surety elects not to renew the bond, the Surety must provide Principal and Obligee written notice their intent to non-renew the bond no less than sixty (60) days prior to the expiration date of the bond. Principal shall provide a replacement performance guarantee acceptable to Sierra Club, as set forth in the Consent Decree, prior to the expiration date of the bond.

The liability of the Surety under this bond and all Continuation Certificates issued in connection therewith shall not be cumulative and shall in no event exceed the amount as set forth in this bond or in any additions, riders, or endorsements properly issued by the Surety as supplements thereto.

Sealed with our seals and dated this **29th day of August, 2013**.

Lehigh Southwest Cement Company

Witness

Principal

Hanson Permanente Cement, Inc.

Witness

Principal

Fidelity and Deposit Company of Maryland

Witness

Terri L. Morrison, Attorney-in-Fact

Fidelity and Deposit Company of Maryland
1400 American Lane, Tower 1, 18th Floor
Schaumburg, IL 60196
847-605-6000
Matthew Cook, Zurich Commercial Surety
Matthew.cook@zurich.com

CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT Exhibit D -- including March 1, 2016 Surety Rider No. 5907

State of Texas

County of Harris

On August 29, 2013 (DATE) before me, Mary Pena, Notary (NAME, TITLE OF OFFICER - E.G., "JANE DOE, NOTARY PUBLIC"),

personally appeared _____ (NAME(S) OF SIGNER(S)),

☐ personally known to me - **OR** - ☐ proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

MARY PENA
Notary Public, State of Texas
My Commission Expires
September 27, 2014

WITNESS my hand and official seal.

Mary Pena
SIGNATURE OF NOTARY

OPTIONAL

Though the data below is not required by law, it may prove valuable to persons relying on the document and could prevent fraudulent reattachment of this form.

CAPACITY CLAIMED BY SIGNER

☐ INDIVIDUAL
☐ CORPORATE OFFICER

_____
TITLE(S)

☐ PARTNER(S) ☐ LIMITED ☐ GENERAL
☐ ATTORNEY-IN-FACT
☐ TRUSTEE(S)
☐ GUARDIAN/CONSERVATOR
☐ OTHER: _____

SIGNER IS REPRESENTING:
NAME OF PERSON(S) OR ENTITY(IES)

DESCRIPTION OF ATTACHED DOCUMENT

_____
TITLE OR TYPE OF DOCUMENT

_____
NUMBER OF PAGES

_____
DATE OF DOCUMENT

_____
SIGNER(S) OTHER THAN NAMED ABOVE

© 1993 NATIONAL NOTARY ASSOCIATION • 8236 Remmet Ave., P.O. Box 7184 • Canoga Park, CA 91309-7184

CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT Exhibit D -- including March 1, 2016 Surety Rider No 5907

State of Texas

County of Dallas

On 9-3-2013 (DATE) before me, Amy Yi, Notary Public (NAME, TITLE OF OFFICER - E.G., "JANE DOE, NOTARY PUBLIC"),

personally appeared Michael Hyer & James Wallmann (NAME(S) OF SIGNER(S)),

☑ personally known to me - OR - ☐ proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

NOTARY PUBLIC STATE OF TEXAS
AMY C. YI
My Commission Expires
November 12, 2014

WITNESS my hand and official seal.

SIGNATURE OF NOTARY

OPTIONAL

Though the data below is not required by law, it may prove valuable to persons relying on the document and could prevent fraudulent reattachment of this form.

CAPACITY CLAIMED BY SIGNER

☐ INDIVIDUAL
☐ CORPORATE OFFICER

TITLE(S)

☐ PARTNER(S) ☐ LIMITED ☐ GENERAL

☐ ATTORNEY-IN-FACT
☐ TRUSTEE(S)
☐ GUARDIAN/CONSERVATOR
☐ OTHER:

SIGNER IS REPRESENTING:
NAME OF PERSON(S) OR ENTITY(IES)

DESCRIPTION OF ATTACHED DOCUMENT

TITLE OR TYPE OF DOCUMENT

NUMBER OF PAGES

DATE OF DOCUMENT

SIGNER(S) OTHER THAN NAMED ABOVE

© 1993 NATIONAL NOTARY ASSOCIATION • 8236 Remmet Ave., P.O. Box 7184 • Canoga Park, CA 91309-7184

Exhibit D -- including March 1, 2016 Surety Rider

EXTRACT FROM BY-LAWS OF THE COMPANIES

"Article V, Section 8, Attorneys-in-Fact. The Chief Executive Officer, the President, or any Executive Vice President or Vice President may, by written instrument under the attested corporate seal, appoint attorneys-in-fact with authority to execute bonds, policies, recognizances, stipulations, undertakings, or other like instruments on behalf of the Company, and may authorize any officer or any such attorney-in-fact to affix the corporate seal thereto; and may with or without cause modify of revoke any such appointment or authority at any time."

CERTIFICATE

I, the undersigned, Vice President of the ZURICH AMERICAN INSURANCE COMPANY, the COLONIAL AMERICAN CASUALTY AND SURETY COMPANY, and the FIDELITY AND DEPOSIT COMPANY OF MARYLAND, do hereby certify that the foregoing Power of Attorney is still in full force and effect on the date of this certificate; and I do further certify that Article V, Section 8, of the By-Laws of the Companies is still in force.

This Power of Attorney and Certificate may be signed by facsimile under and by authority of the following resolution of the Board of Directors of the ZURICH AMERICAN INSURANCE COMPANY at a meeting duly called and held on the 15th day of December 1998.

RESOLVED: "That the signature of the President or a Vice President and the attesting signature of a Secretary or an Assistant Secretary and the Seal of the Company may be affixed by facsimile on any Power of Attorney...Any such Power or any certificate thereof bearing such facsimile signature and seal shall be valid and binding on the Company."

This Power of Attorney and Certificate may be signed by facsimile under and by authority of the following resolution of the Board of Directors of the COLONIAL AMERICAN CASUALTY AND SURETY COMPANY at a meeting duly called and held on the 5th day of May, 1994, and the following resolution of the Board of Directors of the FIDELITY AND DEPOSIT COMPANY OF MARYLAND at a meeting duly called and held on the 10th day of May, 1990.

RESOLVED: "That the facsimile or mechanically reproduced seal of the company and facsimile or mechanically reproduced signature of any Vice-President, Secretary, or Assistant Secretary of the Company, whether made heretofore or hereafter, wherever appearing upon a certified copy of any power of attorney issued by the Company, shall be valid and binding upon the Company with the same force and effect as though manually affixed.

IN TESTIMONY WHEREOF, I have hereunto subscribed my name and affixed the corporate seals of the said Companies, this 21st day of August, 2013.

Geoffrey Delisio

Geoffrey Delisio, Vice President

Exhibit D -- including March 1, 2016 Surety Rider

SURETY RIDER

To be attached to and form a part of Fidelity and Deposit Company of Maryland

Bond No. 09098099

Type of Bond: Performance Guarantee Bond

dated effective June 28, 2013
(MONTH-DAY-YEAR)

executed by Lehigh Southwest Cement Company and Hanson Permanente Cement, Inc. , as Principal.
(PRINCIPAL)

and by Fidelity and Deposit Company of Maryland , as Surety,

in favor of The United States District Court for the Northern District of California
(OBLIGEE)

in consideration of the mutual agreements herein contained the Principal and the Surety hereby consent to changing the bond detail as follows:

Consent Decree is amended globally to read: Amended Consent Decree

Paragraph two (2) - lodged with the court date amended to read: February 22, 2016

Paragraph three (3) - Work Takeover pursuant to paragraph to read: 69

Paragraph five (5) - subject to revision pursuant to paragraph to read: 67

Nothing herein contained shall vary, alter or extend any provision or condition of this bond except as herein expressly stated.

This rider is effective March 1, 2016
(MONTH-DAY-YEAR)

Signed and Sealed March 1, 2016
(MONTH-DAY-YEAR)

Lehigh Southwest Cement Company and Hanson Permanente Cement, Inc.
(PRINCIPAL)

By: _____
(PRINCIPAL) Ana V. Damonte

Fidelity and Deposit Company of Maryland
(SURETY)

By: _____
(ATTORNEY-IN-FACT) Melissa Haddick

S-0443/GE 8/08

XDP

Exhibit D -- including March 1, 2016 Surety Rider

ZURICH AMERICAN INSURANCE COMPANY
COLONIAL AMERICAN CASUALTY AND SURETY COMPANY
FIDELITY AND DEPOSIT COMPANY OF MARYLAND
POWER OF ATTORNEY

KNOW ALL MEN BY THESE PRESENTS: That the ZURICH AMERICAN INSURANCE COMPANY, a corporation of the State of New York, the COLONIAL AMERICAN CASUALTY AND SURETY COMPANY, a corporation of the State of Maryland, and the FIDELITY AND DEPOSIT COMPANY OF MARYLAND a corporation of the State of Maryland (herein collectively called the "Companies"), by **THOMAS O. MCCLELLAN, Vice President,** in pursuance of authority granted by Article V, Section 8, of the By-Laws of said Companies, which are set forth on the reverse side hereof and are hereby certified to be in full force and effect on the date hereof, do hereby nominate, constitute, and appoint **Terri L. MORRISON, Sandra PARKER, Gina A. RODRIGUEZ, Melissa HADDICK and Tannis MATTSON, all of Houston, Texas, EACH** its true and lawful agent and Attorney-in-Fact, to make, execute, seal and deliver, for, and on its behalf as surety, and as its act and deed: **any and all bonds and undertakings, EXCEPT bonds on behalf of Independent Executors, Community Survivors and Community Guardians.** and the execution of such bonds or undertakings in pursuance of these presents, shall be as binding upon said Companies, as fully and amply, to all intents and purposes, as if they had been duly executed and acknowledged by the regularly elected officers of the ZURICH AMERICAN INSURANCE COMPANY at its office in New York, New York., the regularly elected officers of the COLONIAL AMERICAN CASUALTY AND SURETY COMPANY at its office in Owings Mills, Maryland., and the regularly elected officers of the FIDELITY AND DEPOSIT COMPANY OF MARYLAND at its office in Owings Mills, Maryland., in their own proper persons.

The said Vice President does hereby certify that the extract set forth on the reverse side hereof is a true copy of Article V, Section 8, of the By-Laws of said Companies, and is now in force.

IN WITNESS WHEREOF, the said Vice-President has hereunto subscribed his/her names and affixed the Corporate Seals of the said **ZURICH AMERICAN INSURANCE COMPANY, COLONIAL AMERICAN CASUALTY AND SURETY COMPANY, and FIDELITY AND DEPOSIT COMPANY OF MARYLAND,** this 19th day of June, A.D. 2013.

ATTEST:

ZURICH AMERICAN INSURANCE COMPANY
COLONIAL AMERICAN CASUALTY AND SURETY COMPANY
FIDELITY AND DEPOSIT COMPANY OF MARYLAND

By: _____
Secretary
Eric D. Barnes

_____
Vice President
Thomas O. McClellan

State of Maryland
County of Baltimore

On this 19th day of June, A.D. 2013, before the subscriber, a Notary Public of the State of Maryland, duly commissioned and qualified, **THOMAS O. MCCLELLAN, Vice President, and ERIC D. BARNES, Secretary,** of the Companies, to me personally known to be the individuals and officers described in and who executed the preceding instrument, and acknowledged the execution of same, and being by me duly sworn, deposeth and saith, that he/she is the said officer of the Company aforesaid, and that the seals affixed to the preceding instrument are the Corporate Seals of said Companies, and that the said Corporate Seals and the signature as such officer were duly affixed and subscribed to the said instrument by the authority and direction of the said Corporations.

IN TESTIMONY WHEREOF, I have hereunto set my hand and affixed my Official Seal the day and year first above written.

_____
Maria D. Adamski, Notary Public
My Commission Expires: July 8, 2015

Exhibit D -- including March 1, 2016 Surety Rider

EXTRACT FROM BY-LAWS OF THE COMPANIES

"Article V, Section 8, Attorneys-in-Fact. The Chief Executive Officer, the President, or any Executive Vice President or Vice President may, by written instrument under the attested corporate seal, appoint attorneys-in-fact with authority to execute bonds, policies, recognizances, stipulations, undertakings, or other like instruments on behalf of the Company, and may authorize any officer or any such attorney-in-fact to affix the corporate seal thereto; and may with or without cause modify of revoke any such appointment or authority at any time."

CERTIFICATE

I, the undersigned, Vice President of the ZURICH AMERICAN INSURANCE COMPANY, the COLONIAL AMERICAN CASUALTY AND SURETY COMPANY, and the FIDELITY AND DEPOSIT COMPANY OF MARYLAND, do hereby certify that the foregoing Power of Attorney is still in full force and effect on the date of this certificate; and I do further certify that Article V, Section 8, of the By-Laws of the Companies is still in force.

This Power of Attorney and Certificate may be signed by facsimile under and by authority of the following resolution of the Board of Directors of the ZURICH AMERICAN INSURANCE COMPANY at a meeting duly called and held on the 15th day of December 1998.

RESOLVED: "That the signature of the President or a Vice President and the attesting signature of a Secretary or an Assistant Secretary and the Seal of the Company may be affixed by facsimile on any Power of Attorney...Any such Power or any certificate thereof bearing such facsimile signature and seal shall be valid and binding on the Company."

This Power of Attorney and Certificate may be signed by facsimile under and by authority of the following resolution of the Board of Directors of the COLONIAL AMERICAN CASUALTY AND SURETY COMPANY at a meeting duly called and held on the 5th day of May, 1994, and the following resolution of the Board of Directors of the FIDELITY AND DEPOSIT COMPANY OF MARYLAND at a meeting duly called and held on the 10th day of May, 1990.

RESOLVED: "That the facsimile or mechanically reproduced seal of the company and facsimile or mechanically reproduced signature of any Vice-President, Secretary, or Assistant Secretary of the Company, whether made heretofore or hereafter, wherever appearing upon a certified copy of any power of attorney issued by the Company, shall be valid and binding upon the Company with the same force and effect as though manually affixed.

IN TESTIMONY WHEREOF, I have hereunto subscribed my name and affixed the corporate seals of the said Companies, this 1st day of March, 2016.

Geoffrey Delisio

Geoffrey Delisio, Vice President

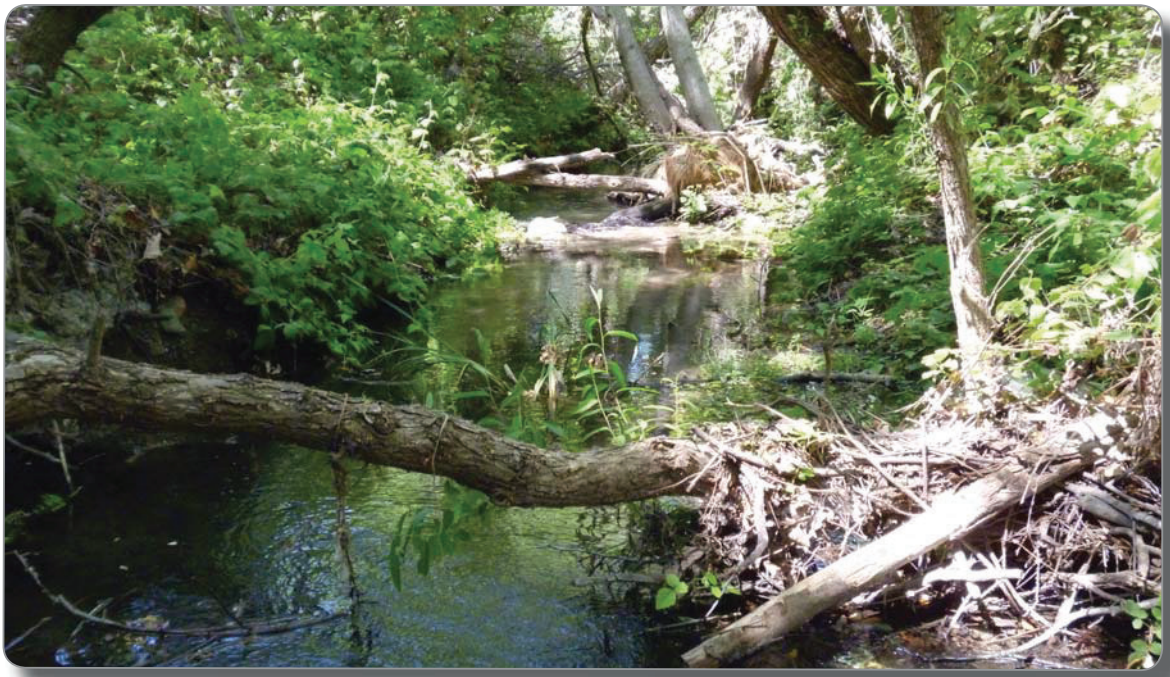
Appendix C

Permanente Creek Restoration Plan Updated 90% Level Submittal Design Basis Technical Memorandum

PERMANENTE CREEK RESTORATION PLAN

Updated - 90% LEVEL SUBMITTAL

DESIGN BASIS TECHNICAL MEMORANDUM



prepared for

LEHIGH SOUTHWEST CEMENT COMPANY AND HANSON PERMANENTE CEMENT, INC.

prepared by

WATERWAYS CONSULTING, INC.

REGISTERED PROFESSIONAL ENGINEER
BRENT M. ZACHARIA
No. 72809
Exp. 06-30-24
CIVIL
STATE OF CALIFORNIA

August 26, 2022

TABLE OF CONTENTS

1.0 INTRODUCTION 1

1.1 Objectives Of This Memorandum 1
1.2 Project Goals and Objectives 1
1.2.1 Introduction to Project Area & Types of Work 2

2.0 BASIS OF DESIGN 3

2.1 Hydrology 4
2.1.1 Peak Flow Hydrology 4
2.1.2 Fish Passage Hydrology 5
2.2 Geomorphic Design Basis 5
2.3 Hydraulic Assessment 7
2.3.1 Approach to Fish Passage Evaluation 7
2.3.2 Channel Hydraulics 11
2.3.3 Sediment Transport 14
2.4 Surface Treatments and Grade Control Elements 15
2.4.1 Engineered Streambed Material (ESM) 15
2.4.2 Floodplain Armor 16
2.4.3 Vegetated Rock Slope Protection (RSP) 16
2.4.4 Vegetation 17
2.4.5 Project Best Management Practices (BMPs) 18
2.5 Floodplain Logs and Large Woody Debris Installations 19
2.6 Geotechnical and Geologic Considerations 20
2.7 Description of Individual Project Components 21
2.7.1 Concrete Channel (Reach 6, Sheet L1) 21
2.7.2 Channel Widening Area (Reaches 8-12, Sheets C11-C18) 21
2.7.3 Culvert 7 (Reach 8, Sheet C11) 22
2.7.4 Culvert 8 (Reach 9, Sheets C14-C15) 22
2.7.5 Sediment Removal Area (Reach 9, Sheets C14 & C16) 22
2.7.6 Culvert #9 Removal Area (Reach 10, Sheet C18) 22
2.7.7 Culverts #10 & #11, Rock Pile, and Pond 13 (Reaches 11-13, Sheets C19-C21) 23
2.7.8 "Old Crusher Foundation" Removal (Reach 17, Sheet C22) 24
2.7.9 Material Removal Area (Reaches 17 & 18, Sheets C23-C26) 24

3.0 IMPLEMENTATION 25

3.1 Construction Sequencing 25
3.2 Field Engineering – Rock Pile (Reaches 11-13) and Material Removal Area (17-18) 26

4.0 ADAPTIVE MANAGEMENT 27

5.0 REFERENCES 28

List of Figures

Figure 1: Permanente Quarry – Permanente Creek Watershed Delineation

List of Tables

Table 1: Summary of Peak Flows

Table 2: Summary of fish passage flows

Table 3: Proposed Channel Dimensions for Constructed Reaches

Table 4: Pool Dimensions and Spacing

Table 5: Fish passage design criteria

List of Attachments

Attachment 1: Updated - 90% Design Drawings

List of Appendices

Appendix A: Fish Passage Design Flow Calculations

Appendix B: Permanente Creek Restoration – Regional Hydraulic Geometry and Analog Channel Assessment Technical Memorandum

Appendix C: Seismic Refraction Survey (Bedrock Analysis)

Appendix D: Fish Passage Calculations - Manning's Roughness & Channel Hydraulics using Manning's Equation at a Station

Appendix E: HEC-RAS Model Results

Appendix F: Engineered Streambed Material, Floodplain Armor and Vegetated Rock Slope Protection Sizing Calculations

Appendix G: Floodplain Log Ballast Calculations

Appendix H: Geologic and Geomorphic Assessment of Permanente Creek (Golder 2019)

Appendix I: Slope Stability Analyses, Permanente Creek Restoration Plan (Golder 2021)

Appendix J: Water Quality Evaluation, Permanente Creek Restoration Project (Golder 2022)

Appendix K: Permanente Creek Restoration Plan Stability Analysis (Stantec 2022)

Appendix L: Material Removal Area Lower Limit of Potential Finished Grade Figures

1.0 INTRODUCTION

1.1 OBJECTIVES OF THIS MEMORANDUM

This technical memorandum has been prepared to describe stream restoration features presented in the "Permanente Creek Restoration Plan Updated 90% Design, Santa Clara County CEQA Review Submittal" drawings ("90% Designs"), dated August 26, 2022, and to document important design criteria, assumptions, and site constraints that have influenced their development. Sheet C2 of the 90% Designs provides an overview for locating project areas discussed in this memorandum. The August 26, 2022 Updated 90% Design drawings, among other things, update the existing topography surrounding the Rock Pile Area and Material Removal Area to reflect the recent May 2022 aerial survey of these areas, eliminate the need for installation of a retaining wall along the north toe of slope below Pond 1250 due to Lehigh's commitment to relocate Pond 1250 rather than leave it in place and require an extensive retaining structure in the creek and include additional project details responsive to reviewing agency comments on the project to date.

The Designs have been prepared, in part, to fulfill the requirements set forth in an Amended Consent Decree (Decree) between the Sierra Club and Lehigh Southwest Cement Company and Hanson Permanente Cement, Inc., lodged February 22, 2016, and to fulfill other regulatory obligations stemming from a 1999 Cleanup and Abatement Order issued by the San Francisco Regional Water Quality Control Board. The 90% Designs specifically address the Decree requirements under Section VI. "Creek Restoration". This memorandum and the 90% Designs comprise the "Complete 90 Percent Level Restoration Plan".

1.2 PROJECT GOALS AND OBJECTIVES

The primary objectives of the work, as set forth in the Decree, include the following:

- Increase quantity and quality of resident rainbow trout habitat through creation of pools, increased channel complexity and cover, and by fish passage through and between reaches consistent with a geomorphically stable, self-sustaining channel unless DFW Restoration Manual hydraulic design criteria cannot be met due to (1) the gradient of the reach, or (2) bedrock grade controls confirmed by an independent geologist;
- Improve riparian habitat, including improvement to channel and stream bank stability and ecological/geomorphic function;
- Remove mining-related fill and sediments in the bed, banks and adjacent slopes;
- Remove or alter man-made structures so as to improve riparian habitat;
- Layback creek banks and adjacent hill slopes to provide stable slopes sufficient to prevent fill from entering the creek;
- Require restoration that is no less stringent than any restoration that is approved or required by any agency, including but not limited to the Santa Clara County Planning Department, the DFW, and the Regional Water Board, and that is to be performed in a period of time no greater than any restoration that is approved or required by any agency, including but not limited to the Santa Clara County Planning Department, the DFW, and the Regional Water Board.

The 90% Designs address these broad objectives and comply with the more detailed reach-specific direction provided within paragraphs 34 through 42 of the Decree. Where feasible, the designs follow fish passage design approaches for resident rainbow trout, consistent with the California Department of Fish & Wildlife's "California Salmonid Stream Habitat Restoration Manual, 4th Edition (Vols. I-II, 2010)" ("DFW Restoration Manual").

It should be noted that the Restoration Plan has evolved considerably as designs have progressed beyond initial concepts. For example, a primary objective of the Restoration Plan as recently as 2014 was to modify Permanente Creek within the quarry property to allow the passage of anadromous salmonids. Following subsequent detailed analysis of existing and historic site constraints and consultation with resource agencies, anadromous fish passage has been removed as a design objective.

1.2.1 Introduction to Project Area & Types of Work

Sheets C2 and C4 of the 90% Designs provide an overview of the proposed work area in both plan and profile. For continuity and ease of comparison, we have retained the original reach designations provided in the URS Permanente Creek Long-Term Restoration Plan (URS 2011). However, the project area overview stream stationing has been revised to reflect the results of a more accurate stream centerline survey performed in the summer of 2013.[1] The work is presented in the drawings proceeding from the downstream to upstream limits. There are generally five major component project areas, as shown on Sheet C2, which include:

- Concrete Channel
- Channel Widening Area
- Rock Pile Area (which is included in the Channel Widening Area)
- "Old Crusher Foundation"
- Material Removal Area

Restoration work proposed at each area includes the following design elements and objectives:

<u>Concrete Channel (Sheet L1)</u>

- Encourage development of mature riparian canopy along the southern bank to shade the concrete channel to reduce solar heat gain on instream flow and discourage the establishment of tules;
- Preservation of existing native vegetation;
- Removal of non-native species and suppression of weeds around existing native seedlings and smaller native plants to encourage their establishment; and
- Installation of native vegetation.

<u>Channel Widening Area (Sheets C11-C18)</u>

- Removal of concrete road segments;
- Construction of floodplain bench areas with habitat elements and reduction of access road width;
- Removal of 260 linear feet of culverts, including a road crossing, and daylighting the creek to improve fish passage conditions and ecological complexity;

[1] Note: Design alignments and stationing at individual project sites differ from the 2013 stream centerline survey because the design alignments have been oriented to the proposed features shown on the drawings.

- Installation of large woody debris (LWD) at the Culvert 7 and Culvert 8 removal sites.
- Removal of old tractor tires along streambanks at a culvert removal site;
- Removal of imported sediment from the bed and banks of a tributary reach;
- Select removal of rock slope protection (RSP) and concrete rubble bank protection at an area that now has adequate mature riparian vegetation that is providing root reinforcement to bank soils;
- Removal of the idled Rock Plant conveyor system and associated infrastructure; and
- Installation of native vegetation.

Rock Pile Area (Sheets C19-C21)

- Removal of concrete road segments and road-related fill material;
- Removal of 930 linear feet of culverts and daylighting of the creek that will help improve fish passage conditions and ecological complexity;
- Construction of a new channel with floodplain bench areas with habitat elements that will help improve fish passage conditions and ecological complexity;
- Removal of Rock Pile, idled Rock Plant conveyor system and associated infrastructure;
- Removal of Pond 13 dam infrastructure;
- Construction of a restored channel through the abandoned Pond 13; and,
- Installation of native vegetation.

"Old Crusher Foundation" (Sheet C22)

- Cutting back the concrete block that is projecting into the channel to better conform to the natural creek bank.

Material Removal Area (Sheets C23-C26)

- Removal of overburden/fill and a relic concrete structure and moving the north toe of slope northward 25 feet along the majority of the project area. Pond 4A is decommissioned. Lehigh will relocate Pond 1250 and the Upper Treatment Facility, as needed.
- Construction of a new channel with floodplain bench areas with habitat elements that will help improve fish passage conditions and ecological complexity, and
- Installation of native vegetation.

2.0 BASIS OF DESIGN

There are numerous considerations that contribute to the design of a successful stream restoration project. Initial design efforts typically include researching features of the project setting such as site geology, regional climate, basin hydrology, topographic features, and vegetation. These features and others are considered in light of project goals and objectives to develop opportunities and constraints and design alternatives. As design alternatives gel into a preferred project, calculations begin to inform the project details. The following sections provide an overview of important site features and design criteria that have shaped the project and describe the calculations that have been used to design specific project elements.

2.1 HYDROLOGY

2.1.1 Peak Flow Hydrology

The determination of design peak flow values is critical to the process of analyzing erosive forces on proposed bed and bank stabilization elements, understanding sediment transport and scour potential, and assisting with the specification of appropriate channel geometry.

Design flows were derived from a hydrologic analysis prepared by the Santa Clara Valley Water District (SCVWD) and presented in a report titled "Santa Clara Valley Water District Stevens and Permanente Creeks Hydrology Report" (Wang et al, 2007). Peak flow values published by the SCVWD for Permanente Creek were developed using a rainfall-runoff model. Rainfall data used in the model were derived from a weighted average of precipitation data collected at gaging stations throughout the area. Other model parameters included loss rates, time of concentration estimates, and routing coefficients.

Design flows were calculated for the four drainage areas at the site (Figure 1) by normalizing SCVWD's published values for Upper Permanente Creek (drainage area = 4.01 sq.mi.) upstream of the confluence with the West Branch Permanente Creek. Normalization was performed using a ratio of the project site's drainage area compared to the total area above the confluence (4.01 sq. mi.) and then relating to the SCVWD's published peak flow values (Table 1). The 1.5-year flow event was calculated by extrapolating values using a log-normal trend-line plotted through the data.

Table 1. Summary of Peak Flows (cfs)

Recurrence Interval	Santa Clara Valley Water District Upper Permanente Creek Peak Flow Rates (Drainage Area = 4.01 sq. mi.)	Project Site (Drainage Area A = 3.5 sq.mi.)	Project Site (Drainage Area B = 3.01 sq.mi.)	Project Site (Drainage Area C = 2.7 sq.mi.)	Project Site (Drainage Area D = 2.02 sq.mi.)
1.5-year	N.A.	284	244	219	164
2.33-year	450	393	338	303	227
5-year	730	637	548	492	368
10-year	970	847	728	653	489
25-year	1,300	1,135	976	875	656
50-year	1,500	1,309	1,126	1,010	757
100-year	1,700	1,484	1,276	1,145	858
Applicable Stream Reaches	**Not Applicable**	**R1-R6[1]**	**R6-R8[2]**	**R9-R15**	**R16-18**

[1]The drainage area extends into a portion of Reach 6, ending at the Concrete Channel downstream of Culvert #2.
[2]The drainage area includes a portion of Reach 6, beginning at Culvert #2.

2.1.2 Fish Passage Hydrology

The California Department of Fish and Wildlife (CDFW) prescribe upper and lower fish passage "design flows" for juvenile and adult rainbow trout. The design flows represent flow rates at which certain hydraulic parameters (*e.g.*, depth, velocity) must be met to consider a reach "passable" by fish. Where flow duration data is available or can be modeled, the upper fish passage design flow is equal to the 5% annual exceedance flow for adult rainbow trout (*i.e.,* adult non-anadromous salmonids) and the 10% annual exceedance for all juvenile salmonids. These flows represent the mean daily flow that is likely to be exceeded 5% or 10% of the time, respectively, in an average year. Similarly, the lower fish passage design flow for adult rainbow trout is equal to the greater of either the 90% annual exceedance or 2 cfs. For juveniles, it is the greater of either the 95% annual exceedance or 1 cfs (CDFW 2003).

Flow duration data for the project were developed from mean daily flows recorded at USGS gaging station 11166000 (Matadero Creek at Palo Alto). This gage is located seven miles north of the project site in a watershed with similar topography and average annual precipitation. We evaluated approximately 65 years of mean daily flow data, from October 1952 to August 2017. Exceedance flows calculated for the gage site were normalized by drainage area to estimate the fish passage flows at the project sites (Table 2). Detailed fish passage design flow calculations are included in Appendix A.

Table 2. Summary of Fish Passage Flows (cfs)

Design Flow / Species and Life Stage	Percent Exceedance	USGS Gage (11166000) Drainage Area =7.26 sq.mi.	Project Site Drainage Area A = 3.5 sq.mi.	Project Site Drainage Area B = 3.01 sq.mi.	Project Site Drainage Area C = 2.7 sq.mi.	Project Site Drainage Area D= 2.02 sq.mi.
Low Flow Juvenile Salmonids	95%	0	1*	1*	1*	1*
Low Flow Adult Non-Anadromous Salmonids	90%	0	2*	2*	2*	2*
High Flow Juvenile Salmonids	10%	3.5	1.7	1.5	1.3	1
High Flow Adult Non-Anadromous Salmonids	5%	9.9	4.8	4.1	3.7	2.8
Corresponding Stream Reaches	--	**Not Applicable**	**R1-R6[1]**	**R6-R8[2]**	**R9-R15**	**R16-18**

* The alternative low fish passage design flows of 2 cfs and 1 cfs were adopted for the adult non-anadromous salmonid and juvenile salmonid fish passage analyses, respectively.

[1]The drainage area extends into a portion of Reach 6, ending at the Concrete Channel downstream of Culvert #2.

[2]The drainage area includes a portion of Reach 6, beginning at Culvert #2.

2.2 GEOMORPHIC DESIGN BASIS

Successful channel restoration requires an understanding of suitable channel geometries (*e.g.*, bankfull width and depth), longitudinal gradients, and step and pool spacing and size for a particular geomorphic context and hydraulic regime. Among other things, appropriate channel geometric design helps to ensure sediment transport continuity through constructed reaches and appropriately distributes shear

stresses across the channel bed and floodplain areas during floods. It is also important to have a firm understanding of flood hydraulics to size bed and floodplain material appropriately to ensure short-term channel stability while vegetation becomes established, and long-term stability within the active channel where vegetation will be absent.

This project includes the design and reconstruction of the channel bed and banks at multiple locations - Culverts #7 and #8 within the Channel Widening Area, and the Rock Pile and Material Removal Areas. To assist with developing appropriate channel geometry, we evaluated existing datasets for gaged sites located in the Santa Cruz Mountains to help develop relationships for bankfull width and depth as a function of watershed area. We also surveyed and evaluated geometry data from four nearby "reference" channel reaches, where the channel is considered to be "natural". This includes two analog channels (within Swiss Creek and Corte Madera Creek) identified as having watershed and geomorphic characteristics similar to Permanente Creek (URS, 2011) and two channel segments located in the upper Permanente Creek watershed within Reach 20. The channel geometry of the reference reaches was incorporated into the dataset for the regional geometry developed from the gaged sites to refine bankfull channel dimensions for the project area. An overview of how bankfull channel dimensions were developed for the reconstructed channel segments is included in Appendix B, Permanente Creek Restoration – Regional Hydraulic Geometry and Analog Channel Assessment. A summary of the bankfull channel dimensions is included below in Table 3. Minimum and maximum bankfull dimensions are provided for design slope ranges to provide for variability and flexibility during channel construction. The bankfull dimensions have also been included on the appropriate design drawing sheets included in the 90% Designs.

Table 3. Proposed Channel Dimensions for Constructed Reaches

Project Site	Design Slope (%)	Design Slope Range (%)	Proposed Bankfull Width Min (ft)	Proposed Bankfull Width Max (ft)	Proposed Bankfull Depth Min (ft)	Proposed Bankfull Depth Max (ft)	Cross Sectional Area Min (ft^2)	Cross Sectional Area Max (ft^2)
Culvert 7	4.3%	4%-8%	16.5	20.5	2.1	2.5	28.2	34.2
Culvert 8	2.7%	<4%	18.0	22.0	1.9	2.3	28.2	34.2
Rock Pile Area	Varies	<4%	17.5	21.5	1.8	2.2	26.9	32.9
		4%-8%	16.0	20.0	2.0	2.4		
		>8%	15.5	18.5	2.4	2.8		
Overburden Removal Area	Varies	<4%	16.0	20.0	1.7	2.1	22.5	28.5
		4%-8%	14.5	18.5	1.9	2.3		
		>8%	14.0	17.0	2.3	2.7		

An evaluation of pool and step dimensions and spacing was also conducted. Data from the reference reach channel surveys and the 2013 Permanente Creek channel survey was used to help inform pool design geometry. A review of literature related to channel morphology and bed profile arrangements was used to refine the pool design geometry and incorporate steps into the channel forms at the Rock Pile and Material Removal Areas. A summary of the proposed pool and step dimensions and spacing are included in Table 4. Sheet C34 includes tables with pool and step dimensions and spacing for the Rock Pile and Material Removal Areas. Sheet C34 also includes typical details demonstrating how the

pools and steps will be constructed. The Culvert #7 and #8 removal sites are relatively short and include a single pool each. The pool dimensions are shown on the respective culvert removal area design profiles (Sheets C11 and C15).

Table 4. Pool and Step Dimensions and Spacing

Average Channel Slope	Pool Geometry					Step Geometry		
	Pool Length (ft.)	Pool Depth (ft.)	Drop Height (ft.)	Pool Spacing (ft.)	Pool Spacing (bankfull widths)	Step Drop (ft.)	Step Spacing (ft.)	Step Spacing (bankfull widths)
4% - 8% (Step-Pool Channel)	10 – 20	0.5 - 2	0.5 – 1	30 – 120	2 - 6	0.5 – 1	8 - 20	0.5 - 1
8% - 12% (Cascade Channel)	6 - 13	0.5 - 2	0.5 - 1	28 - 75	2 - 4	0.5 – 1	6 - 13	0.4 – 0.8

2.3 HYDRAULIC ASSESSMENT

2.3.1 Approach to Fish Passage Evaluation

The improvement of passage conditions for resident rainbow trout is a primary goal of the proposed work. Within the various project reaches, we have attempted to meet this goal through a combination of channel and floodplain enhancements. The nature and extent of these enhancements varies by reach, and each location requires a carefully considered approach to the design and analysis of fish passage elements. Our design basis and methodology are outlined below.

CDFW allows for varying approaches to analyzing fish passage within natural or constructed channels. The "Stream Simulation Method" consists of constructing a channel that mimics geomorphically similar adjacent reference reaches. The Stream Simulation Method works on the premise that a constructed channel that mimics adjacent natural reaches will present no more of an obstacle to passage than the adjacent natural channel.

The "Hydraulic Design" approach allows for construction of a channel geometry that has been proven through modeling to meet specific hydraulic design criteria. For channels designed using Hydraulic Design methods, CDFW provides general guidelines prescribing minimum water depths, maximum velocities, and maximum hydraulic drop heights (Table 5). Projects designed using the Hydraulic Design Method must satisfy these criteria throughout the full range of fish passage design flows.

Table 5. Fish Passage Design Criteria			
Species and Life stage	**Minimum Flow Depth (ft)**	**Maximum Water Velocity (ft/s)**	**Maximum Drop (ft)**
Adult Non-Anadromous Salmonids	0.67	2 [1]	1
Juvenile Salmonids	0.5	1	0.5

[1] *2 ft/s for culverts or riffles between pools greater than 200 feet long.*

Each of these methods has its limitations. For instance, the Hydraulic Design method is not recommended where profile grades exceed approximately 5%. The Stream Simulation Method is not recommended where adjacent reaches are disturbed or where sediment supply or transport has been significantly altered from natural conditions, which is the case throughout the project area. For these reasons and others, the direct application of these methods has proven difficult at many locations throughout the project area.

Our approach has been to use Hydraulic Design methods to analyze fish passage conditions where the profile gradient is relatively low and where hydraulic design standards for fish passage can be achieved within the recommended range of applicable channel profile gradients. These areas include Reaches 8-10.

Where average profile gradient exceeds that recommended for the Hydraulic Design method (Reaches 11-18), we have designed a channel based upon analogs from less-disturbed reaches within and near to the Permanente Creek Watershed. The objective of channel design within these reaches is the creation of a geomorphically appropriate and stable channel that enhances opportunities for fish passage where feasible. However, the presence of bedrock may ultimately dictate channel geometry and dependent fish passage characteristics at many locations. We have evaluated velocity and depth within these steeper reaches to determine if the Hydraulic Design criteria for fish passage are satisfied, as discussed in the following section.

Although the proposed project does not provide optimal passage opportunities along its entire length, resident rainbow trout passage is still a primary objective of the work. Numerous constraints make it difficult to create optimal fish passage conditions within the project area, or even to meet established minimum performance standards. Some of these constraints include:

- Reaches with historically high gradients prior to development of the quarry (>10%);
- The presence of natural bedrock drops exceeding 6 feet in height; and
- Highly unstable reaches with excessive bed load.

Where these constraints exist, we have done our best to optimize passage and habitat benefits, while considering the need to ensure the following:

- Maintenance of channel, bank, and floodplain stability;
- Maintenance of flood conveyance (where infrastructure is present);
- Protection of public safety;
- Preservation and protection of existing critical infrastructure; and
- Preservation of existing mature riparian vegetation, where feasible.

One of the greatest challenges to the development of the Designs has been a lack of knowledge of the extent to which past anthropogenic disturbances at the site may have altered the original channel geometry, and as a result, fish passage conditions. Within Reaches 11-12 and 17-18, it appears that the channel profile has been altered through the placement of fill. The designs lower the profile in these reaches to remove culverts and/or fill material to establish a profile grade more closely following what existed prior to disturbance, a portion of which will likely follow bedrock. The resulting profile grades are still quite steep, averaging up to 12% in portions of Reach 11 and up to 22.7% in portions of Reach 17.

The design profiles at these locations are based on a best fit to subsurface bedrock locations that were identified through a seismic refraction study (Appendix C), and later refined at the Rock Pile Area based on exploratory borings. In order to avoid alternating steep chutes or drops and low gradient segments, and optimize fish passage potential, the design attempts to follow an average grade that connects the high points of the bedrock profile rather than following it continuously. It is likely that the original channel would have followed a more irregular profile with exposed bedrock at pinch points and steepened reaches, as seen at other less disturbed reaches within the project area (*e.g.,* reaches 15 and 16). A process has been outlined to further evaluate the geometry of bedrock in the field during construction and make field adjustments allowing the proposed channel to conform to uncovered areas of bedrock. For instance, the minimum design profile grade upstream of bedrock controls will be set to 4% and the maximum constructed profile grade between bedrock outcrops will not exceed 12%. For further details, see the "Field Engineering Notes" included on Sheet C40 of the 90% Designs..

Individual project components or areas are discussed in detail within Section 2.7. Within each section, we have provided a summary of the ability of the design to meet recommended fish passage criteria.

2.3.1.1 *Assessment of Fish Passage within Constructed Channel Reaches*

Manning's equation is the primary method we used to determine depths and average velocities within the constructed channel sections under design fish passage flows to evaluate compliance with the fish passage criteria listed in Table 5[2]. Fish passage was evaluated at the following locations where channel bed modifications or reconstruction is proposed:

- Culvert #7;
- Culvert #8;
- Rock Pile Area; and
- Material Removal Area.

Proposed channel gradients are less than 4% at Culverts #7 and #8. Fish passage design criteria were evaluated using the Hydraulic Design Method at these locations.

The maximum average gradient at which a restored channel segment will be constructed at the Rock Pile and Material Removal Areas is 12%. This maximum gradient has been established by the guidelines included in the Field Engineering Notes (Sheet C40). As discussed above, 12% is considerably steeper than the 5% maximum profile grade that is recommended for application of the Hydraulic Design

[2] Design fish passage criteria were evaluated within channel sections where the channel bed and lower banks would be modified. The portions of Permanente Creek where only a floodplain bench would be constructed along the main channel (e.g. Channel Widening Area) were not evaluated.

method. We evaluated hydraulic parameters of a 12% channel for comparison to fish passage design criteria established under the Hydraulic Design method to determine if the fish passage design criteria would still be met.

Manning's equation is a universally accepted method for determining relationships between depth, velocity, and channel geometry (*e.g.*, shape, size and roughness of the channel) for open channel flow conditions. Calculations were performed using the "Hydraflow Express" extension of AutoCAD Civil 3D. Parameters used in the equation include:

- Discharge;
- Channel bed slope;
- Hydraulic radius; and
- Manning's roughness coefficient.

The roughness coefficients were estimated using depth-based roughness equations applicable to the proposed channels (Mussetter, 1989). Refer to Appendix E for detailed calculations.

Hydraulic calculations for the constructed channel sections are also presented in detail within Appendix D. The modeled cross section geometry incorporates boulders that will protrude above the channel bed to take into account cracks between rocks that fish can use for moving between reaches. Results indicate that depth and velocity criteria would be satisfied over the range of design fish passage flows described in Section 2.1.2 "Fish Passage Hydrology". It should be noted that within steep (>6-8%) portions of the reconstructed channel, it will be impossible to avoid post-construction channel adjustments and the reorganization and associated formation of steps, chutes, and pools, the geometry of which cannot be accurately predicted. Further, the channel will likely conform to bedrock outcrops in some locations, which may dictate cross section and profile geometry in ways that we cannot anticipate.

Fish passage flows were also modeled using HEC-RAS to generate water surface profiles and velocity profiles for existing and proposed conditions, as requested by the reviewing agencies. This was completed for the two locations where the channel bed will be reconstructed and the Field Engineering Notes (Sheet C40) do not apply - Culvert #7 and Culvert #8 removal areas within the Channel Widening Area. The culverts will be removed and the channel will be reconstructed as shown on the drawings. Reconstruction of the channel at these two locations greatly improves fish passage conditions. See Section 2.3.2.2 below for a summary of model results. Since there is uncertainty regarding the post-project channel profile within the Rock Pile and Material Removal Areas due to the unknown depth to bedrock, it does not seem relevant to present existing versus proposed HEC-RAS results. If bedrock is encountered the constructed profile could be very steep (>12%) and potentially include significant vertical drops of several feet.

Qualitatively, it is apparent that removal of Culverts #10 and #11 at the Rock Pile Area and the construction of an open channel will improve fish passage opportunities within this channel segment. This, of course, assumes that significant drops over bedrock or bedrock chutes are not uncovered once the culvert is removed.[3] Culverts with a low Manning's n value will be replaced with open channels constructed using Engineered Streambed Material (ESM) with increased hydraulic roughness. This

[3] See the Field Engineering Notes on Sheet C40 of the 90% Designs for a description of how the channel will be constructed if bedrock is encountered.

changed condition will both reduce flow velocities and increase flow depth, along with providing improved habitat and hydraulic complexity. The coarse-grained ESM will provide areas of velocity shadowing behind large boulders, and cracks and small pools between boulders with increased flow depths and resting areas that will provide more conducive conditions for fish passage under proposed conditions. See Section 2.3.2.2 for a discussion of the HEC-RAS model results that predict improved fish passage conditions once Culverts #7 and #8 are removed and the channel bed is reconstructed.

We could not locate a resource that estimates the maximum sustained channel slope that will be a barrier to upstream passage of resident rainbow trout. However, studies show that adult anadromous salmonids can navigate steeper slopes than resident rainbow trout (Coastal Conservancy 2004). Considering this, CDFW has identified a sustained slope of greater than 8% as a barrier to anadromy (CDFW, 2009). Therefore, it is reasonable to assume that sustained slopes of 8% are a barrier to resident rainbow trout passage. The Washington Department of Transportation considers a slope of 12% for >160 meters as the cutoff for anadromous passage. We have provided passage calculations for reaches up to 12% average profile gradient, although extended reaches at this slope are likely too steep for resident rainbow trout to navigate, especially given the likelihood of channel adjustments and bedrock exposures discussed above.

2.3.2 Channel Hydraulics

Having a good understanding of channel hydraulics is important for developing designs that will provide the intended instream habitat complexity while also providing channel stability during the first few years following construction, until vegetation becomes established. Peak flood hydraulic modeling was conducted using HEC-RAS 5.0.4 river analysis software, developed by the United States Army Corps of Engineers (USACE). Modeling results were used to confirm that appropriate bankfull channel dimensions have been incorporated into project designs, to assist with sizing surface treatments (*e.g.*, engineered streambed material) to provide channel stability and erosion protection, and to ensure infrastructure and access roads won't be significantly impacted by the 100-year flood.

2.3.2.1 *Peak Flood Modeling (1D HEC-RAS)*

Two separate HEC-RAS models have been developed for the project. One model was prepared for the Channel Widening and Rock Pile Areas since they are integrally connected, and a separate model was developed for the Material Removal Area because it is located more than 3,000 feet upstream of the Rock Pile Area. The existing conditions models were developed using topography from detailed surveys conducted at both areas by Waterways between 2013 and 2015. Proposed condition channel geometry was developed by importing the design grade topography into the existing conditions model and adding additional sections as necessary to model areas where culverts are proposed for removal. The Channel Widening and Rock Pile Area model extends over approximately 6,500 linear feet of channel, beginning just downstream of Culvert #2, and extending approximately 400 feet upstream of Pond 13. The Material Removal Area model extends over approximately 2,900 feet, beginning over 500 feet downstream of the Upper Treatment Facility located on the north bank approximately twenty feet above the channel and extending approximately 400 upstream of the proposed restoration limits. Overview figures have been prepared for each of the models and are included in Appendix E.[4] The first

[4] The HEC-RAS models extend beyond the limits of the proposed work to account for downstream conditions that could affect hydraulics within the proposed restoration areas. Because of this, design stationing does not match stationing used in the HEC-RAS models. To assist with comparison between HEC-RAS and the design drawings,

two figures show the locations of the cross sections included in the model for the Channel Widening and Rock Pile Areas. The third figure shows the location of the cross sections included in the model for the Material Removal Area.

Roughness values (Manning's n) were chosen from field-based observation of the channel and floodplains for existing conditions. The United States Geological Survey (USGS) "Roughness Characteristics of Natural Channels" report was used to aid in the selection of roughness values for proposed conditions. The report includes descriptive data and photographs for fifty different stream channels for which roughness coefficients have been determined.

Boundary conditions were set using the normal depth method and are included in Appendix E. The upstream and downstream boundary conditions were set to match the slope of the energy grade line at these respective locations, which roughly matches the channel slope.

1.5-Year Flood Model

The 1.5-year flood was evaluated to confirm that the bankfull geometry for the Rock Pile and Material Removal Areas developed in the "Permanente Creek Restoration – Regional Hydraulic Geometry and Analog Channel Assessment" included in Appendix B, is appropriate for the constructed channel segments. This modeled flow was also used to assist with determining the channel-side design elevation of the floodplain bench along the Channel Widening Area. Graphical outputs of water surface profiles are included in Appendix E. Results for existing and proposed conditions have been included per the request of the reviewing agencies. The profile outputs include a profile of the channel-side design elevation of the floodplain bench to demonstrate that the design elevations of the floodplain benches are near the 1.5-year water surface elevation. Detailed output tables that include flow depth, velocity, and top width for both existing and proposed conditions have also been included in Appendix E.

10-Year Flood Model

The 10-year flood was evaluated to assist with establishing the upper limits of floodplain armor throughout the project area. Floodplain armor will be placed over constructed benches up to approximately the 10-year water surface elevation to provide erosion protection while vegetation becomes established. Results for existing and proposed conditions have been included per the request of the reviewing agencies. Graphical outputs of 10-year water surface profiles are included in Appendix E. Detailed output tables that include flow depth, velocity, and top width for both existing and proposed conditions have also been included in Appendix E.

100-Year Flood Model

The 100-year flood was evaluated to assist with designing surface treatments to ensure reconstructed channel areas remain stable, and that floodplain benches remain stable while vegetation becomes established. It was also used to evaluate the potential for erosion above the limits of floodplain armor, which has been set to approximately the 10-year water surface elevation, and whether the proposed angular rock vehicle barrier along the Channel Widening Area would remain stable at locations where bank overtopping will occur. See Section 2.4 below for design details related to surface treatments.

HEC-RAS stationing for the Channel Widening and Rock Pile Area model includes the design stationing plus 100+00. The Material Removal Area model includes the design stationing plus 10+00.

Graphical outputs of 100-year water surface profiles under existing and proposed conditions are included in Appendix E. Detailed output tables that include flow depth, velocity, and top width for both existing and proposed conditions have also been included in Appendix E.

Angular Rock Vehicle Barrier Assessment

At locations where bank overtopping flows will run along the rock vehicle barrier, the maximum velocity of the overtopping flow was determined to be 5 ft/sec. with a flow depth of approximately 1.2 feet and a maximum shear stress of 4.5 lbs/ft^2. This occurs for approximately 50 linear feet near the upstream end of the Channel Widening Area (HEC-RAS Station 144+50) where the proposed floodplain bench narrows and the height of the bank between the bench and access road is reduced.

Overtopping flow that occurs at discrete locations along the Channel Widening Area has velocities that range from 0.3 – 5.0 ft/sec with an average velocity of 2.9 ft/sec. Six-inch diameter cobbles can resist flow velocities up to 10 ft/sec and shear stresses of 2.5 lbs/ft^2 (Fischenich 2001). The vehicle barrier will be composed of 4 to 8-inch diameter angular rock along most of its length, which is more stable than sub-rounded to rounded cobble. To protect against mobilization at the area of maximum velocity the vehicle barrier will be composed of 10 to 16-inch dimeter angular rock, which can resist flow velocities up to 13 ft/sec and shear stresses of 5.1 lbs/ft^2 (Fischenich 2001). A summary of the overtopping locations, flow depths, and velocities are included in Appendix E. Overtopping flow velocities were determined using the velocity distribution module in HEC-RAS, which provides a graphical output of flow velocities across a given cross section. A cross section velocity output for each section where overtopping occurs is included in Appendix E.

2.3.2.2 *Fish Passage Hydraulics at the Culvert #7 and #8 Removal Areas*

Fish passage has been assessed at the Culvert #7 and #8 removal areas within the Channel Widening Area where the channel bed and banks will be reconstructed as shown on Sheets C11 and C15. Results of the modeling effort are included Appendix E. Water surface profiles and velocity profiles for adult and juvenile high and low design flows are presented in the appendix as well. As can be seen, flow depths are increased, and velocities are reduced under proposed versus existing conditions along the length of proposed channel reconstruction. The HEC-RAS results document that flow depths and velocities meet fish passage design criteria along the reconstructed channel segments at all locations within the culvert removal areas, except that flow depths are slightly below the design criteria listed in Table 5 for both adult and juvenile low flows at the upstream end of the Culvert #7 removal area. The adult low flow depth is 0.50 ft. versus 0.67 ft. and the juvenile depth is 0.37 ft. versus 0.5 ft. However, unlike the Manning's at a section calculations (Appendix D), the model does not account for cracks within the boulders that will occur within the engineered streambed material. These cracks will provide additional depth for fish to utilize for passage. Fish passage design criteria are not necessarily met outside the culvert removal areas shown on the profile plots, where active channel geometry reverts to existing conditions.

2.3.2.3 *Model Calibration and Sensitivity Analysis*

Model calibration has not been possible because no gauge data correlating water surface elevations to discharge rates is available in the project area for the design peak flood recurrence intervals. Golder Associates (Golder) maintained stream gauges in the project area during the 2017-2018 and 2018-2019

winters. However, measured peak flow rates were well below the 1.5-year recurrence interval flood (35 cfs vs. 284 cfs) during this time period.

The main aspects of the design that the model has been used for are sizing of the various rock materials specified for the project, determining the upper limit of the rock placements, establishing the floodplain bench elevation at the Channel Widening Area and evaluating the 100-year water surface elevation. The design bankfull channel dimensions where complete reconstruction of the channel bed is proposed are based on geomorphic criteria developed through evaluating nearby reference reaches. However, the model was used to confirm the design bankfull dimensions are reasonable relative to expected flows.

As a means to assess the sensitivity of the hydraulic model and evaluate implications for assumptions related to chosen Manning's roughness values we varied n-values by +10/-10 percent. Manning's n-values account for channel roughness due to irregularities in channel bed and bank forms, bed material size and natural debris in the channel, and vegetation. Small changes in n-values have the potential to affect the modeled water surface elevations and flow velocities. As n-values decrease flow depths typically decrease and velocities increase. The opposite is true for increases in n-values.

Chosen n-values for this project have the potential to effect floodplain bench design elevations at the Channel Widening Area, where reconstruction of the bed is not proposed, and criteria from the analog study at nearby references reaches is not relevant. Altering the n-values by +10/-10 percent generally resulted in the change of water surface elevations by less than 0.3 tenths of a foot along the project reaches for the 1.5-, 10-, 100-year peak flows, with the average change in water surface being less than (+/-) 0.1 tenth of a foot. This level of variability is within the tolerance for which the channel features will be constructed and is not considered significant. Results from the sensitivity analysis performed on the Channel Widening to Rock Pile hydraulic model are included in Appendix E.

We found the sensitivity analysis to have a limited effect on the proposed rock sizing. Rock slope protection (RSP), engineered streambed material (ESM), and floodplain armor sizing equations are based on flow velocity, with velocity explicitly included in the RSP calculations and the design flow (Q) over a given channel width (e.g., bankfull width) included in the ESM and floodplain armor calculations (see Appendix F). As expected, decreases in n-values resulted in high flow velocities, which in turn has the potential to result in larger rock sizing if the increase in velocity is significant enough. The opposite is true for increases in n-values. We found that the variation of n-values was not significant regarding RSP sizing, and that the calculations still resulted in rock size classes falling within the size range of the Caltrans Standard Specifications for RSP that were determined using the initial model inputs for channel roughness. We also found that the variation of n-values did not result in any significant differences in ESM or floodplain armor size. We have included the RSP calculations in Appendix F for reference.

2.3.3 Sediment Transport

The project has been designed to help maintain sediment transport continuity while creating depositional zones on the extensive floodplain areas that will be constructed as part of project implementation. As discussed above, proposed bankfull channel dimensions at each of the reconstructed reaches have been informed by a reference reach study and would vary as channel slope changes. Appropriately sized bankfull dimensions that adjust with changes in the channel profile slope will assist with sediment transport continuity through the reconstructed channels. See Table 3 for proposed bankfull dimensions based on channel slope. To help maintain sediment transport continuity and channel stability upstream of bedrock controls encountered at the Rock Pile and

Material Removal Areas, the minimum design profile grade at these areas will be set to 4 percent, as outlined in the Field Engineering Notes (Sheet C40).

Constructed floodplain areas will provide depositional zones for fine sediment and smaller coarse material when flood flows occur. Floodplains constructed along the Channel Widening Area will serve as a depositional area for fine sediment that will be mobilized from the Rock Pile and Material Removal Areas during the first couple of years after their construction, as floodplain and riparian vegetation become established.

2.4 SURFACE TREATMENTS AND GRADE CONTROL ELEMENTS

Surface treatments and grade control elements have been included throughout the project area to ensure that the channel and newly constructed surfaces remain stable against erosive forces. Surface treatments and grade control elements include:

- Engineered streambed material (ESM) that will be used as channel substrate where the bed is reconstructed.
- Floodplain armor to protect newly constructed floodplain surfaces.
- Vegetated rock slope protection to protect newly constructed streambanks that are steeper than 2H:1V and the area adjacent to the Culvert #6 inlet.
- Boulders sills that will periodically extend across the proposed floodplains to serve as grade control if significant erosion were to occur along floodplain areas.
- Boulder weirs that will be incorporated into the ESM and keyed into the floodplain armor to provide grade control at locations of energy dissipation where channel flow plunges into pools.
- Vegetation, which includes live willow stakes, container plants and seeding to provide rooting strength to help reinforce substrate along the channel, at floodplain and riparian areas, and on newly, constructed creek banks.
- Erosion control BMPs (e.g. fiber rolls).

2.4.1 Engineered Streambed Material (ESM)

Throughout the Designs, we have specified the placement of engineered streambed material (ESM) within the bed of the reconstructed portions of the channel. ESM is a term derived from the CDFW Design Guidelines and refers to a well-graded mixture of boulders, cobble, gravel, sand, and fines, proportioned in a way that is stable under design flood flows and still meets habitat enhancement goals. ESM is mixed to the Engineer's gradation requirements for stability for specific locations, containing sufficient amounts of fine material to ensure that vegetation can establish and that flows do not "sub-out" or move beneath the surface of the mix during times of low flow. Properly specified ESM placed in a geomorphically appropriate location should look and behave like a natural streambed.

At the Rock Pile and Material Removal Areas, ESM sizing may vary depending on the location of bedrock exposures and the constructed channel geometry. The Field Engineering Notes (Sheet C40) will guide channel construction since there is uncertainty regarding the vertical and lateral position of bedrock. ESM sizing will be refined during construction, as needed, to account for conform locations along exposed bedrock where hydraulic forces may be more significant than can be foreseen during the design phase.

Steps and pools will be incorporated into the Rock Pile and Material Removal Areas as shown on the Typical Cascade and Step-Pool Reach Details on Sheet C34. The head of large pools will be reinforced

with boulder weirs to promote plunging flow into the pool and provide profile grade control. Boulder weirs will be keyed into adjacent floodplain armor as shown on Sheet C36. The weir boulders will extend five to seven feet into the floodplain armor to protect against flanking. The ESM material has been designed to remain stable during the 100-year recurrence interval flow, with only minor adjustments expected to channel shape in reaches with bed slopes less than approximately 6-8%. In steeper reaches (>6-8%) post-construction channel adjustments are expected, as described above in Section 2.3.1.1. These adjustments may result in changes to constructed pool and step geometry and the formation of new pools and steps in response to flood flows. Detailed ESM sizing calculations are included in Appendix F. Resulting ESM gradations are presented on Sheet C39.

2.4.2 Floodplain Armor

Floodplain armor was sized similarly to ESM, using CDFW Design Guidelines for developing a well-graded mixture of boulders, cobble, gravel, sand, and fines. The substrate is proportioned to be stable under design flood flows while providing appropriately sized material to enhance constructed floodplain habitats. Sufficient fine material has been included to ensure that vegetation can establish and the flows do not "sub-out" or move beneath the surface of the mix when floodplains are activated by flood flows. As with the ESM, the floodplain armor has been designed to remain stable during the 100-year recurrence interval flow, with only minor adjustments expected to floodplain shape in reaches with slopes less than approximately 6-8%. Post-construction floodplain adjustments are anticipated in steeper reaches.

Planting pockets have been incorporated throughout proposed floodplain areas to provide locations for planting during project revegetation. Planting pockets are areas 5 to 8 feet in diameter that will be interspersed within the floodplain and filled with a soil mix designed to support container plants. If erosion of planting pocket soils were to occur, the floodplain armor would adjust to fill and protect eroded areas. Boulder sills have also been periodically incorporated across proposed floodplain areas to provide roughness to help reduce overbank flow velocities and serve as grade control if significant erosion were to occur along floodplain areas. Boulders used in the construction of boulder sills will be in the D84 - D100 size range of the respective floodplain armor gradation. The planting pocket and boulder sill details are included on Sheets C35 and C36, respectively.

At the Rock Pile and Material Removal Areas floodplain armor sizing may vary depending on the location of bedrock exposures and the constructed channel geometry. The Field Engineering Notes (Sheet C40) will guide floodplain construction since there is uncertainty regarding the vertical and lateral position of bedrock. Floodplain armor sizing will be refined, as needed, during construction to conform to exposed bedrock. Detailed floodplain armor calculations are included in Appendix F. Resulting floodplain armor gradations are presented on Sheet C39.

2.4.3 Vegetated Rock Slope Protection (RSP)

Vegetated rock slope protection (RSP) has been proposed at three locations. Vegetated RSP will be constructed using boulders of a specified gradation with live stakes installed throughout the RSP. Live stakes are live plant cuttings capable of regenerating into mature plants. Live stakes are typically taken from willows. RSP sizing calculations are included in Appendix F.

Vegetated RSP will be used to provide channel stability at the Culvert #7 and #9 removal areas, where the right bank (looking downstream) will be left in an over-steepened condition after culvert removal, and where the floodplain bench conforms to the inlet of Culvert #6 at the downstream end of the

Channel Widening Area. Culvert #7 is an 11.5-foot diameter culvert that will be removed along with the fill placed over the top of the culvert. After culvert removal the right bank side slope will range from 1-2H:1V. Laying back the bank to a consistent slope of 2H:1V is not practical at this location given the extensive vegetation removal and bank grading that would be required due to the steepness of the existing slope, which is 1-1.5H:1V (see Sheet C11). Grading would have to extend approximately 50 vertical feet to the top of slope at the edge of the idled Rock Plant. RSP is required to ensure the over-steepened reconstructed streambank remains stable while vegetation becomes established.

Culvert #9 consists of a 60-inch diameter corrugated metal pipe that is perched in the bank above the channel. The culvert appears to be a relic of an historic crossing. The culvert likely became plugged or the entrance obstructed at some time in the past and the channel cut around it. The right bank side slope will be 1-1.5H:1V after culvert removal. As with Culvert 7, it is not practical to lay back the bank to 2H:1V due to the steepness of the existing valley wall. See Sheet C18 for the existing average bank slope near the creek. Flow velocities are high at the Culvert 9 removal area, as the channel narrows and steepens, requiring large RSP to protect the channel bank.

Flow velocities are relatively low at the entrance to Culvert #6 as this area becomes somewhat backwatered due to the undersized culvert. However, vegetated RSP is required to protect the existing over-steepened slope at the floodplain bench conform to the Culvert #6 inlet (See Appendix F for rock sizing calculations).

2.4.4 Vegetation

Vegetation will be an essential component of ensuring short and long-term erosion projection and habitat value on excavated slopes, constructed floodplains and the reconstructed channel banks. All areas disturbed during construction will be revegetated with native species appropriate to the setting. Planting will include live staking, container planting and seeding. Sheets L1-L6 show proposed planting areas, tables identifying proposed species, container sizes, on-center spacings, seed quantities, and installation details. Irrigation details have not been included with this submittal. However, an irrigation system will be designed to maintain installed plantings during their establishment period. The irrigation plan will primarily consist of drip emitters at container plants. Overhead sprinklers may be used to irrigate seed during initial establishment only. A detailed plan will be included with the next design submittal.

Sheet L1 includes details for planting that will occur along the concrete channel. Grading is not proposed along the concrete channel. The planting information on Sheet L1 reflects habitat enhancement specifications included in the Decree.

The remaining landscape sheets include planting information for the areas that will be disturbed by grading activities. Planting tables have been included for each work area (e.g. Rock Pile Area) for both floodplain and riparian areas. A seed mix table has also been included. The seed mix will be applied to all disturbed areas as shown on the Drawings. The seed is expected to provide short-term erosion control through dense establishment of a groundcover including grasses and herbaceous species. Woody species and container plantings will contribute to long-term erosion control and habitat value.

Container plants will be installed in planting pockets and live stakes will be installed throughout the floodplain armor and ESM at floodplain and streambank areas at the spacings shown in the planting tables and relevant details. Live stake trench packs and live willow transplants will also be installed

throughout floodplain areas. Refer to relevant details on Sheets C35 and C37 for trench pack and willow transplant installation and spacing information.

For revegetation purposes, the "riparian" planting zone has been defined as the areas extending 10 vertical feet up the channel bank from the toe of slope at the edge of constructed floodplain benches. Riparian areas will be revegetated with container plants and seed mix. Refer to the planting tables for individual component project areas (Sheets L1-L6).

Erosion Protection above the 10-Year Water Surface Elevation

Revegetation will be the primary means of erosion control on slopes above the limits of floodplain armor (i.e. 10-year water surface) Flow velocities along the lateral margin of floodplain areas average less than 3 ft/sec during the 100-year flood. Revegetated soils can resist flow velocities of 4-6 ft/sec (Fischenich 2001). These areas will be seeded and planted. Mulch and/or erosion control fabric will be provided as appropriate pending constructed geometry, with fabric preferred on slopes steeper than 2.5H:1V.

2.4.5 Project Best Management Practices (BMPs)

Project designs typically incorporate BMPs to reduce construction-related impacts during and after construction. BMPs may include structural elements (*e.g.,* dewatering of work areas, installation of fiber rolls, sediment barrier fence and revegetation of disturbed areas) and may also include planning measures such as beneficial phasing and scheduling of work or limitations on disturbance areas. Some of these elements are typically shown on the Design Drawings, while others are often presented within a detailed Stormwater Pollution Prevention Plan (SWPPP). A SWPPP is a separate document that provides specifications for implementation as well as monitoring and reporting and is submitted to the Regional Water Quality Control Board for review. At present, a SWPPP has not been prepared for the project. Given the complexity of the project site and the particular challenges associated with work within the streambed, we anticipate a very detailed SWPPP document will be required to address the phasing of the work and the potential variations on final geometry and surface materials (*e.g*., bedrock vs. alluvium in channel banks).

The primary concerns at this site include limiting disturbance to adjacent riparian areas, avoiding episodic or chronic release of sediments to the creek, and quickly reestablishing a dense riparian canopy within disturbed work areas. Some of the principal BMPs currently included in the design are presented below.

Construction fencing will be installed along limits of disturbance prior to commencement of grading activities. Access to project areas will be along existing quarry access roads, as shown on Sheets C27-C28. Equipment will be staged and refueled within established staging areas. Continuous dust control will be provided throughout construction in accordance with the dust control notes shown on Sheet C27 and project permits.

Dewatering will occur at all sites where surface water is present and grading is proposed along the channel bed, or where access across the channel is required (i.e. Culvert #9 removal area). Diversion plans are included on Sheets C29-C32, with a typical dewatering plan and details shown on Sheet C33. Block nets will be installed upstream/downstream of the area to be dewatered, and fish and other aquatic organisms will be removed and relocated by a qualified biologist, prior to the installation of dewatering facilities. Where removal of seepage water is required within an isolated construction area, the water will be pumped to a depression or temporary basin to either infiltrate or be detained until it

is routed through a sediment treatment facility, as needed. Any pumping of surface water with the potential to entrain aquatic organisms will be screened using a mesh with a maximum opening size of 5 millimeters. The screen will be checked regularly to ensure it is functioning as intended and that animals are not becoming entrapped. Turbid waters will not be allowed to discharge into Permanente Creek. At the completion of construction, all accumulated sediment will be removed from the work area, characterized, and, if appropriate, placed elsewhere at the Facility in a manner that will not result in erosion or mobilization of sediment to Permanente Creek, and that will be consistent with applicable Waste Discharge Requirements. The final placement location will be determined by the Engineer, in consultation with Lehigh, the Regional Water Board, and the Geotechnical Engineer or Project Geologist at the time of construction.

Fiber rolls will be installed around staging areas and a sediment barrier fence[5] will be installed along the creek-side edge of the proposed floodplain bench excavation areas at the Channel Widening Area. Fiber rolls will be in place to trap mobilized sediment in the event there is rain during construction. The sediment barrier fence will act as a barrier to any loose material during floodplain bench excavation.

Constructed channel areas and bank slopes will be protected from erosion using the specified rock mixtures and/or vegetation as shown on the drawings. Erosion control fabric will be utilized if needed. Fiber rolls will be installed across excavated slopes as shown on Sheets C29 to C32. Prior to revegetating slopes, these areas will be track-walked to ensure drainage in the intended direction and provide smooth transitions to undisturbed sloped. Fiber rolls and container plants will be installed, where specified, and the slopes will be hydroseeded with the seed mix shown on the drawings. The hydroseed mixture will include hydromulch, amendment/fertilizer, and tackifier, to assist with erosion control and seed establishment[6]. Constructed channel and floodplain areas will receive ESM, floodplain armor, and vegetation as discussed above.

All constructed slopes that are steeper than 2H:1V will be evaluated by the Geotechnical Engineer or Project Geologist, and recommendations will be provided, as needed, to ensure geotechnical stability.

2.5 FLOODPLAIN LOGS AND LARGE WOODY DEBRIS INSTALLATIONS

Floodplain Logs

Floodplain logs have been proposed throughout the project. Floodplain logs will consist of both “live logs” and “roughness logs”, as described on Sheet C35. All floodplain logs will be salvaged with rootwads left intact. Live logs will consist of willows that will be removed during project grading. These trees will have all limbs removed to increase the likelihood they will survive and regrow, and they will be partially buried on floodplain areas with the expectation that the majority of them will re-sprout. Roughness logs will consist of all other tree species impacted by project grading. These trees will be partially buried like the live logs, but some limbs will be left intact to add additional roughness and complexity to the floodplain. Calculations have been completed to determine ballasting requirements, and the floodplain logs will be properly ballasted so they will not be moved by flood flows. Ballast calculations are included in Appendix G. Calculations will be adjusted, as necessary, during project implementation to ensure appropriate ballasting for trees of varying dimensions.

[5] Lehigh will coordinate with USFWS staff during the Section 7 Consultation to identify an appropriate fabric for use as a sediment barrier.

[6] Hydroseeding specifications will be included in the next design submittal.

Large Woody Debris (LWD) Structures

Large woody debris structures have been proposed at each of the pools that will be constructed at the Culvert #7 and Culvert #8 removal areas. Each of the two structures will consist of one log with a rootwad and one log without a rootwad. The Engineer will be present during installation to ensure the LWD structures are installed in accordance with the design intent to promote pool scour and provide cover for aquatic species. The logs will either be Douglas fir or redwood meeting the dimensions shown on Sheet C39. The structures have been designed to remain stable during the 100-Year discharge. Each structure will be ballasted and stabilized by cabling each log to two 4-foot diameter boulders (four boulders total per structure) and cabling the logs to each other. Ballast calculations are included in Appendix G.

2.6 GEOTECHNICAL AND GEOLOGIC CONSIDERATIONS

Golder Associates (Golder) and Stantec have provided geologic and geotechnical review of the proposed project. Golder has been involved in the project since the initial concept designs were prepared in 2014. They have reviewed each round of drawings as they have been developed. Stantec has recently been added to the project team to provide additional geotechnical engineering review, evaluation and design support.

Golder prepared a detailed assessment of project area geology and geotechnical considerations in 2019 at the request of the reviewing agencies (Golder 2019). The Technical Memorandum titled: "Geologic and Geomorphic Assessment of Permanente Creek" is included in Appendix H. Design slopes shown on the drawings meet Golder's recommendations for proposed slopes above the restored creek. Subsurface investigations have been performed to gain an understanding of the materials underlying the project limits at the Material Removal and Rock Pile Areas. However, precise locations of bedrock are not known, including its position (both vertically and laterally) and orientation. Field adjustments and modifications to conform to existing bedrock will likely be required.

In addition to their work developing an estimated bedrock profile beneath the Rock Pile and Material Removal Areas, Golder's geotechnical assessment focused primarily on evaluating the stability of the final valley slopes within restored reaches. Golder has provided recommendations on allowable slope angles for the different material types that may be encountered within excavations and the project geotechnical engineer or project geologist will be integrally involved with construction at the Rock Pile and Material Removal Areas to inspect excavated areas and provide recommendations, as necessary, to ensure finished slopes meet geotechnical criteria for stability. At both the Rock Pile and Material Removal Areas, excavations on the southern side of Permanente Creek are expected to follow similar slope angles as the existing exposed slope, likely uncovering areas of bedrock. The 90% Designs show a 1.5H:1V side slope at these locations for the two sites. The northern bank of the creek will be initially excavated into fill material and may potentially expose underlying bedrock depending on the depth of excavation. Default design side slopes on the north bank are 2H:1V or flatter. The northern banks may be constructed at a steeper slope if bedrock is uncovered. The project geotechnical engineer or project geologist will inspect the slope below the Rock Pile once it is removed and evaluate the nature and stability of the exposed material. Recommendations will be developed, as necessary, to ensure the slope is geotechnically stable.

In response to comments received from reviewing agencies, Golder prepared a stability assessment of the slope underlying the large aggregate pile at the Rock Pile Area (Golder 2021). Golder's assessment found the slope will be stable after removal of the rock pile but noted that the underlying slope should

be inspected by a qualified professional engineer or geologist to confirm the assumptions used in the analysis. Notes are also included on Sheet C19 of the 90% Designs that require the project geotechnical engineer or project geologist to inspect the slope exposed below the rock pile following its removal and provide recommendations on final stabilization measures. The Golder slope stability analyses report is included in Appendix I.

Most recently, Golder has also prepared a report to assess potential water quality impacts associated with specific project construction elements (Golder 2022). The report is included in Appendix J. The water quality evaluation assesses geologic units (e.g. limestone bedrock) likely to be uncovered in the creekbed by project implementation and found no significant impacts to water quality. The evaluation also determined that the locally available greenstone and graywacke encompassing the majority of the Permanente Creek basin is not detrimental to water quality if used as backfill and that from a water quality perspective can also be used as engineered streambed material and floodplain armor in the restored channel reaches.

Stantec prepared the Permanente Creek Restoration Project (PCRP) Stability Analysis, dated August 26, 2022, to support the updated project design (Stantec 2022). The assessment reevaluated the stability of the proposed slopes at the Rock Pile Area and also assessed the stability of the proposed slopes at the Material Removal Area (Appendix K). The report presents the results of their analysis assessing the most extreme conditions along the north slope of the creek at both sides. The slopes were analyzed under both static and pseudo-static conditions and were found to have acceptable factors of safety.

2.7 DESCRIPTION OF INDIVIDUAL PROJECT COMPONENTS

The individual project components are briefly described below, introduced from the downstream to the upstream limits of the proposed work.

2.7.1 Concrete Channel (Reach 6, Sheet L1)

Native riparian plantings will be installed along the southern bank of the concrete channel, from the edge of concrete to the top of bank. Installed plantings will infill areas outside of existing mature tree canopy. Existing oak seedlings will be preserved and a 3-foot radius around each seedling will be hand-weeded to reduce competition. The goal of the work is to expand the riparian corridor and increase canopy cover over the channel to lower stream temperature. Shading will also reduce the ability of cattails to established or persist in the channel. Cattails currently block the channel in many locations, thereby reducing sediment transport and flood capacity. They also present a partial barrier to the movement of any fish within the concrete channel.

Fish passage was not evaluated within the concrete channel, as there are not any improvements proposed within the concrete channel.

These proposed improvements meet the conditions outlined in paragraph #40 of the Decree.

2.7.2 Channel Widening Area (Reaches 8-12, Sheets C11-C18)

Within Reaches 8 through 10, the north bank will be excavated to form a bench at the estimated bankfull (1.5-year) water surface elevation. The bench width will be maximized by narrowing the existing roadway. The bench will be constructed to leave a maximum roadway width of 20 feet, as measured to the top of the creekside vehicle barrier. Work generally avoids disturbance to the bed of the channel and the south bank, except where large concrete debris or culverts are proposed for removal. Where

existing mature riparian trees are present, the bench excavation has been modified to preserve them, where feasible, in the interest of maintaining shade cover and improved habitat.

The floodplain bench will be over-excavated and then lined with a mixture of coarse alluvial materials sized to resist mobilization during floods. Periodic floodplain roughness elements (e.g., floodplain logs and boulder sills) will be incorporated to minimize channel migration into the benches as vegetation becomes well established.

Fish passage was not evaluated where only the construction of a floodplain bench is proposed because work is not proposed within the active channel bed.

These improvements meet the conditions outlined in paragraphs #38-39 of the Decree.

2.7.3 Culvert 7 (Reach 8, Sheet C11)

Culvert #7 will be completely removed and the area restored with a floodplain bench incorporated along the northern bank. Biomechanical bank stabilization treatments will be required along the southern bank to support the toe of the hillslope where the culvert and associated fill are proposed for removal. The biomechanical treatment includes the installation of vegetated RSP. A pool that will include the installation of a large woody debris structure has been included to provide habitat and cover for aquatic species.

Fish passage design criteria for both depth and velocity are met when using the "Hydraulic Design" approach.

These improvements meet the conditions outlined in paragraph #39 of the Decree.

2.7.4 Culvert 8 (Reach 9, Sheets C14-C15)

Culvert #8 will be completely removed and the area restored with a floodplain bench incorporated along the northern bank. A pool that will include the installation of a large woody debris structure has been included to provide habitat and cover for aquatic species.

Fish passage design criteria for both depth and velocity are met when using the "Hydraulic Design" approach.

These improvements meet the conditions outlined in paragraph #39 of the Decree, although Culvert #8 is not specifically mentioned.

2.7.5 Sediment Removal Area (Reach 9, Sheets C14 & C16)

Accumulated sediments and fill materials will be removed as necessary to restore pre-disturbance geometry within the tributary channel and adjacent floodplain area. The access road and existing storage area will be revegetated. Final grades will be dependent upon sub-surface conditions (*i.e.*, the location of bedrock). All disturbed areas will be revegetated with native riparian species.

These improvements meet the conditions outlined in paragraph #39 of the Decree.

2.7.6 Culvert #9 Removal Area (Reach 10, Sheet C18)

Stream flow does not pass through Culvert #9. The pipe is perched above the channel in the south bank. There is exposed RSP along the channel margins, as shown on Sheet C18 of the drawings, and cobbles

and boulders are present along the channel bed providing sufficient armoring to resist erosion. Mature riparian vegetation is also present along the channel banks providing rooting strength to bank soils. The culvert will be removed and the void will be filled with vegetated RSP (see Section B, Sheet C18). There will be limited impacts to the channel bed and existing vegetation during the culvert removal work. It is expected that some significant vegetation pruning and disturbance of roots will be required, but the native alders and willows along the channel are used to disturbance and will rebound quickly to provide shade and rooting strength to any disturbed bank soils[7].

Culvert #9 will be completely removed from its perched location and the bank will be restored in the vicinity of the work. Biomechanical bank stabilization treatments will likely be required to restore the southern streambank where the culvert is removed unless bedrock is exposed during demolition. Any required biomechanical treatment work will include the installation of vegetated RSP.

Fish passage was not evaluated because there is not any work proposed within the active channel bed.

These improvements meet the conditions outlined in paragraph #39 of the Decree.

2.7.7 Culverts #10 & #11, Rock Pile, and Pond 13 (Reaches 11-13, Sheets C19-C21)

Extensive channel realignment and reconstruction is proposed throughout this area, including removal of Culverts #10 & #11, rip rap in the vicinity of the Culvert #10 outlet, and the dam at Pond 13.

As discussed above, the channel profile appears to have been significantly modified in this reach, resulting in a flattened profile downstream of Pond 13 at Culvert #11 (half culvert) and a very steep profile through Culvert #10. The design optimizes fish passage conditions by creating a more uniform grade through the reach. Cuts approximating thirty to forty feet of depth are required to accomplish this. The grading plan reflects the Lower Limit of Potential Design Channel Invert, which includes removal of Pond 13. The Upper Limit of Potential Design Channel Invert shown in profile has been established as a best fit to bedrock elevations that were estimated using a seismic refraction analysis and geotechnical borings. The results of this seismic refraction analysis are attached as Appendix C. Since we cannot know the exact location of all bedrock without extensive subsurface exploration, (*e.g.*, drilling or trenching) final geometry will likely vary somewhat from that shown on the drawings, as necessary to conform to existing bedrock.

The newly excavated floodplain benches will be lined with a mixture of coarse alluvial materials sized to resist mobilization, but able to adjust and reorganize in response to significant flood flows. Floodplain roughness elements (*e.g.*, log structures and/or boulder sills) will be incorporated to minimize channel migration into the benches until vegetation becomes well established.

The dam will be removed at Pond 13 and replaced with a boulder weir grade control structure, if the upper limit of potential design channel invert is constructed. Fine sediment impounded within the pond will be removed so the material is not transported downstream after the restoration project is implemented. The limits and thickness of accumulated sediment have not been surveyed. Accumulated fine sediment occurring below elevation 805.0 will be removed. Removal of fine sediment will occur until alluvial material (*i.e.,* gravel/cobble) or bedrock are encountered. Engineered fill would then be placed to raise grades, where necessary, and a channel conforming to the dimensions shown on the

[7] During site inspections in 2022 it appeared most of the alders shown on the drawings that were mapped during 2013-2015 have died and been replaced by willow volunteers.

Typical Channel Treatment Detail for the Rock Pile, Sheet C20, would be constructed through the previously ponded area to restore an open channel.

The rock pile and associated infrastructure will be removed to accommodate the lowered and widened channel, as shown on cross sections C and D of Sheet C21. An access road has been incorporated into the design for maintenance of Pond 13B. Newly disturbed upland hillslopes will be vegetated with native species, as will the constructed channel and floodplains. The slope exposed below the Rock Pile will be inspected by the Geotechnical Engineer or Project Geologist to evaluate the nature and stability of the exposed material and provide recommendations, as necessary, to ensure geotechnical stability of the slope and access road.

These improvements meet the conditions outlined in paragraphs #37 & 38 of the Decree.

Fish passage design criteria for both depth and velocity are met when compared to the hydraulic design parameters established under the Hydraulic Design approach, due to the high roughness of the proposed channel substrate. However, it should be noted that the design profile grade of 12% exceeds CDFW's estimated limit to anadromy, which is a sustained slope of over 8%; and studies show that adult anadromous salmonids are able to navigate steeper slopes than resident rainbow trout (Coastal Conservancy 2004). See Section 2.3.1.1 above for a discussion regarding fish passage evaluation in steep reaches.

2.7.8 "Old Crusher Foundation" Removal (Reach 17, Sheet C22)

The "old crusher foundation" will be modified to conform to the adjacent banks. The portion of the "old crusher foundation" that is projecting into the creek will be removed. Sheet C22 includes a site plan and cross sections of the proposed work. All work will be completed using hand labor and small equipment with worker safety being the highest priority, given that the foundation is located at the base of a very steep and tall slope. All waste material and spoils will be removed from the creek using hand tools and disposed of. Access is anticipated to be provided by use of a constant rate descender, or similar. Final geometry will be inspected by the Engineer to ensure a smooth hydraulic transition along the portion of the "old crusher foundation" to remain.

These improvements meet the conditions outlined in paragraph #35 of the Decree.

2.7.9 Material Removal Area (Reaches 17 & 18, Sheets C23-C26)

This area has been modified by the placement of material within and adjacent to the channel. The exact extent and depth of material is uncertain at this time, due to limited subsurface data. A seismic refraction analysis has been performed to estimate the depth to bedrock, in an effort to gain a clearer understanding of the pre-disturbance site geometry and allow a more informed evaluation of opportunities and constraints to enhancement. The results of this analysis are attached as Appendix C.

The 90% Designs show the area will be excavated to establish a more uniform profile gradient, as shown on Sheets C23 and C24. The grading plan reflects the Upper Limit of Potential Design Channel Invert and has been established as a best fit to bedrock elevations that were estimated using the seismic refraction analysis. The Lower Limit of Potential Design Channel Invert is shown in profile and represents the lowest grade at which the channel invert would be constructed if bedrock is not encountered.[8] Proposed

[8] Design drawings for the Lower Limit of Potential Design Channel Invert that include a grading plan and cross sections are included on Figures 1-4 in Appendix L.

cuts extend to depths of over thirty feet below existing ground, resulting in profile grades of 7.1% to 22.7%. These grades follow the peaks of the estimated subsurface bedrock profile. Final grades would be determined in the field to best-fit bedrock exposures encountered during excavation. Since we cannot know the exact location of all bedrock without extensive subsurface exploration, (*e.g*., drilling or trenching) final geometry will likely vary somewhat from that shown on the drawings.

The proposed centerline of the creek was established by extending the existing southern hillside slope down at 1.5H: 1V to meet the new profile grade, and then leaving room for a bench that varies in width at bankfull elevation. The existing toe of the slope on the north side of the creek was relocated northward by twenty-five feet, except at the downstream end of the reach where the bench needed to be narrowed slightly to accommodate the Upper Treatment Facility and existing access road. The north bank is sloped at a maximum steepness of 2H:1V. The "relic concrete structures" shown on the Drawings will be removed during site grading. All disturbed areas will be revegetated with native species appropriate to the site.

The newly excavated floodplain benches will be lined with a mixture of coarse alluvial materials sized to resist mobilization, but able to adjust and reorganize in response to significant flood flows. Floodplain roughness elements (*e.g.,* log structures and/or boulder sills) will be incorporated to minimize channel migration into the benches until vegetation becomes well established.

These improvements meet the conditions outlined in paragraph #35 of the Decree. It should be noted, however, that the design profile grade within this reach will likely vary from 7.1% to 22.7% and may have drops over bedrock features. Fish passage will be an objective, but cannot be guaranteed with these site constraints, the majority of which exceed CDFW's estimated limit to anadromy, which is a sustained slope of over 8%; and studies show that adult anadromous salmonids are able to navigate steeper slopes than resident rainbow trout (Coastal Conservancy 2004). See Section 2.3.1.1 above for a discussion regarding fish passage evaluation in steep reaches.

3.0 IMPLEMENTATION

3.1 CONSTRUCTION SEQUENCING

There are many considerations when determining the optimal sequencing of a large stream restoration effort. At Permanente, examples include project area diversion and dewatering requirements, temporary impacts to stream and wetland habitat, post-construction sedimentation, quarry operations, and noise and dust. Permit requirements, including the in-stream work window, will also have bearing on the sequence of construction and the amount of construction that is completed in a given season.

In-stream flows can vary from year to year with surface water present in some portions of Permanente Creek and not in others. Although the presence of surface water will not dictate where work occurs in a given year, it will be considered to help simplify construction and reduce potential water quality impacts. Any relocation of the Upper Treatment Facility and associated infrastructure (*e.g.,* Pond 1250) that have been installed to remove selenium from quarry water will also be considered when determining construction sequencing. Work at the Material Removal Area may be sequenced to occur after other portions of the project are constructed if the treatment facilities and Pond 1250 need to remain in their current location at the start of project implementation. These facilities may be relocated in the localized area to accommodate changes to the slope if the facilities are necessary for post-creek restoration project activities associated with quarry dewatering and reclamation.

Ecological impacts from temporary site disturbances are also an important consideration. Of the potential impacts, soil disturbance and riparian vegetation removal are primary concerns. Vegetation removal reduces available cover and habitat for wildlife and shading of Permanente Creek. Soil disturbance associated with channel grading activities will further increase risk of erosion and sedimentation in the short term. Although the constructed features will be designed to ultimately reduce erosion and sedimentation, there will always be some minor erosion that mobilizes fine sediment while vegetation from erosion control seed and installed container plantings are becoming established during the first year following construction. Although the project will ultimately result in a significant expansion of riparian area, the removal of vegetation will temporarily reduce areas of riparian habitat, increase risk of erosion, and reduce shading of the creek until replacement plantings have matured.

In consideration of these short-term impacts, we have planned to stage the work so that the area of impact is limited in any given year, and in a manner that will allow newly constructed floodplains at the downstream limit of the work to treat runoff from the upstream end of the project area that would be disturbed in subsequent years.

We recommend that the initial stream restoration work occur along the Channel Widening Area, extending upstream to the end of Reach 10, where floodplain benches will be created. The benching will provide opportunities for sediment deposition to occur if material is mobilized from the Rock Pile and Material Removal Areas during the initial years after construction. The benches will also provide depositional areas for fine sediment mobilized from the large sediment deposits located within reaches, R14-R16 and R19-R21. In addition to providing this water quality benefit, the Channel Widening Area is also the least complex of the major construction components, allowing the opportunity for the construction team to gain familiarity with the particular challenges of the site (e.g., material processing, dewatering, topsoil salvage, and revegetation) before tackling the upstream reaches where channel grading is more complex.

The second phase of the work is expected to involve the Rock Pile Area. The final stage would include the Material Removal Area.

A final construction schedule will be prepared once all project permits and approvals are received for project construction, in accordance with paragraph #46 of the Decree.

3.2 FIELD ENGINEERING – ROCK PILE (REACHES 11-13) AND MATERIAL REMOVAL AREA (17-18)

The design engineers will be closely involved with construction implementation at the Rock Pile and Material Removal Areas. The drawings for each site present an “Upper Limit of Potential Design Channel Invert” and “Lower Limit of Potential Design Channel Invert”. The upper limit represents the design grade based on connecting high points on the bedrock profile that were identified during subsurface investigations. The lower limit represents the maximum extent of excavation at locations where bedrock is not encountered during project construction. The likelihood is that the constructed channel will lie somewhere between these two profiles. Sheet C40 includes a description of field engineering parameters that will guide determination of the final profile at the Rock Pile and Material Removal Areas. Final slopes steeper than 2H:1V will be evaluated by the Geotechnical Engineer or Project Geologist and recommendations will be provided, as needed, to ensure geotechnical stability.

4.0 ADAPTIVE MANAGEMENT

The project has been designed to restore significant portions of Permanente Creek and greatly expand floodplain and riparian areas along the component project areas. Project designs include elements to provide short-term stability, while also being able to respond to future flooding events and changes in the sediment transport regime. As with most stream restoration projects, it is not possible to predict all future adjustments that may occur, and adaptive management may be required.

The reconstructed channel and floodplains will be protected with engineered streambed material (ESM) and floodplain armor. These substrates have been sized to remain relatively stable while allowing for natural adjustments to flooding events and sediment transport from upstream reaches. Boulder sills have been incorporated throughout the project to reduce the percentage of large boulders used in the ESM and floodplain armor, and to protect against erosion from large flooding events that may occur in the initial years after project construction while vegetation is becoming established. We anticipate that the armoring and sills will perform as designed. However, adjustments or areas of erosion could occur that require attention to ensure the project evolves as intended.

The creation of inset floodplain benches will allow for significant sediment storage within the project reaches, or for the low flow channel to adjust laterally without consequence in most instances. However, sediment mobilized from project areas or from areas outside the influence of project construction may accumulate in undesirable locations within the reconstructed channel segments. Areas of significant aggradation would be evaluated and corrective measures would be proposed. In the initial years after project implementation, it will be important to ensure that sediment/debris does not accumulate at locations that may direct future flood flows in a manner that could affect project stability.

The plants selected for the revegetation effort were chosen based on experience revegetating other areas of the project site. Although a certain percentage of die-off is typical with any native revegetation effort, it is expected that the selected species will do well along the restored project areas. If it is found that the revegetation effort is not meeting project performance standards, the cause will be evaluated and either alternative species will be used, or the species that are performing well be increased to ensure the project meets required performance standards for vegetation establishment.

Each project area should be inspected during the first year after construction after storms delivering 1.5 inches or more of rainfall have occurred. If erosion or sedimentation does occur, the cause of the issue will be evaluated and adaptive management practices will be developed to help stabilize the area. The default approach at areas of erosion will be the installation of additional vegetation where this approach is a viable solution to help halt erosion. If the area of erosion is significant, and the installation of additional vegetation is not a potential solution, an approach will be developed and the resource agencies will be engaged if heavy equipment is involved.

During the permitting process, a Monitoring and Adaptive Management Plan (MAMP) will be prepared for review and approval by the resource agencies. The MAMP will establish monitoring protocols, performance criteria, the monitoring period and reporting requirements. Potential adaptive management strategies and approaches will be discussed. Ultimately the MAMP will be a tool for helping to ensure long-term channel stability and successful establishment of the revegetation effort.

5.0 REFERENCES

State Coastal Conservancy. 2004. Inventory of Barriers to Fish Passage in California's Coastal Watersheds. Oakland, CA, The Coastal Conservancy.

California Department of Fish and Game (CDFG). 2009. Fish Passage Design and Implementation: Part XII of the California Salmonid Stream Habitat Restoration Manual. Sacramento, CA, CA Department of Fish and Game.

California Department of Fish and Game (CDFG). 2003. Fish Passage Evaluation at Stream Crossings: Part IX of the California Salmonid Stream Habitat Restoration Manual. Sacramento, CA, CA Department of Fish and Game.

Fischenich, Craig. May 2001. Stability Thresholds for Stream Restoration Materials. USAE Research and Development Center, Environmental Laboratory. Vicksburg Mississippi.

Flosi, G.; S.Downie; J. Hopelain; M. Bird; R. Coey; B. Collins. 2002. California Salmonid Stream Habitat Restoration Manual. Sacramento, CA, CA Department of Fish and Game.

Golder Associates Inc. August 26, 2022. Technical Memorandum: Water Quality Evaluation, Permanente Creek Restoration Project, Lehigh Southwest Cement Company And Hanson Permanente Cement, Inc., Permanente Quarry, Cupertino, California.

Golder Associates Inc. July 22, 2021. Technical Memorandum: Slope Stability Analyses, Permanente Creek Restoration Plan, Lehigh Southwest Cement Company and Hanson Permanente Cement, Inc. Permanente Quarry, Cupertino, California.

Golder Associates Inc. October 31, 2019. Technical Memorandum: Geologic and Geomorphic Assessment of Permanente Creek, Lehigh Hanson Permanente Quarry, Santa Clara County, CA.

Montgomery, David R. and Buffington, John M. Mary 1997. Channel-reach morphology in mountain drainage basins. GSA Bulletin.

Mussetter, R. 1989. Dynamics of Mountain Streams. PhD. Dissertation. Colorado State University, Fort Collins, Colorado.

Stantec. August 26, 2022. PCRP Stability Analysis.

URS Corporation. March 11, 2011. Permanente Creek Long-term Restoration Plan.

U.S. Army Corps of Engineers. 1994. Hydraulic Design of Flood Control Channels, EM-1110-2-1601.

U.S. Department of the Interior Bureau of Reclamation. 2007. Rock Ramp Design Guidelines. http://www.usbr.gov/pmts/sediment/kb/SpanStructs/index.html

U.S. Department of Transportation 1989. Design of Riprap Revetment, Hydraulic Engineering Circular No. 11. Publication No. FHWA-IP-89-016.

USGS. 1982. Guidelines for determining flood flow frequency. Bulletin #17B of the Hydrology Subcommittee. Interagency Advisory Committee on Water Data, U.S. Geologic Survey, Virginia.

Wang, J., W. Chang, and N. Lee, 2007. Santa Clara Valley Water District Stevens and Permanente Creeks Hydrology Report. November 2007.

Washington Department of Fish and Wildlife. 2003. Design of Road Culverts for Fish Passage. http://wdfw.wa.gov/hab/engineer/cm/.

WEST BRANCH PERMANENTE CREEK

UPPER PERMANENTE CREEK

A

B

C

D

R1–R6

R22 R21

R21 R20

R20 R19

R19 R18

R18 R17

R17 R16

R16 R15

R15 R14

R14 R13

R13 R12

R12 R11

R11 R10

R10 R9

R9 R8

R8 R7

R7 R6

PERMANENTE

Deer Hollow Farm

Permanente Rd

Montebello Rd

El Cerrito Rd

SOURCE: WWW.GOOGLEMAPS.COM

WATERSHED DELINEATION MAP

SCALE: 1"=1300'

LEGEND

- B — DRAINAGE AREA POINT OF CONCENTRATION
- WATERSHED BOUNDARY
- R14 / R13 — REACH DESIGNATIONS FROM THE "PERMANENTE CREEK LONG-TERM RESTORATION PLAN" PREPARED BY URS AND DATED MARCH 11, 2011

WATERWAYS CONSULTING INC.

Santa Cruz, CA | watways.com | Portland, OR

CONCEPT LEVEL SUBMITTAL

DESIGN BASIS TECHNICAL MEMORANDUM

PERMANENTE QUARRY - PERMANENTE CREEK WATERSHED DELINEATION MAP

BAR IS ONE INCH ON ORIGINAL DRAWING. USE TO SCALES FOR REDUCED PLOTS

0 1"

FIGURE

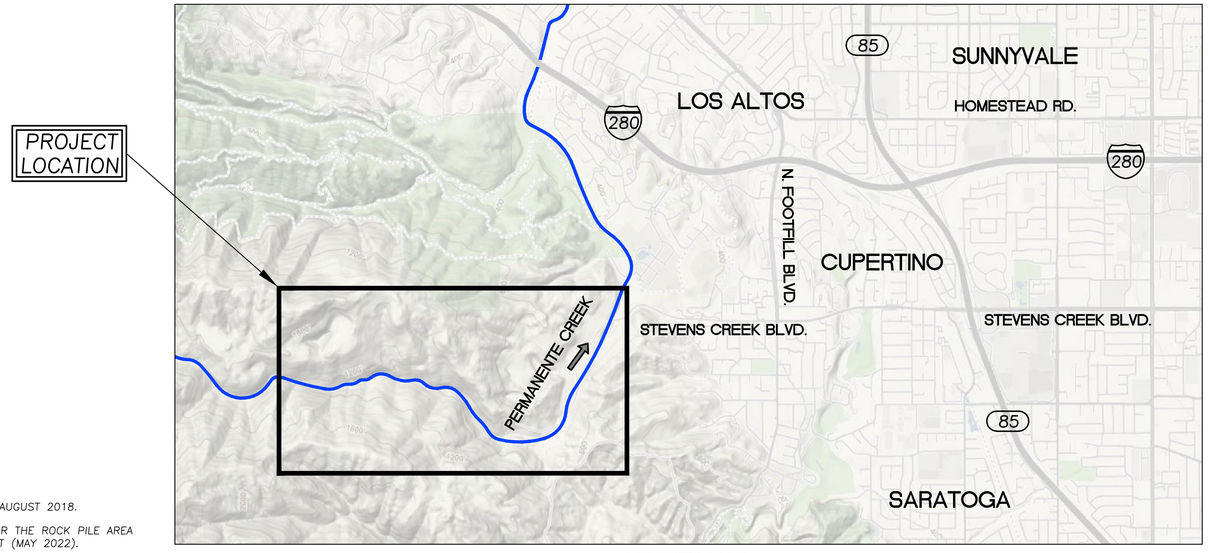
1.0

ATTACHMENT 1

Permanente Creek Restoration Plan - Updated 90% Design Drawings

PERMANENTE CREEK RESTORATION PLAN

UPDATED 90% DESIGN
SANTA CLARA COUNTY CEQA REVIEW SUBMITTAL
AUGUST 26, 2022



VICINITY MAP
N.T.S. (GOOGLE)

N

SHEET INDEX

C1	COVER SHEET
C2	PROJECT AREA OVERVIEW
C3	RECLAMATION PLAN AREA OVERVIEW
C4	EXISTING CHANNEL PROFILE
C5	SHEET LAYOUT OVERVIEW
C6	SITE PARCELS AND RIGHT-OF-WAY OVERLAY
C7	CHANNEL WIDENING DEMOLITION PLAN (1 OF 2)
C8	CHANNEL WIDENING DEMOLITION PLAN (2 OF 2)
C9	ROCK PILE AREA DEMOLITION PLAN
C10	MAT. REMOVAL AREA AND OLD CRUSHER FOUNDATION DEMO. PLAN
C11	CHANNEL WIDENING PLAN (1 OF 6)
C12	CHANNEL WIDENING PLAN (2 OF 6)
C13	CHANNEL WIDENING PLAN (3 OF 6)
C14	CHANNEL WIDENING PLAN (4 OF 6) AND SEDIMENT REMOVAL AREA
C15	CULVERT #8 PROFILE AND SECTION
C16	SEDIMENT REMOVAL AREA PROFILE AND SECTIONS
C17	CHANNEL WIDENING PLAN (5 OF 6)
C18	CHANNEL WIDENING PLAN (6 OF 6)
C19	ROCK PILE AREA PLAN
C20	ROCK PILE AREA SECTIONS (1 OF 2)
C21	ROCK PILE AREA SECTIONS (2 OF 2)
C22	OLD CRUSHER FOUNDATION SITE PLAN
C23	MATERIAL REMOVAL AREA PLAN (1 OF 2)
C24	MATERIAL REMOVAL AREA PLAN (2 OF 2)
C25	MATERIAL REMOVAL AREA SECTIONS (1 OF 2)
C26	MATERIAL REMOVAL AREA SECTIONS (2 OF 2)
C27	ACCESS AND STAGING PLAN (1 OF 2)
C28	ACCESS AND STAGING PLAN (2 OF 2)
C29	CHANNEL WIDENING DIVERSION AND EROSION CONTROL PLAN (1 OF 2)
C30	CHANNEL WIDENING DIVERSION AND EROSION CONTROL PLAN (2 OF 2)
C31	ROCK PILE AREA DIVERSION AND EROSION CONTROL PLAN
C32	MATERIAL REMOVAL AREA DIVERSION AND EROSION CONTROL PLAN
C33	DEWATERING DETAILS (1 OF 6)
C34	TYPICAL CASCADE AND STEP-POOL REACH DETAILS (2 OF 6)
C35	TYPICAL FLOODPLAIN ROUGHNESS AND HABITAT PLAN DETAILS (3 OF 6)
C36	TYPICAL BOULDER WEIR, SILL, AND POOL DETAILS (4 OF 6)
C37	TYP WILLOW LIVE STAKE TRENCH PACK & RELOCATION DETAILS (5 OF 6)
C38	DETAILS (6 OF 6)
C39	LOG STRUCTURE DETAILS AND ROCK SPECIFICATIONS
C40	NOTES
C41	CONTROL POINT TABLES
L1	CONCRETE CHANNEL REVEGETATION PLAN
L2	CHANNEL WIDENING REVEGETATION PLAN (1 OF 2)
L3	CHANNEL WIDENING REVEGETATION PLAN (2 OF 2)
L4	ROCKPILE AREA REVEGEATION PLAN
L5	MATERIAL REMOVAL AREA REVEGETATION PLAN
L6	TYPICAL PLANTING LAYOUTS

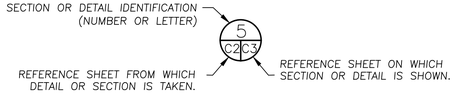
GENERAL NOTES

1. TOPOGRAPHIC MAPPING WAS PERFORMED BY:
   WATERWAYS CONSULTING, INC.
   509 SWIFT STREET, UNIT A
   SANTA CRUZ, CA 95060
   SURVEY DATES; JUNE THROUGH AUGUST 2013,
   FEBRUARY THROUGH MAY 2014, MARCH 2015, AUGUST 2018.
2. AERIAL CONTOURS PROVIDED BY TOWILL, INC. FOR THE ROCK PILE AREA AND THE MATERIAL REMOVAL AREA LiDAR FLIGHT (MAY 2022).
3. ELEVATION DATUM: NAVD88 BASED ON A FIELD TIE TO SANTA CLARA VALLEY WATER DISTRICT BENCHMARK ID: BM198 WITH AN ELEVATION OF 478.22'.
4. HORIZONTAL DATUM: NAD83 CALIFORNIA STATE PLANE, ZONE 3.
5. AERIAL PHOTO SOURCE:
   AERIAL PHOTOMAPPING SERVICES
   2929 LARKIN AVENUE
   CLOVIS, CA 93612
   PHOTOGRAPH DATE: JUNE 2013 AND JUNE 2017
6. ELEVATIONS AND DISTANCES SHOWN ARE IN FEET AND DECIMALS THEREOF. CONTOUR INTERVAL IS 1 FOOT.
7. THIS IS NOT A BOUNDARY SURVEY. PROPERTY LINES, WHERE SHOWN, WERE COMPILED FROM RECORD INFORMATION. THE LOCATION OF THESE LINES IS SUBJECT TO CHANGE, PENDING THE RESULTS OF A COMPLETE BOUNDARY SURVEY.
8. TREE DIMENSIONS: TRUNK DIAMETERS SHOWN REPRESENT DIAMETER AT BREAST HEIGHT (DBH), MEASURED IN INCHES. DBH IS MEASURED 4.5 FT ABOVE GROUND FOR SINGLE TRUNKS AND TRUNKS THAT SPLIT INTO SEVERAL STEMS CLOSE TO THE GROUND. EACH TRUNK IS SHOWN AT MULTI-STEM TREES. ONLY THE LABEL OF THE DBH OF THE LARGEST TRUNK IS SHOWN FOR DRAWING CLARITY. WHERE TREES FORK NEAR BREAST HEIGHT, TRUNK DIAMETER IS MEASURED AT THE NARROWEST PART OF THE MAIN STEM BELOW THE FORK. FOR TREES ON A SLOPE, BREAST HEIGHT IS REFERENCED FROM THE UPPER SIDE OF THE SLOPE. FOR LEANING TREES, BREAST HEIGHT IS MEASURED ON THE SIDE THAT THE TREE LEANS TOWARD. TREES WITH DBH LESS THAN 8" ARE TYPICALLY NOT SHOWN.

   12"P = 12" DBH PINE

9. TREE SPECIES ARE IDENTIFIED WHEN KNOWN. HOWEVER, FINAL DETERMINATION SHOULD BE MADE BY A QUALIFIED BOTANIST. REFER TO THE LEGEND FOR TREE SPECIES SYMBOLS.
10. SURVEYED TREES INCLUDE:
    A. OAKS (QUERCUS SPP.) 5 INCHES OR LARGER DBH
    B. ALL OTHER TREES 12 INCHES OR LARGER DBH
    C. ALL MULTI-STEM TREES WITH A COMBINED DIAMETER OF 24 INCHES OR LARGER DBH
11. TREE MAPPING OCCURRED DURING THE 2013-2015 SURVEYS. SOME TREES SHOWN ON THE DRAWINGS MAY HAVE DIED SINCE THE DATE OF SURVEY. ADDITIONAL TREES MEETING THE SURVEY THRESHOLD USED DURING THE ORIGINAL MAPPING EFFORTS MAY NOW EXIST WITHIN THE MAPPED AREAS AND ARE NOT SHOWN ON THE DRAWINGS.
12. THE DRIPLINES ARE SHOWN AROUND ALL SURVEYED TREES. DRIPLINES ARE BASED ON A UNIFORM CANOPY RADIUS FOR EACH TREE. WHERE CANOPIES OF INDIVIDUAL TREES OVERLAP, THEY WERE JOINED TO SHOW A CONTIGUOUS DRIPLINE. THE DRIPLINES OF SMALL DIAMETER, UNMAPPED TREES ARE NOT SHOWN.

SECTION AND DETAIL CONVENTION



ABBREVIATIONS

AVG.	AVERAGE	NTS	NOT TO SCALE
CC	CONCRETE	O.C.	ON CENTER
CY	CUBIC YARDS	O.D.	RELATIVE COMPACTION
DBH	DIAMETER BREST HEIGHT	RSP	ROCK SLOPE PROTECTION
DIA.	DIAMETER	S	SLOPE
E	EXISTING	SD	STORM DRAIN
E.G.	EXISTING GROUND	SPK	SPIKE
ELEV.	ELEVATION	SQ.FT.	SQUARE FOOT
DI	DRAINAGE INLET	TBD	TO BE DETERMINED
FG	FINISHED GRADE	TYP	TYPICAL
FT	FEET	UNK	UNKNOWN
INV	INVERT	WSE	WATER SURFACE ELEVATION
N	NEW	YR	YEAR

PROJECT DESCRIPTION

THESE DRAWINGS PROVIDE 90% LEVEL DESIGNS FOR THE CONSTRUCTION OF CHANNEL AND FLOODPLAIN ENHANCEMENTS ON PORTIONS OF PERMANENTE CREEK AT THE PERMANENTE QUARRY PROPERTY IN SANTA CLARA COUNTY, CALIFORNIA.

TREE REMOVAL NOTES

1. SALVAGE MAPPED WILLOWS SHOWN ON THE DRAWINGS FOR REMOVAL AND INCORPORATE THEM INTO THE WORK AS FLOODPLAIN LIVE LOGS, PER DETAIL 3, SHEET C35. ALL UNMAPPED WILLOWS WITHIN THE GRADING LIMITS SHALL BE RESERVED FOR SALVAGE AND TRANSPLANTING, PER THE WILLOW TRANSPLANT DETAIL 2 ON SHEET C37. WILLOWS TO BE SALVAGED FOR TRANSPLANTING WILL BE FLAGGED IN THE FIELD BY THE PROJECT ENGINEER, PRIOR TO THE START OF ANY CLEARING OR GRADING ACTIVITIES.
2. SALVAGE ALL OTHER TREES REMOVED AS PART OF PROJECT CONSTRUCTION AND INCORPORATE THEM INTO THE WORK AS FLOODPLAIN ROUGHNESS LOGS, PER DETAIL 3, SHEET C35.

TREE ABBREVIATIONS

A	ALDER
B	BAY
BK	BUCKEYE
M	MAPLE
O	OAK
SYC	SYCAMORE
W	WILLOW

* CALL BEFORE YOU DIG *
CONTACT UNDERGROUND SERVICE ALERT (USA)
PRIOR TO ANY CONSTRUCTION WORK 1-800-227-2600

WATERWAYS CONSULTING INC.
509A SWIFT ST.
SANTA CRUZ, CA 95060
PH:(831)421-9291 // FAX:(888)819-6847
WWW.WATWAYS.COM

PRELIMINARY
NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT
GROUP

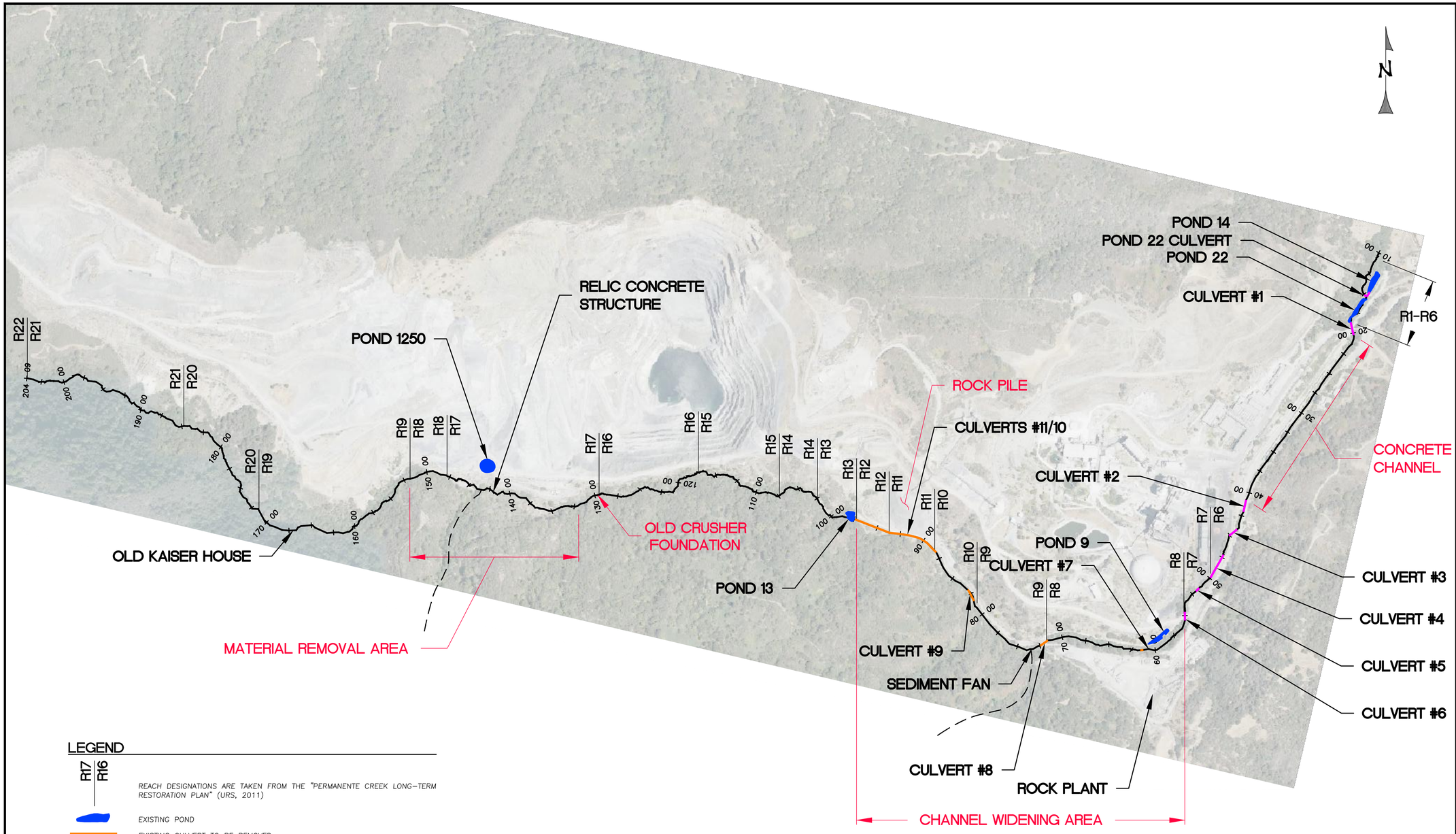
COVER SHEET

PERMANENTE CREEK
RESTORATION PLAN
UPDATED 90% DESIGN
SANTA CLARA COUNTY
CEQA REVIEW SUBMITTAL

DESIGNED BY:	–
DRAWN BY:	B.M.S.
CHECKED BY:	M.W.W.
DATE:	8/26/22
JOB NO.:	13-016

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

C1



LEGEND

R17 / R16 — REACH DESIGNATIONS ARE TAKEN FROM THE "PERMANENTE CREEK LONG-TERM RESTORATION PLAN" (URS, 2011)

EXISTING POND

EXISTING CULVERT TO BE REMOVED

EXISTING CULVERT TO REMAIN

TRIBUTARY (RELEVANT TO PROJECT)

70 00 — PERMANENTE CREEK THALWEG ALIGNMENT 2013
(NOTE: DESIGN ALIGNMENTS AND STATIONING VARY AT INDIVIDUAL WORK AREAS)

PROJECT AREA OVERVIEW

SCALE: 1" = 500'

WATERWAYS CONSULTING INC.
509A SWIFT ST.
SANTA CRUZ, CA 95060
PH:(831)421-9291 // FAX:(888)819-6847
WWW.WATWAYS.COM

PRELIMINARY

NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT GROUP

PROJECT AREA OVERVIEW

PERMANENTE CREEK RESTORATION PLAN

UPDATED 90% DESIGN

SANTA CLARA COUNTY
CEQA REVIEW SUBMITTAL

DESIGNED BY:	B.M.S.
DRAWN BY:	B.M.S.
CHECKED BY:	M.W.W.
DATE:	8/26/22
JOB NO.:	13-016

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

RECLAMATION PLAN AREA BOUNDARY

AREA OF PROPOSED GRADING THAT FALLS OUTSIDE RECLAMATION PLAN AREA BOUNDARY

POND 1250

ROCK PILE

CULVERT 10/11

POND 13

(E) CONVEYOR

CULVERT 9

MATERIAL REMOVAL AREA

POND 14

POND 14/22 CULVERTS

POND 22

CULVERT 1

CULVERT 2

CULVERT 3

CULVERT 5

CULVERT 6

CULVERT 4

POND 9

CULVERT 8

CULVERT 7

ROCK PLANT

CONCRETE CHANNEL

CHANNEL WIDENING AREA

N

LEGEND

- EXISTING POND
- EXISTING CULVERT TO BE REMOVED
- EXISTING CULVERT TO REMAIN
- TRIBUTARY (RELEVANT TO PROJECT)
- EXISTING CONVEYOR
- PERMANENTE CREEK THALWEG ALIGNMENT 2013

RECLAMATION PLAN AREA OVERVIEW

SCALE: 1" = 500'

WATERWAYS CONSULTING INC.
509A SWIFT ST.
SANTA CRUZ, CA 95060
PH:(831)421-9291 // FAX:(888)819-6847
WWW.WATWAYS.COM

PRELIMINARY

NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:

LEHIGH HANSON
HEIDELBERG CEMENT GROUP

RECLAMATION PLAN AREA OVERVIEW

PERMANENTE CREEK RESTORATION PLAN

UPDATED 90% DESIGN

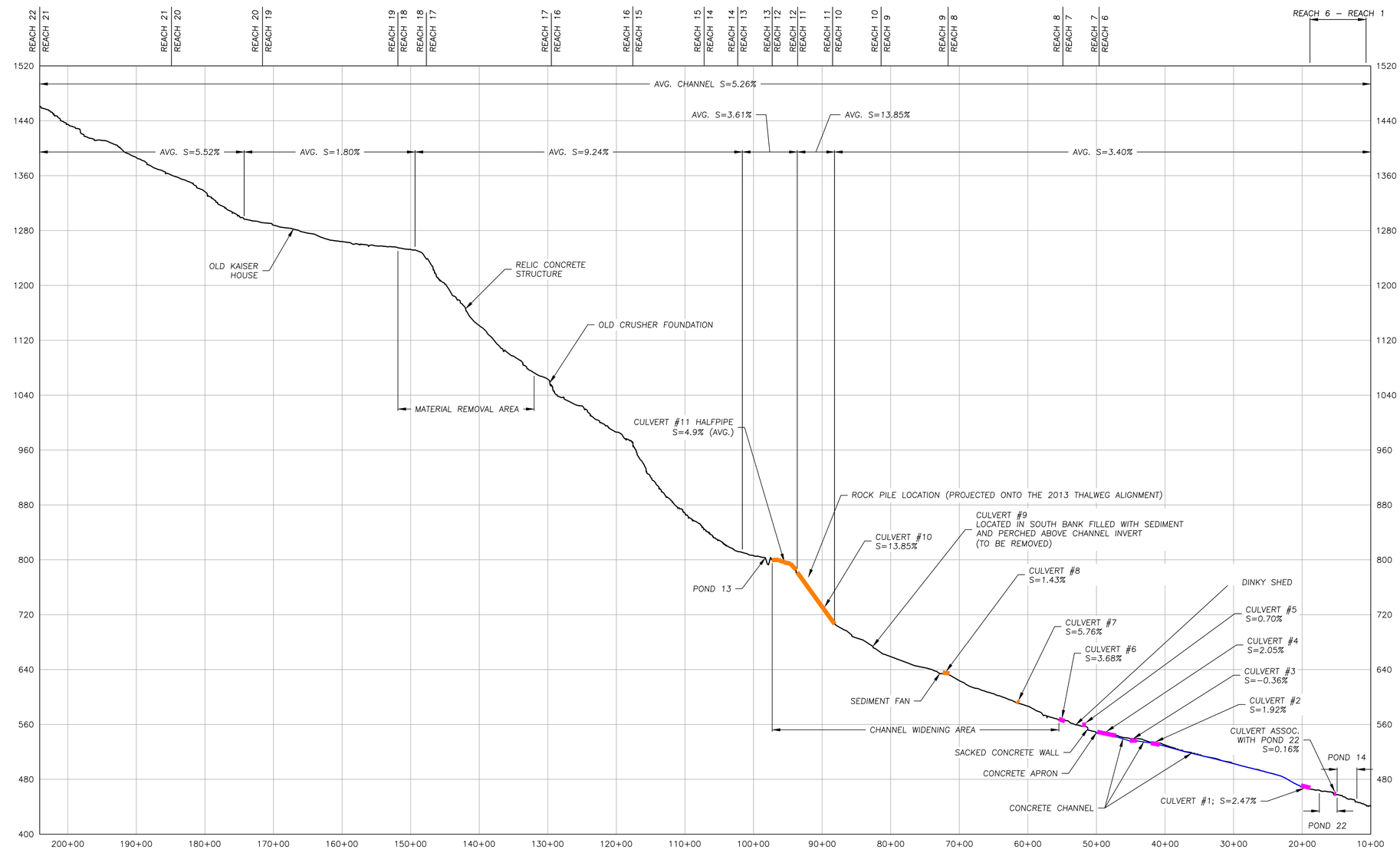
SANTA CLARA COUNTY CEQA REVIEW SUBMITTAL

DESIGNED BY:	B.M.S.
DRAWN BY:	B.M.S.
CHECKED BY:	M.W.W.
DATE:	8/26/22
JOB NO.:	13-016

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS

0 1"

C3



LEGEND

REACH 7 / REACH 6 — REACH DESIGNATIONS FROM THE "PERMANENTE CREEK LONG-TERM RESTORATION PLAN" (URS, 2011)

EXISTING CULVERT TO BE REMOVED

EXISTING CULVERT TO REMAIN

EXISTING CHANNEL THALWEG PROFILE

SCALE: H: 1" = 800'; V: 1"=80'

WATERWAYS CONSULTING INC.
509A SWIFT ST.
SANTA CRUZ, CA 95060
PH:(831)421-9291 // FAX:(888)819-6847
WWW.WATWAYS.COM

PRELIMINARY

NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:

LEHIGH HANSON
HEIDELBERG CEMENT
GROUP

EXISTING CHANNEL PROFILE

PERMANENTE CREEK
RESTORATION PLAN

UPDATED 90% DESIGN

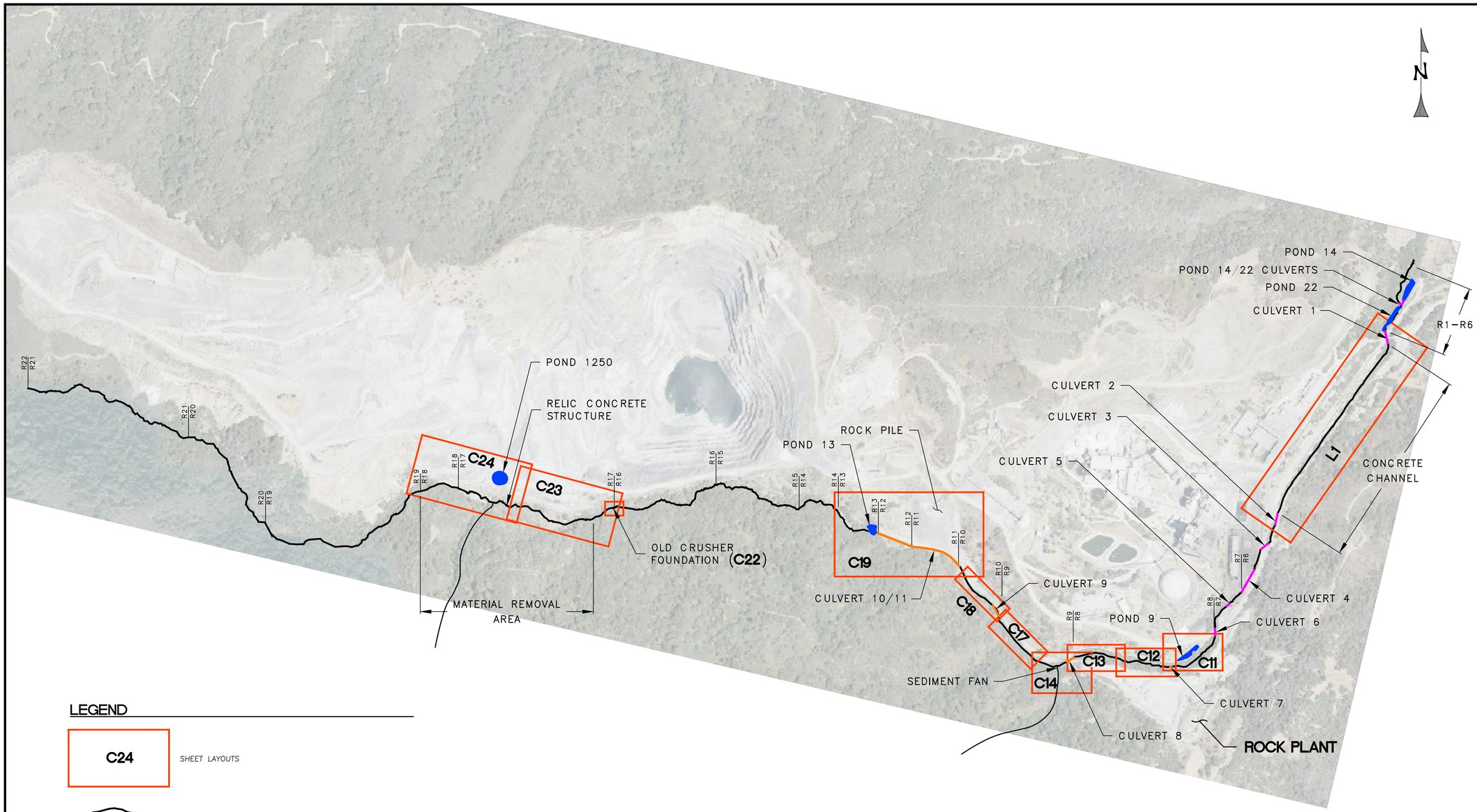
SANTA CLARA COUNTY
CEQA REVIEW SUBMITTAL

DESIGNED BY:	B.M.S.
DRAWN BY:	B.M.S.
CHECKED BY:	M.W.W.
DATE:	8/26/22
JOB NO.:	13-016

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS

0 1"

C4



LEGEND

- C24 — SHEET LAYOUTS
- PERMANENTE CREEK THALWEG ALIGNMENT 2013
- TRIBUTARY (RELEVANT TO PROJECT)
- EXISTING CULVERT TO BE REMOVED
- EXISTING CULVERT TO REMAIN

SHEET LAYOUT OVERVIEW

SCALE: 1" = 500'

WATERWAYS CONSULTING INC.
509A SWIFT ST.
SANTA CRUZ, CA 95060
PH:(831)421-9291 // FAX:(888)819-6847
WWW.WATWAYS.COM

PRELIMINARY

NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:

LEHIGH HANSON
HEIDELBERG CEMENT GROUP

SHEET LAYOUT OVERVIEW

PERMANENTE CREEK RESTORATION PLAN

UPDATED 90% DESIGN

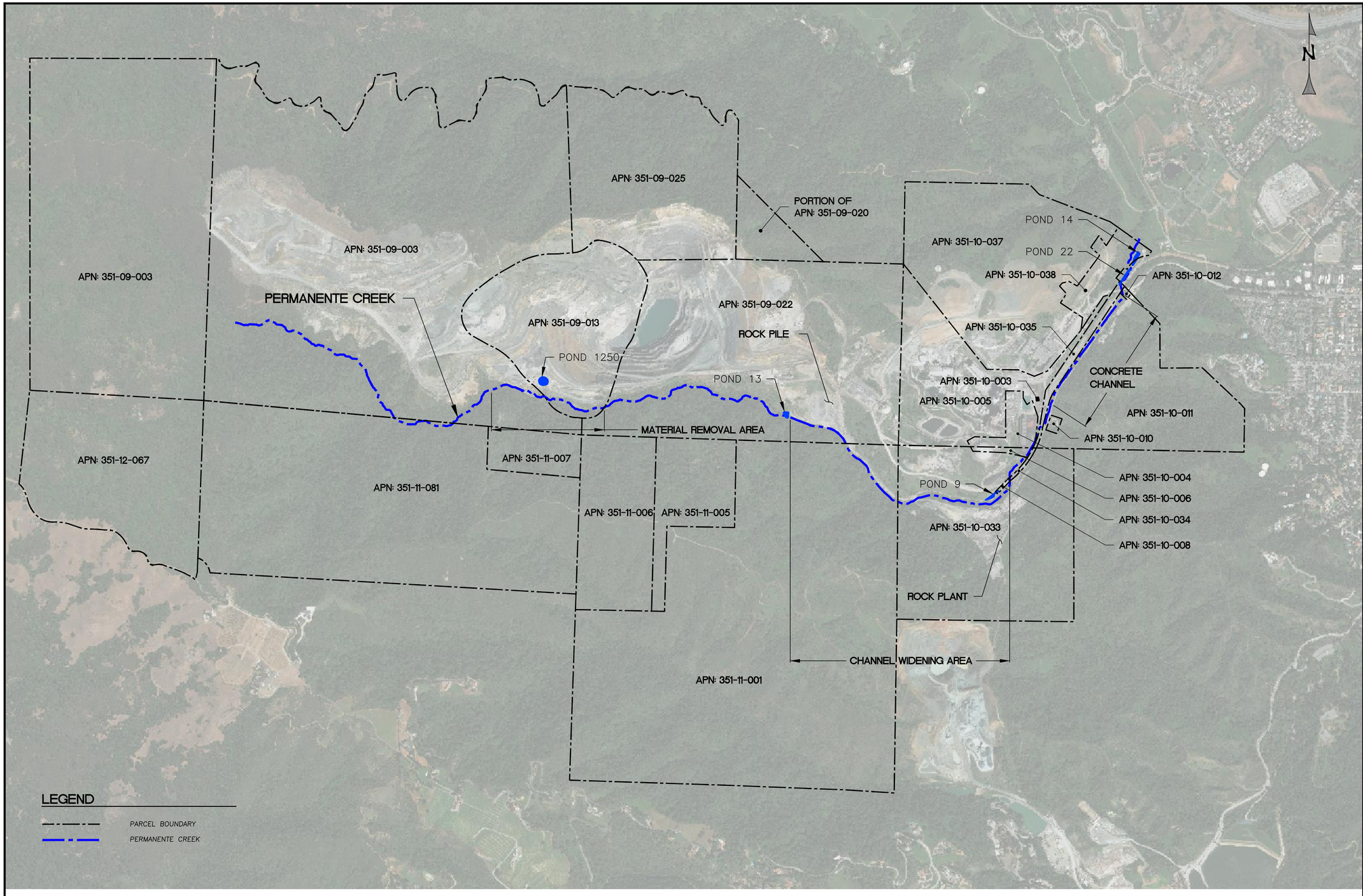
SANTA CLARA COUNTY CEQA REVIEW SUBMITTAL

DESIGNED BY:	B.M.S.
DRAWN BY:	B.M.S.
CHECKED BY:	M.W.W.
DATE:	8/26/22
JOB NO.:	13-016

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS

0 1"

C5



PARCEL BOUNDARY SOURCE:
SANTA CLARA COUNTY GIS WEBSITE (https://ges.sccgov.org/discovergis/sccmap)
DOWNLOADED JUNE 2022

SITE PARCELS AND RIGHT-OF-WAY OVERLAY
SCALE: 1"=700'

NOTE:
THIS IS NOT A BOUNDARY SURVEY. PROPERTY LINES, WHERE SHOWN, WERE COMPILED FROM RECORD INFORMATION. THE LOCATION OF THESE LINES IS SUBJECT TO CHANGE, PENDING THE RESULTS OF A COMPLETE BOUNDARY SURVEY.

WATERWAYS CONSULTING INC.
509A SWIFT ST.
SANTA CRUZ, CA 95060
PH:(831)421-9291 // FAX:(888)819-6847
WWW.WATWAYS.COM

PRELIMINARY
NOT FOR CONSTRUCTION

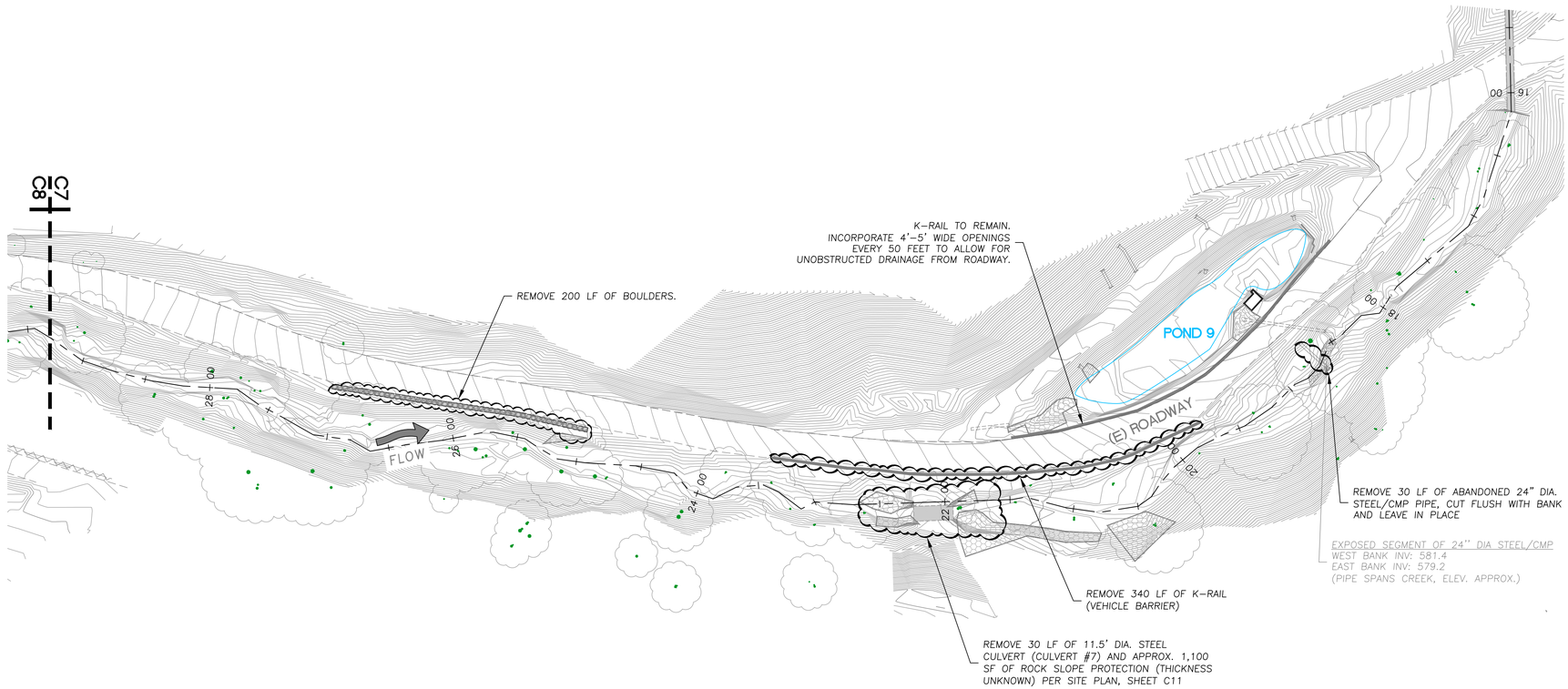
PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT GROUP

SITE PARCELS AND RIGHT-OF-WAY OVERLAY

PERMANENTE CREEK RESTORATION PLAN
UPDATED 90% DESIGN
SANTA CLARA COUNTY CEQA REVIEW SUBMITTAL

DESIGNED BY:	–
DRAWN BY:	–
CHECKED BY:	M.W.W.
DATE:	8/26/22
JOB NO.:	13-016

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"



CHANNEL WIDENING DEMOLITION PLAN (1 0F 2)

SCALE: 1" = 50'

LEGEND

- (E) TREE
- (E) CONTOURS
- (E) EDGE OF ROAD
- W — (E) WATER LINE
- (E) EXPOSED ROCK SLOPE PROTECTION
- (E) CONVEYOR
- 22+00 — DESIGN ALIGNMENT

NOTES:

1. SEE SITE PLANS FOR TREES TO BE REMOVED.
2. REMOVE ALL CONCRETE UNDERLYING ROADWAYS WITHIN THE GRADING LIMITS (SEE SITE PLANS). PLAN EXTENT AND THICKNESS OF CONCRETE IS UNKNOWN.

WATERWAYS CONSULTING INC.
509A SWIFT ST.
SANTA CRUZ, CA 95060
PH:(831)421-9291 // FAX:(888)819-6847
WWW.WATWAYS.COM

PRELIMINARY

NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:

LEHIGH HANSON
HEIDELBERG CEMENT GROUP

CHANNEL WIDENING DEMOLITION PLAN (1 OF 2)

PERMANENTE CREEK RESTORATION PLAN

UPDATED 90% DESIGN

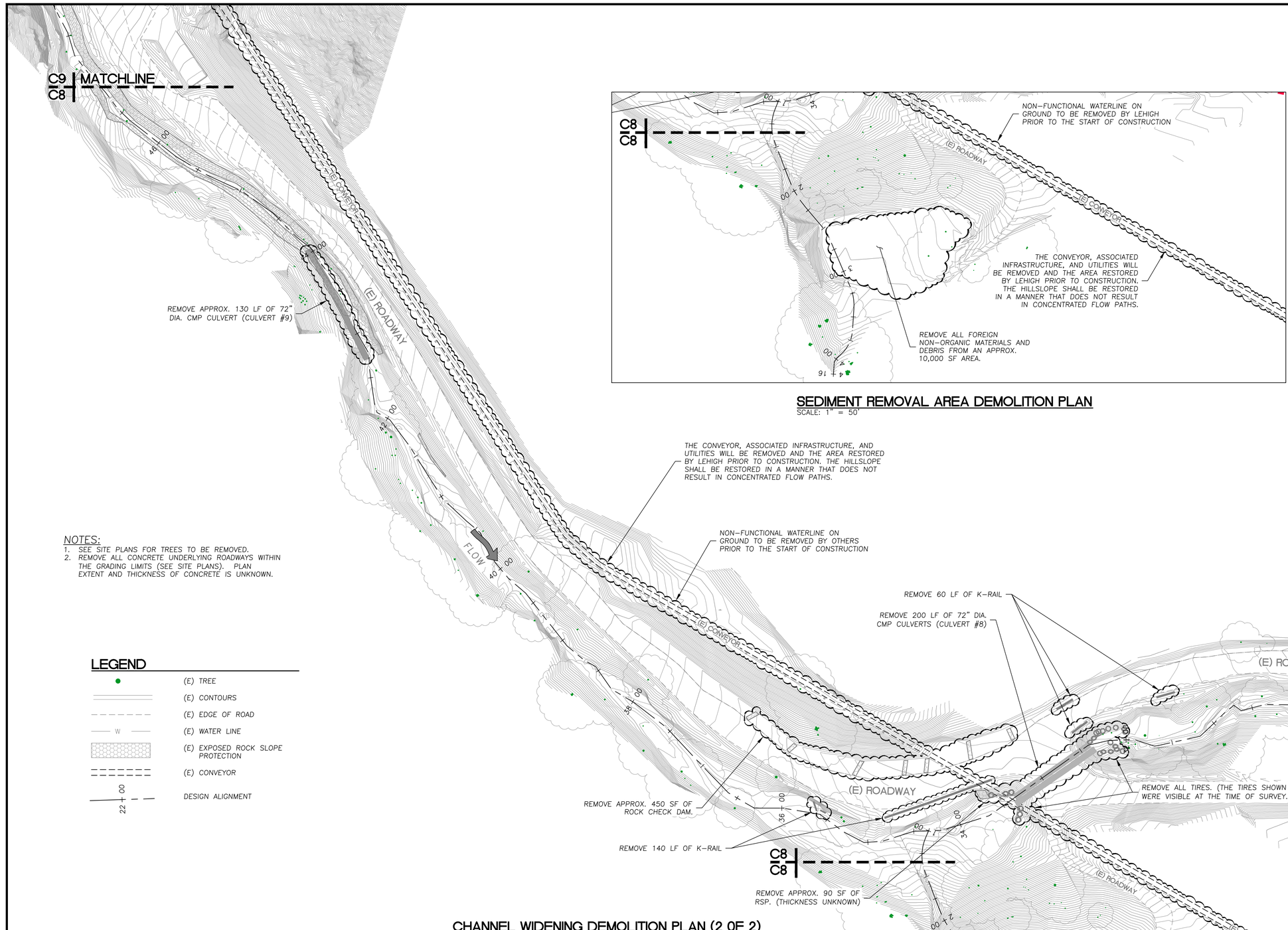
SANTA CLARA COUNTY CEQA REVIEW SUBMITTAL

DESIGNED BY:	B.M.S.
DRAWN BY:	B.M.S.
CHECKED BY:	M.W.W.
DATE:	8/26/22
JOB NO.:	13-016

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS

0 — 1"

C7



CHANNEL WIDENING DEMOLITION PLAN (2 0F 2)
SCALE: 1" = 50'

SEDIMENT REMOVAL AREA DEMOLITION PLAN
SCALE: 1" = 50'

N

NOTES:
1. *SEE SITE PLANS FOR TREES TO BE REMOVED.*
2. *REMOVE ALL CONCRETE UNDERLYING ROADWAYS WITHIN THE GRADING LIMITS (SEE SITE PLANS). PLAN EXTENT AND THICKNESS OF CONCRETE IS UNKNOWN.*

LEGEND

- (E) TREE
- (E) CONTOURS
- (E) EDGE OF ROAD
- W — (E) WATER LINE
- (E) EXPOSED ROCK SLOPE PROTECTION
- (E) CONVEYOR
- 22+00 — DESIGN ALIGNMENT

WATERWAYS CONSULTING INC.
509A SWIFT ST.
SANTA CRUZ, CA 95060
PH:(831)421-9291 // FAX:(888)819-6847
WWW.WATWAYS.COM

PRELIMINARY

NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT
GROUP

CHANNEL WIDENING DEMOLITION PLAN (2 OF 2)

PERMANENTE CREEK
RESTORATION PLAN

UPDATED 90% DESIGN

SANTA CLARA COUNTY
CEQA REVIEW SUBMITTAL

DESIGNED BY:	B.M.S.
DRAWN BY:	B.M.S.
CHECKED BY:	M.W.W.
DATE:	8/26/22
JOB NO.:	13-016

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 — 1"

C8

8 OF 47

RETAIN POND 13B

RETAIN EXISTING CULVERT/SLOPEDRAIN AND INCORPORATE INTO THE RESTORED CHANNEL, AS DESCRIBED ON SHEET C19.

POND 13

(E) ROAD

FLOW

REMOVE POND 13 DAM INCLUDING ALL CONCRETE AND STEEL COMPONENTS.

REMOVE APPROX. 380 LF OF 11.5' DIA. CMP HALF-CULVERT (CULVERT #11) AND ASSOCIATED CONCRETE DROP STRUCTURE AT DOWNSTREAM END..

REMOVE APPROX. 550 LF OF 96" DIA. CMP CULVERT (CULVERT #10, ALIGNMENT ESTIMATED)

REMOVE 190 LF OF K-RAIL

REMOVE 220 LF OF K-RAIL

THE ROCK PILE, THE INTAKES TO CONVEYOR SYSTEM AND SUBGRADE CONVEYOR COMPONENTS WILL BE REMOVED BY LEHIGH PRIOR TO CONSTRUCTION.

THE CONVEYOR, ASSOCIATED INFRASTRUCTURE, AND UTILITIES WILL BE REMOVED AND THE AREA RESTORED BY LEHIGH PRIOR TO CONSTRUCTION. THE HILLSLOPE SHALL BE RESTORED IN A MANNER THAT DOES NOT RESULT IN CONCENTRATED FLOW PATHS.

NON-FUNCTIONAL WATER LINE ON GROUND SURFACE TO BE REMOVED BY LEHIGH PRIOR TO THE START OF CONSTRUCTION.

REMOVE APPROX. 1,000 SF OF ROCK SLOPE PROTECTION (THICKNESS UNKNOWN) PER SITE PLAN, SHEET C19. FINAL EXTENT OF ROCK SLOPE PROTECTION REMOVAL WILL BE DETERMINED AT THE TIME OF CONSTRUCTION BY THE ENGINEER TO ENSURE A SMOOTH TRANSITION TO THE EXISTING CHANNEL.

NOTES:
1. SEE SITE PLANS FOR TREES TO BE REMOVED.
2. REMOVE ALL CONCRETE UNDERLYING ROADWAYS WITHIN THE GRADING LIMITS (SEE SITE PLANS). PLAN EXTENT AND THICKNESS OF CONCRETE IS UNKNOWN.

LEGEND

- (E) TREE
- (E) CONTOURS
- (E) CONTOURS ESTIMATED BELOW ROCK PILE
- (E) EDGE OF ROAD
- (E) WATER LINE
- (E) EXPOSED ROCK SLOPE PROTECTION
- (E) CONVEYOR
- DESIGN ALIGNMENT

ROCK PILE AREA DEMOLITION PLAN
SCALE: 1" = 50'

C9 MATCHLINE C8

WATERWAYS CONSULTING INC.
509A SWIFT ST.
SANTA CRUZ, CA 95060
PH:(831)421-9291 // FAX:(888)819-6847
WWW.WATWAYS.COM

PRELIMINARY

NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT
GROUP

ROCK PILE AREA DEMOLITION PLAN

PERMANENTE CREEK RESTORATION PLAN
UPDATED 90% DESIGN
SANTA CLARA COUNTY CEQA REVIEW SUBMITTAL

DESIGNED BY:	B.M.Z.
DRAWN BY:	B.R.S
CHECKED BY:	M.W.W.
DATE:	8/26/22
JOB NO.:	13-016

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

POND 1250, THE UPPER TREATMENT FACILITIES, AND ASSOCIATED INFRASTRUCTURE THAT WILL BE IMPACTED BY PROJECT CONSTRUCTION WILL BE REMOVED AND RELOCATED, AS NEEDED, BY LEHIGH PRIOR TO THE START OF CONSTRUCTION AT THE MATERIAL REMOVAL AREA.

POND 1250

(E) THALWEG

(E) WATER TREATMENT FACILITIES

(E) WATER TREATMENT FACILITIES

(E) ROADWAY

(E) ROADWAY

(E) WATER TREATMENT FACILITIES

REMOVE RELIC CONCRETE STRUCTURES (CONCRETE EXTENTS EXPOSED AT THE SURFACE ARE SHOWN, VOLUME UNKNOWN)

FLOW

DEMOLISH A PORTION OF THE "OLD CRUSHER FOUNDATION" TO CONFORM TO THE ADJACENT BANKS, PER THE OLD CRUSHER SITE PLAN, SHEET C22.

NOTES:
1. SEE SITE PLANS FOR TREES TO BE REMOVED.

LEGEND

- (E) TREE
- (E) CONTOURS
- (E) EDGE OF ROAD
- (E) WATERLINE
- (E) OVERHEAD ELECTRICAL LINE
- (E) ELECTRICAL POWER POLE
- TRIBUTARY
- DESIGN ALIGNMENT

MATERIAL REMOVAL AREA AND "OLD CRUSHER FOUNDATION" DEMOLITION PLAN

SCALE: 1" = 60'

WATERWAYS CONSULTING INC.
509A SWIFT ST.
SANTA CRUZ, CA 95060
PH:(831)421-9291 // FAX:(888)819-6847
WWW.WATWAYS.COM

PRELIMINARY

NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:

LEHIGH HANSON
HEIDELBERG CEMENT GROUP

MAT. REMOVAL AREA AND OLD CRUSHER FOUNDATION DEMO. PLAN

PERMANENTE CREEK RESTORATION PLAN

UPDATED 90% DESIGN

SANTA CLARA COUNTY
CEQA REVIEW SUBMITTAL

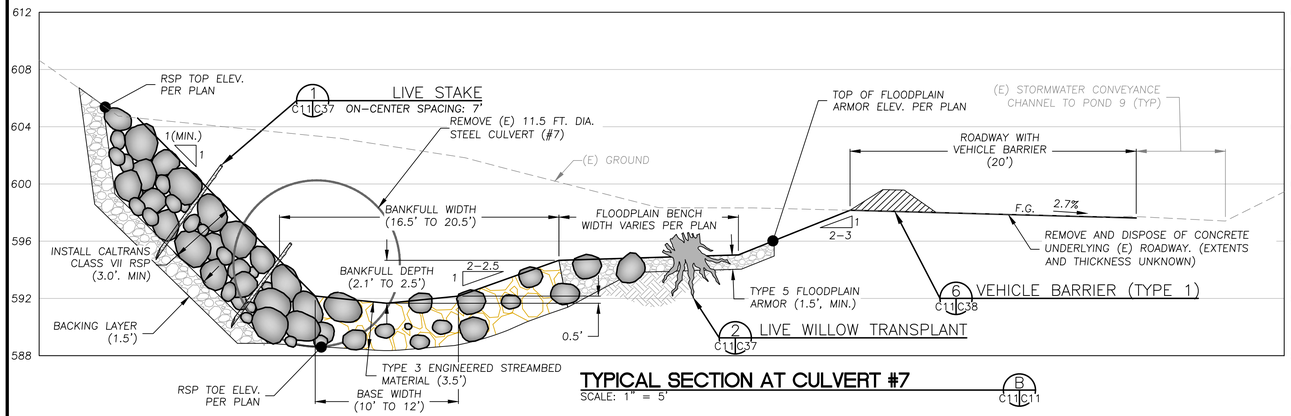
DESIGNED BY:	B.M.Z.
DRAWN BY:	B.M.S.
CHECKED BY:	M.W.W.
DATE:	8/26/22
JOB NO.:	13-016

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS

0 1"

C10

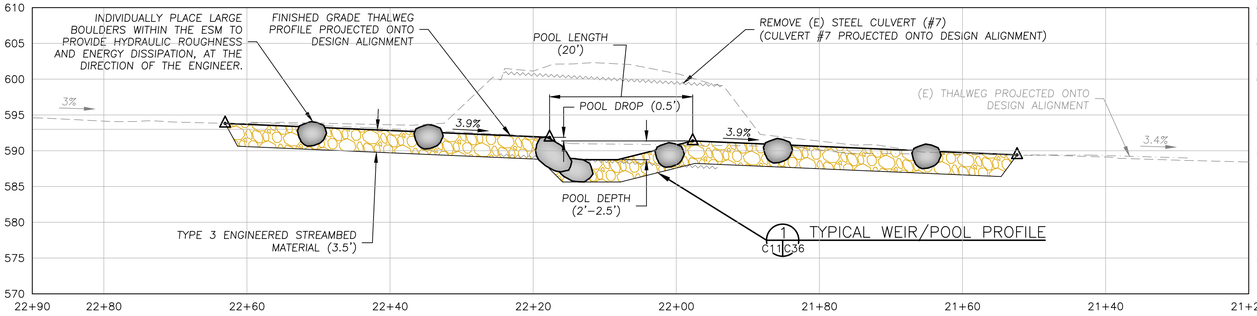
10 OF 47



TYPICAL SECTION AT CULVERT #7

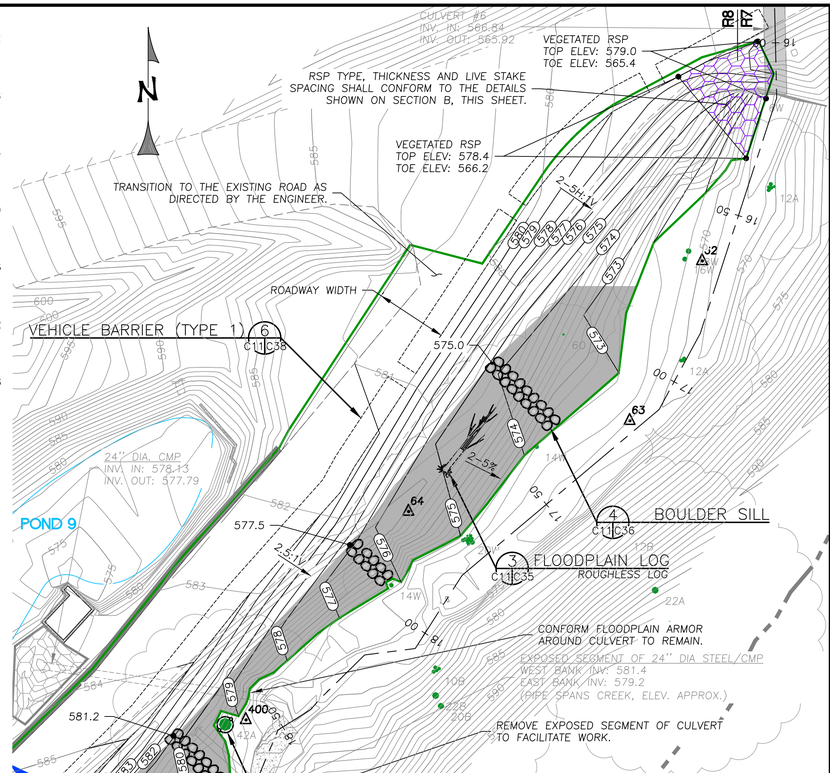
SCALE: 1" = 5'

B C11C11



CULVERT #7 CHANNEL PROFILE

SCALE: 1" = 10'



CHANNEL WIDENING PLAN (1 OF 6)

SCALE: 1" = 20'

TREE REMOVAL SUMMARY

TREE SPECIES	DBH	NUMBER
ALDER (DOUBLE STEM)	24"	1

NOTE:
THE TREE REMOVAL SUMMARY IS FOR STA. 16+20 TO STA. 23+50.

LEGEND

- SURVEY CONTROL
- (E) TREE AND DRIPLINE
- (E) TREE TO BE REMOVED
- (E) CONTOURS
- PROPOSED CONTOURS
- (E) THALWEG ALIGNMENT
- (E) EDGE OF ROAD
- (E) WATER LINE
- (E) STORM DRAIN LINE
- (E) EXPOSED ROCK SLOPE PROTECTION
- LIMITS OF GRADING (APPROX.)
- FLOODPLAIN ARMOR
- ENGINEERED STREAMBED MATERIAL
- VEGETATED ROCK SLOPE PROTECTION
- REACH DESIGNATIONS FROM THE "PERMANENTE CREEK LONG-TERM RESTORATION PLAN" (URS, 2011)
- RECLAMATION AREA PLAN BOUNDARY
- REVERSE GRADE DIP
- BOULDER SILL (WITH TOP ELEVATION)
- VEHICLE BARRIER

NOTES:

1. THE PLAN EXTENT OF CONCRETE UNDERLYING THE ROADWAY IS NOT SHOWN. EXTENTS ARE UNKNOWN. REMOVE AND DISPOSE OF ALL CONCRETE UNDERLYING (E) ROADWAY AND ADJACENT AREAS.
2. FINISHED GRADE CONTOURS SHOWN WITHIN POOL DO NOT REPRESENT DETAILS OF POOL GRADING. REFER TO TYPICAL WEIR AND POOL SECTIONS AND PROFILE, SHT. C34.
3. SALVAGE TREES WITHIN AREAS TO BE GRADED PER THE TREE REMOVAL NOTES, SHEET C1.

FLOODPLAIN ARMOR NOTES:

1. INSTALL TYPE 5 FLOODPLAIN ARMOR FROM STA. 16+70 TO 28+00 (1.5', MIN. THICKNESS)
2. INSTALL TYPE 6 FLOODPLAIN ARMOR FROM STA. 30+75 TO 31+75 (2', MIN. THICKNESS)
3. INSTALL TYPE 5 FLOODPLAIN ARMOR FROM STA. 31+75 TO 40+50 (1.5', MIN. THICKNESS)
4. INSTALL TYPE 7 FLOODPLAIN ARMOR FROM STA. 40+50 TO 45+00 (3', MIN. THICKNESS)
5. INSTALL TYPE 6 FLOODPLAIN ARMOR FROM STA. 45+00 TO 48+75 (2', MIN. THICKNESS)

WATERWAYS CONSULTING INC.
509A SWIFT ST.
SANTA CRUZ, CA 95060
PH:(831)421-9291 // FAX:(888)819-6847
WWW.WATWAYS.COM

PRELIMINARY
NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT GROUP

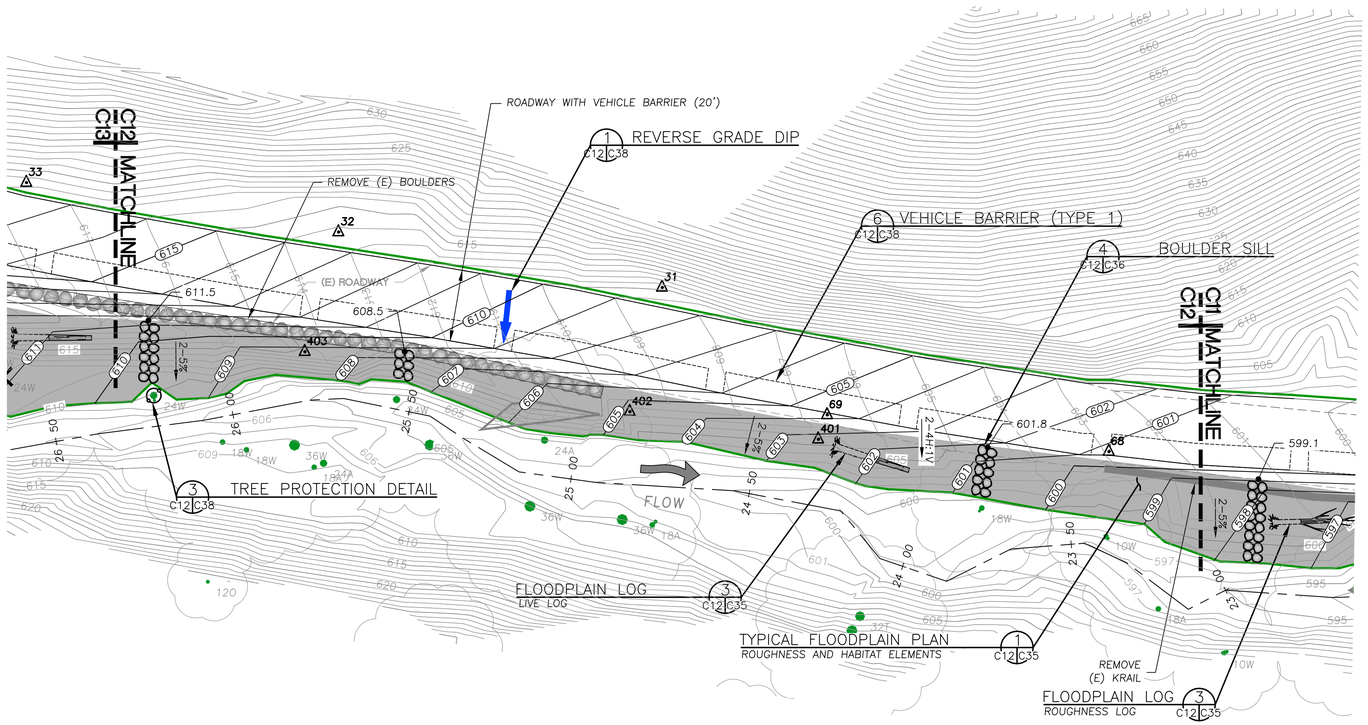
CHANNEL WIDENING PLAN (1 OF 6)

PERMANENTE CREEK RESTORATION PLAN
UPDATED 90% DESIGN
SANTA CLARA COUNTY CEQA REVIEW SUBMITTAL

DESIGNED BY:	B.Z.
DRAWN BY:	B.M.S.
CHECKED BY:	M.W.W.
DATE:	8/26/22
JOB NO.:	13-016

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

C11



CHANNEL WIDENING PLAN (2 OF 6)
SCALE: 1" = 20'

TREE REMOVAL SUMMARY

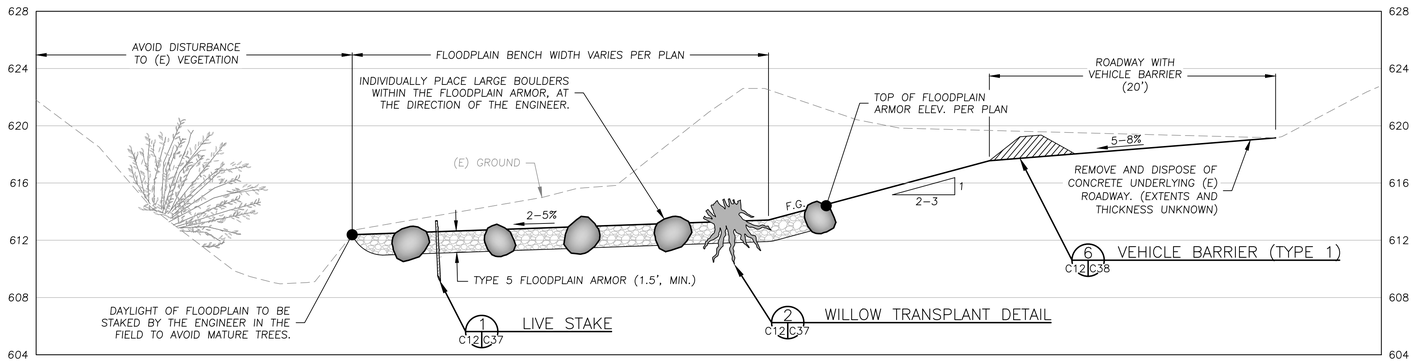
SEE SHEET C11 FOR TREES REMOVED DOWNSTREAM OF STA. 23+50 AND SHEET C13 AND C14 FOR TREES REMOVED UPSTREAM OF STA. 26+50.

NOTES:
1. THE PLAN EXTENT OF CONCRETE UNDERLYING THE ROADWAY IS NOT SHOWN. EXTENTS ARE UNKNOWN. REMOVE AND DISPOSE OF ALL CONCRETE UNDERLYING (E) ROADWAY AND ADJACENT AREAS.
2. SALVAGE TREES WITHIN AREAS TO BE GRADED PER THE TREE REMOVAL NOTES, SHEET C1.

FLOODPLAIN ARMOR NOTES:
SEE FLOODPLAIN ARMOR NOTES ON SHEET C11 FOR FLOODPLAIN ARMOR TYPE, THICKNESS AND LOCATION.

LEGEND

- SURVEY CONTROL
- (E) TREE AND DRIPLINE
- (E) TREE TO BE REMOVED
- (E) CONTOURS
- PROPOSED CONTOURS
- (E) THALWEG ALIGNMENT
- (E) EDGE OF ROAD
- (E) WATER LINE
- (E) STORM DRAIN LINE
- (E) EXPOSED ROCK SLOPE PROTECTION
- LIMITS OF GRADING (APPROX.)
- FLOODPLAIN ARMOR
- ENGINEERED STREAMBED MATERIAL
- VEGETATED ROCK SLOPE PROTECTION
- REVERSE GRADE DIP
- BOULDER SILL (WITH TOP ELEVATION)



TYPICAL SECTION
SCALE: 1" = 5'
C C13|C12

NOTES:
SEE REVEGETATION SHEETS (L1–L5) FOR DETAILS REGARDING SPACING OF LIVE STAKES AND WILLOW TRANSPLANTS.

WATERWAYS CONSULTING INC.
509A SWIFT ST.
SANTA CRUZ, CA 95060
PH:(831)421-9291 // FAX:(888)819-6847
WWW.WATWAYS.COM

PRELIMINARY
NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT GROUP

CHANNEL WIDENING PLAN (2 OF 6)

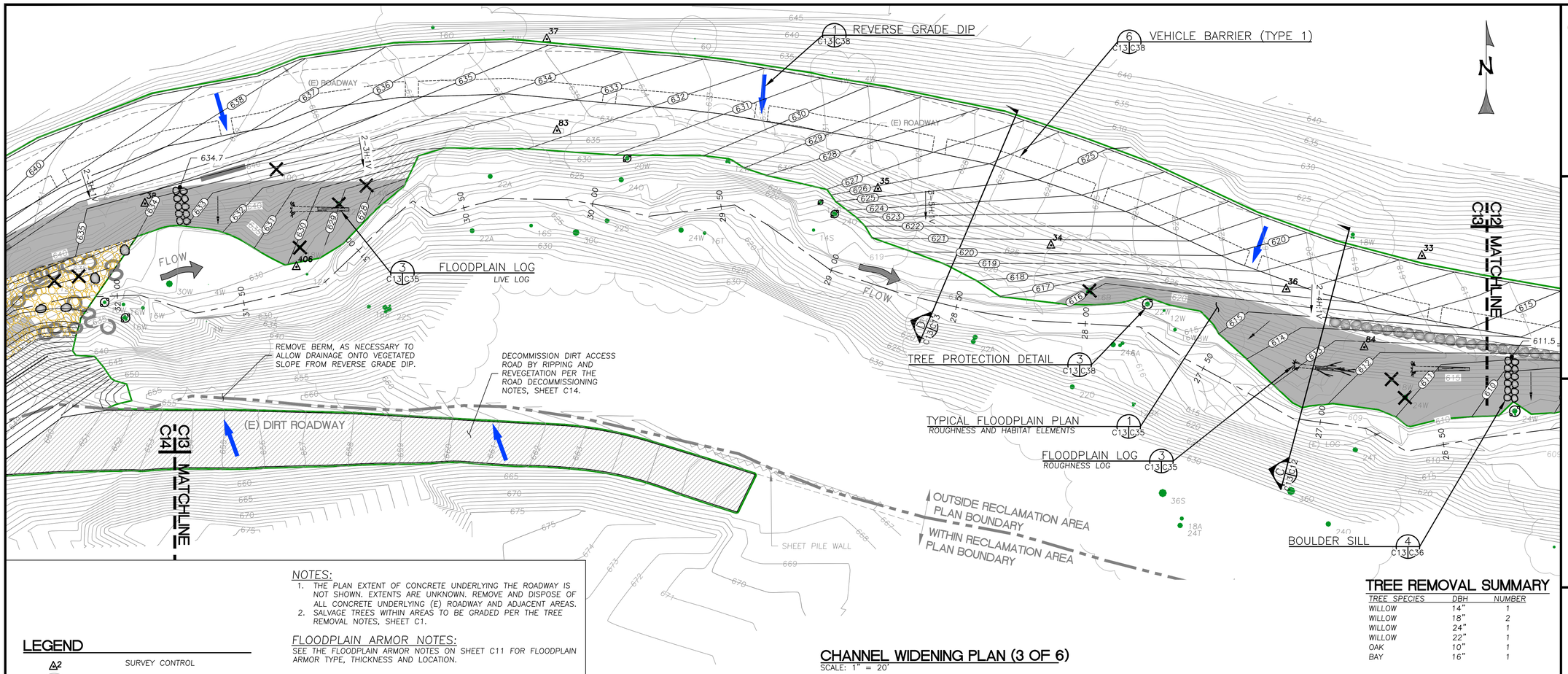
PERMANENTE CREEK RESTORATION PLAN
UPDATED 90% DESIGN
SANTA CLARA COUNTY
CEQA REVIEW SUBMITTAL

DESIGNED BY:	B.M.S.
DRAWN BY:	B.M.S.
CHECKED BY:	M.W.W.
DATE:	8/26/22
JOB NO.:	13-016

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

C12

12 OF 47



TREE REMOVAL SUMMARY

TREE SPECIES	DBH	NUMBER
WILLOW	14"	1
WILLOW	18"	2
WILLOW	24"	1
WILLOW	22"	1
OAK	10"	1
BAY	16"	1

CHANNEL WIDENING PLAN (3 OF 6)

SCALE: 1" = 20'

NOTES:

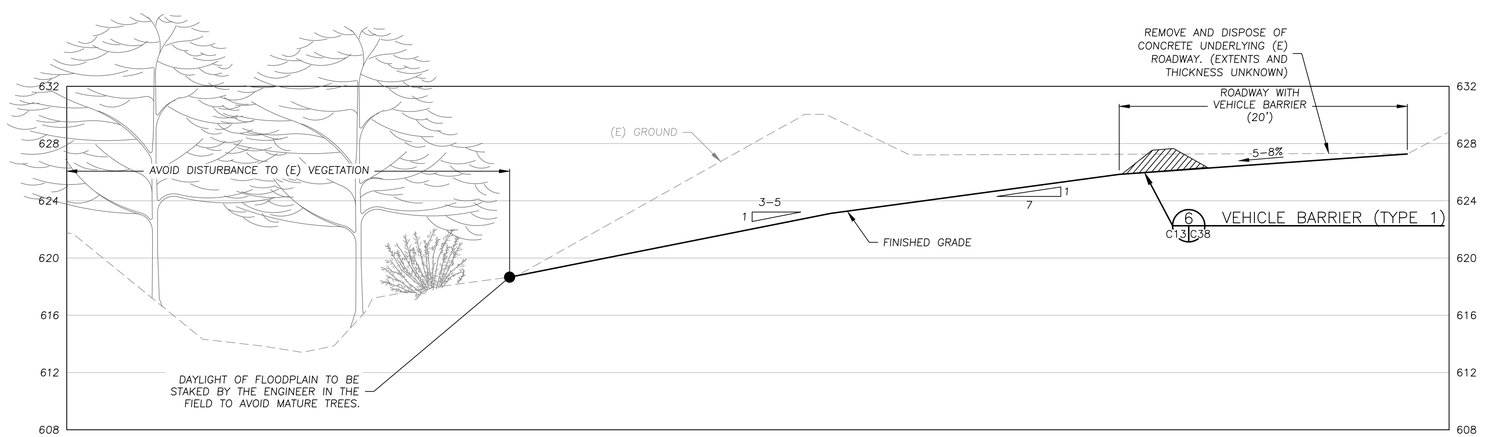
1. THE PLAN EXTENT OF CONCRETE UNDERLYING THE ROADWAY IS NOT SHOWN. EXTENTS ARE UNKNOWN. REMOVE AND DISPOSE OF ALL CONCRETE UNDERLYING (E) ROADWAY AND ADJACENT AREAS.
2. SALVAGE TREES WITHIN AREAS TO BE GRADED PER THE TREE REMOVAL NOTES, SHEET C1.

FLOODPLAIN ARMOR NOTES:

SEE THE FLOODPLAIN ARMOR NOTES ON SHEET C11 FOR FLOODPLAIN ARMOR TYPE, THICKNESS AND LOCATION.

LEGEND

- SURVEY CONTROL
- (E) TREE AND DRIPLINE
- (E) TREE TO BE REMOVED
- (E) CONTOURS
- PROPOSED CONTOURS
- (E) THALWEG ALIGNMENT
- (E) EDGE OF ROAD
- (E) WATER LINE
- (E) STORM DRAIN LINE
- (E) EXPOSED ROCK SLOPE PROTECTION
- LIMITS OF GRADING (APPROX.)
- FLOODPLAIN ARMOR
- ENGINEERED STREAMBED MATERIAL
- VEGETATED ROCK SLOPE PROTECTION
- ROAD DECOMMISSIONING AREA
- REACH DESIGNATIONS FROM THE "PERMANENTE CREEK LONG-TERM RESTORATION PLAN" (URS, 2011)
- RECLAMATION AREA PLAN BOUNDARY
- REVERSE GRADE DIP
- BOULDER SILL (WITH TOP ELEVATION)
- VEHICLE BARRIER



TYPICAL SECTION

SCALE: 1" = 5'

D C13|C13

WATERWAYS CONSULTING INC.

509A SWIFT ST.
SANTA CRUZ, CA 95060
PH:(831)421-9291 // FAX:(888)819-6847
WWW.WATWAYS.COM

PRELIMINARY

NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:

LEHIGH HANSON
HEIDELBERG CEMENT GROUP

CHANNEL WIDENING PLAN (3 OF 6)

PERMANENTE CREEK RESTORATION PLAN

UPDATED 90% DESIGN

SANTA CLARA COUNTY CEQA REVIEW SUBMITTAL

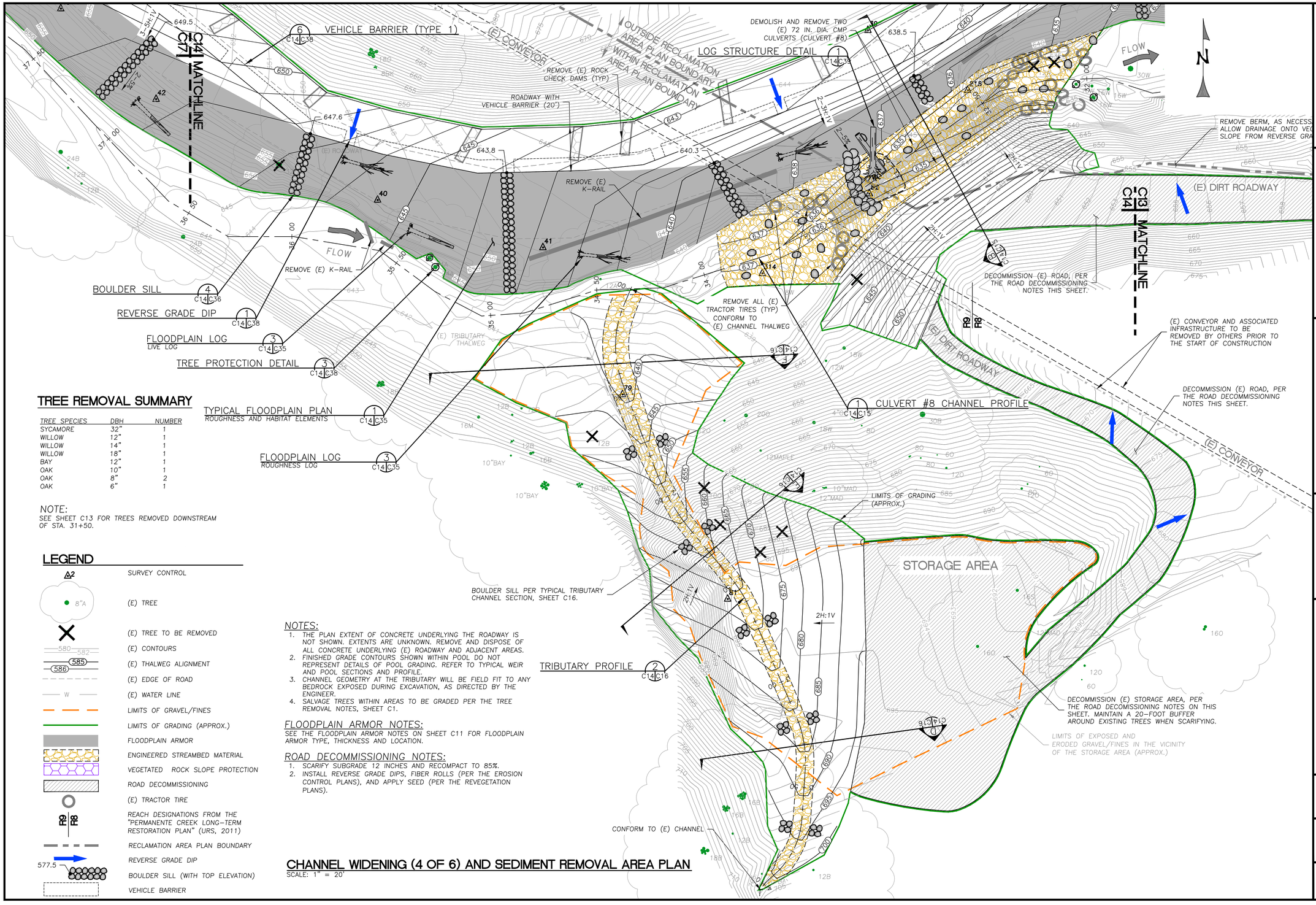
DESIGNED BY:	B.M.S.
DRAWN BY:	B.M.S.
CHECKED BY:	M.W.W.
DATE:	8/26/22
JOB NO.:	13-016

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS

0 1"

C13

13 OF 47



TREE REMOVAL SUMMARY

TREE SPECIES	DBH	NUMBER
SYCAMORE	32"	1
WILLOW	12"	1
WILLOW	14"	1
WILLOW	18"	1
BAY	12"	1
OAK	10"	1
OAK	8"	2
OAK	6"	1

NOTE:
SEE SHEET C13 FOR TREES REMOVED DOWNSTREAM OF STA. 31+50.

LEGEND

- SURVEY CONTROL
- (E) TREE
- (E) TREE TO BE REMOVED
- (E) CONTOURS
- (E) THALWEG ALIGNMENT
- (E) EDGE OF ROAD
- (E) WATER LINE
- LIMITS OF GRAVEL/FINES
- LIMITS OF GRADING (APPROX.)
- FLOODPLAIN ARMOR
- ENGINEERED STREAMBED MATERIAL
- VEGETATED ROCK SLOPE PROTECTION
- ROAD DECOMMISSIONING
- (E) TRACTOR TIRE
- REACH DESIGNATIONS FROM THE "PERMANENTE CREEK LONG-TERM RESTORATION PLAN" (URS, 2011)
- RECLAMATION AREA PLAN BOUNDARY
- REVERSE GRADE DIP
- BOULDER SILL (WITH TOP ELEVATION)
- VEHICLE BARRIER

NOTES:
1. THE PLAN EXTENT OF CONCRETE UNDERLYING THE ROADWAY IS NOT SHOWN. EXTENTS ARE UNKNOWN. REMOVE AND DISPOSE OF ALL CONCRETE UNDERLYING (E) ROADWAY AND ADJACENT AREAS.
2. FINISHED GRADE CONTOURS SHOWN WITHIN POOL DO NOT REPRESENT DETAILS OF POOL GRADING. REFER TO TYPICAL WEIR AND POOL SECTIONS AND PROFILE.
3. CHANNEL GEOMETRY AT THE TRIBUTARY WILL BE FIELD FIT TO ANY BEDROCK EXPOSED DURING EXCAVATION, AS DIRECTED BY THE ENGINEER.
4. SALVAGE TREES WITHIN AREAS TO BE GRADED PER THE TREE REMOVAL NOTES, SHEET C1.

FLOODPLAIN ARMOR NOTES:
SEE THE FLOODPLAIN ARMOR NOTES ON SHEET C11 FOR FLOODPLAIN ARMOR TYPE, THICKNESS AND LOCATION.

ROAD DECOMMISSIONING NOTES:
1. SCARIFY SUBGRADE 12 INCHES AND RECOMPACT TO 85%.
2. INSTALL REVERSE GRADE DIPS, FIBER ROLLS (PER THE EROSION CONTROL PLANS), AND APPLY SEED (PER THE REVEGETATION PLANS).

CHANNEL WIDENING (4 OF 6) AND SEDIMENT REMOVAL AREA PLAN
SCALE: 1" = 20'

WATERWAYS CONSULTING INC.
509A SWIFT ST.
SANTA CRUZ, CA 95060
PH:(831)421-9291 // FAX:(888)819-6847
WWW.WATWAYS.COM

PRELIMINARY
NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT GROUP

CHANNEL WIDENING PLAN (4 OF 6) AND SEDIMENT REMOVAL AREA

PERMANENTE CREEK RESTORATION PLAN

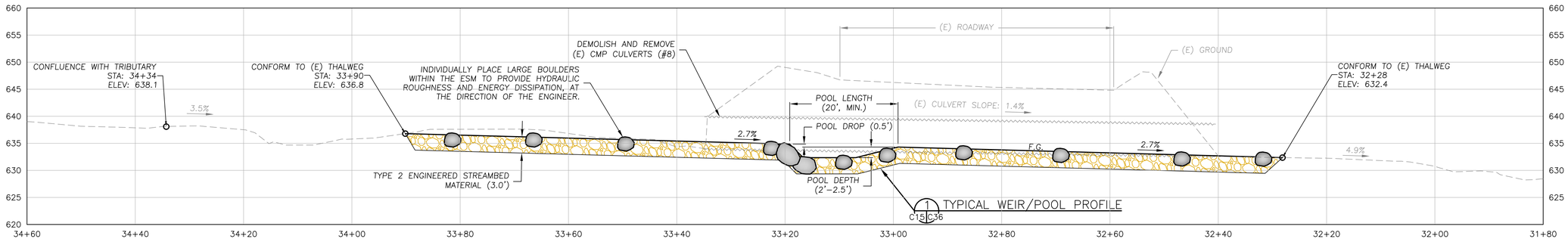
UPDATED 90% DESIGN

SANTA CLARA COUNTY
CEQA REVIEW SUBMITTAL

DESIGNED BY:	B.Z.
DRAWN BY:	B.M.S.
CHECKED BY:	M.W.W.
DATE:	8/26/22
JOB NO.:	13-016

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

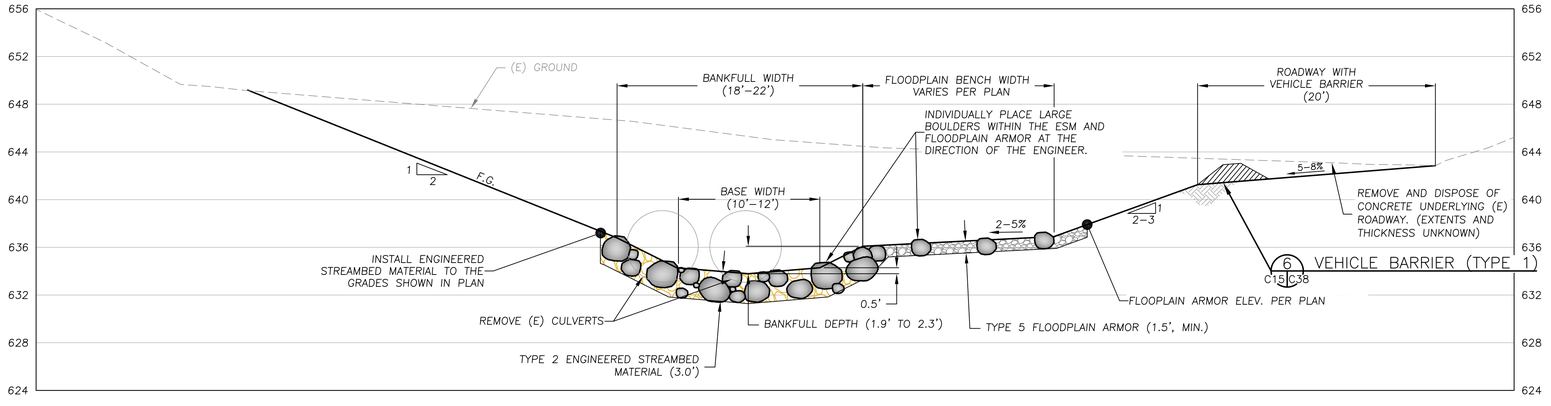
C14



CULVERT #8 CHANNEL PROFILE

SCALE: 1" = 10'

1 C14 C15



TYPICAL SECTION AT CULVERT #8 SECTION

SCALE: 1" = 6'

B C14 C15

WATERWAYS CONSULTING INC.
509A SWIFT ST.
SANTA CRUZ, CA 95060
PH:(831)421-9291 // FAX:(888)819-6847
WWW.WATWAYS.COM

PRELIMINARY

NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT
GROUP

CULVERT #8
PROFILE AND
SECTION

PERMANENTE CREEK
RESTORATION PLAN

UPDATED 90% DESIGN

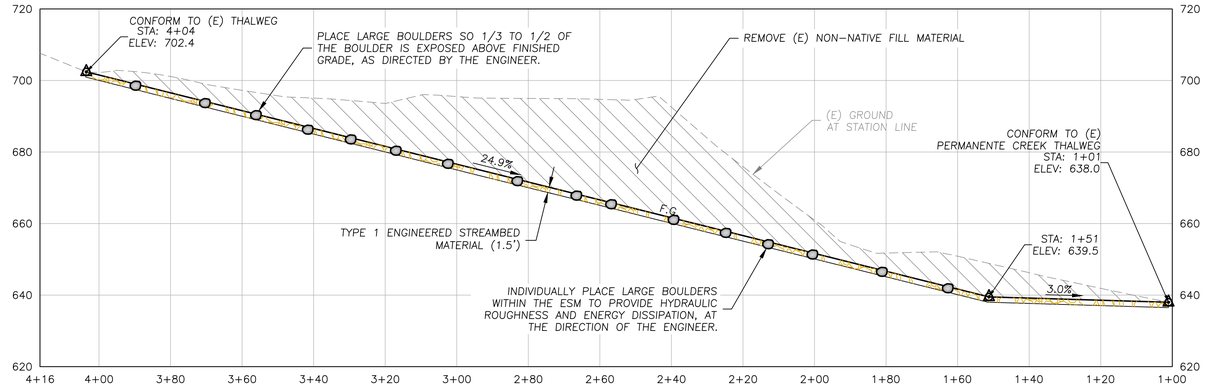
SANTA CLARA COUNTY
CEQA REVIEW SUBMITTAL

DESIGNED BY:	B.M.Z.
DRAWN BY:	B.M.S.
CHECKED BY:	M.W.W.
DATE:	8/26/22
JOB NO.:	13-016

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS

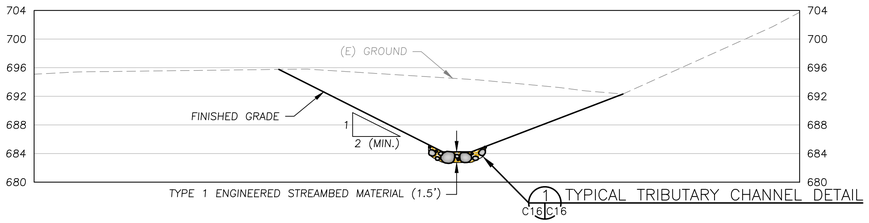
0 1"

C15



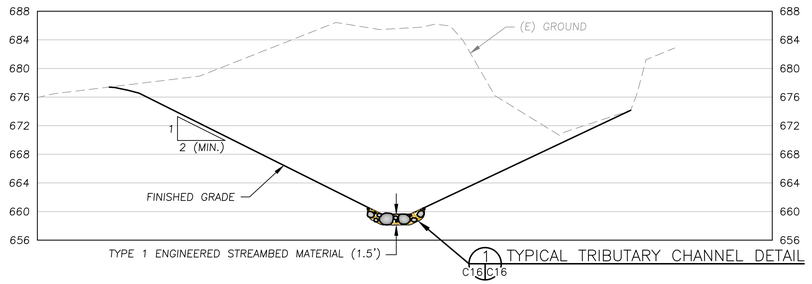
TRIBUTARY PROFILE (2) C14|C16
SCALE: 1" = 20'

NOTE:
1. FINISHED GRADES SHOWN ARE APPROXIMATE. ALL IMPORTED FILL SHALL BE REMOVED FROM THE CHANNEL BED AND BANKS.
2. CHANNEL GEOMETRY AT THE TRIBUTARY WILL BE FIELD FIT TO ANY BEDROCK EXPOSED DURING EXCAVATION, AS DIRECTED BY THE ENGINEER.
3. CONFORM ENGINEERED STREAMBED MATERIAL TO THE EXISTING CHANNEL AT THE UPSTREAM AND DOWNSTREAM END AS DIRECTED BY THE ENGINEER.



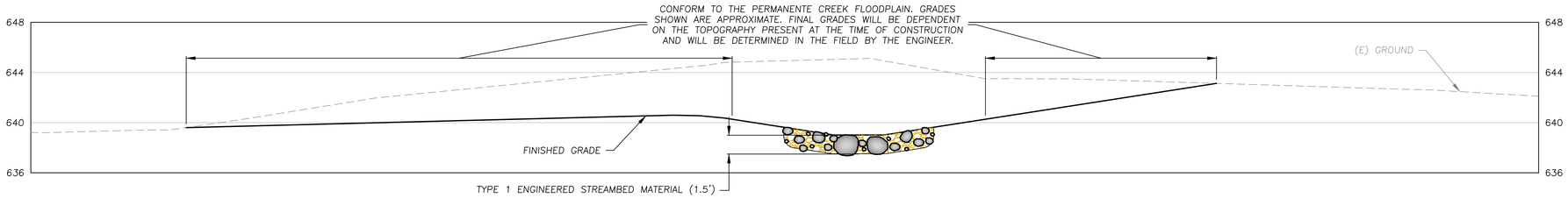
1 TYPICAL TRIBUTARY CHANNEL DETAIL C15|C16

SECTION (D) C14|C16
SCALE: 1" = 10'

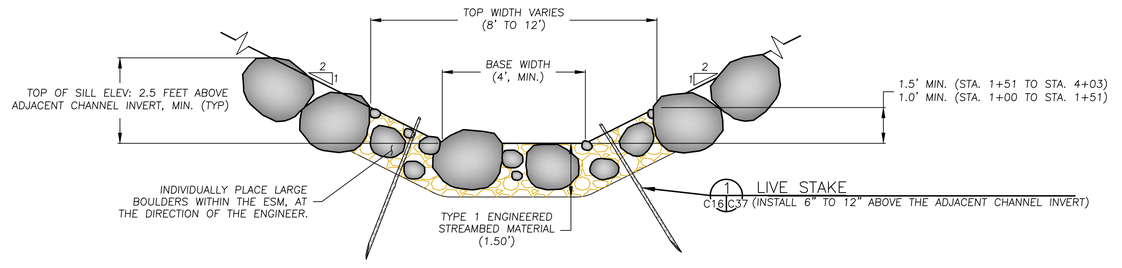


1 TYPICAL TRIBUTARY CHANNEL DETAIL C15|C16

SECTION (E) C14|C16
SCALE: 1" = 10'



SECTION (F) C14|C16
SCALE: 1" = 5'



TYPICAL TRIBUTARY CHANNEL DETAIL (1) C16|C16
SCALE: 1" = 2'

WATERWAYS CONSULTING INC.
509A SWIFT ST.
SANTA CRUZ, CA 95060
PH:(831)421-9291 // FAX:(888)819-6847
WWW.WATWAYS.COM

PRELIMINARY
NOT FOR CONSTRUCTION

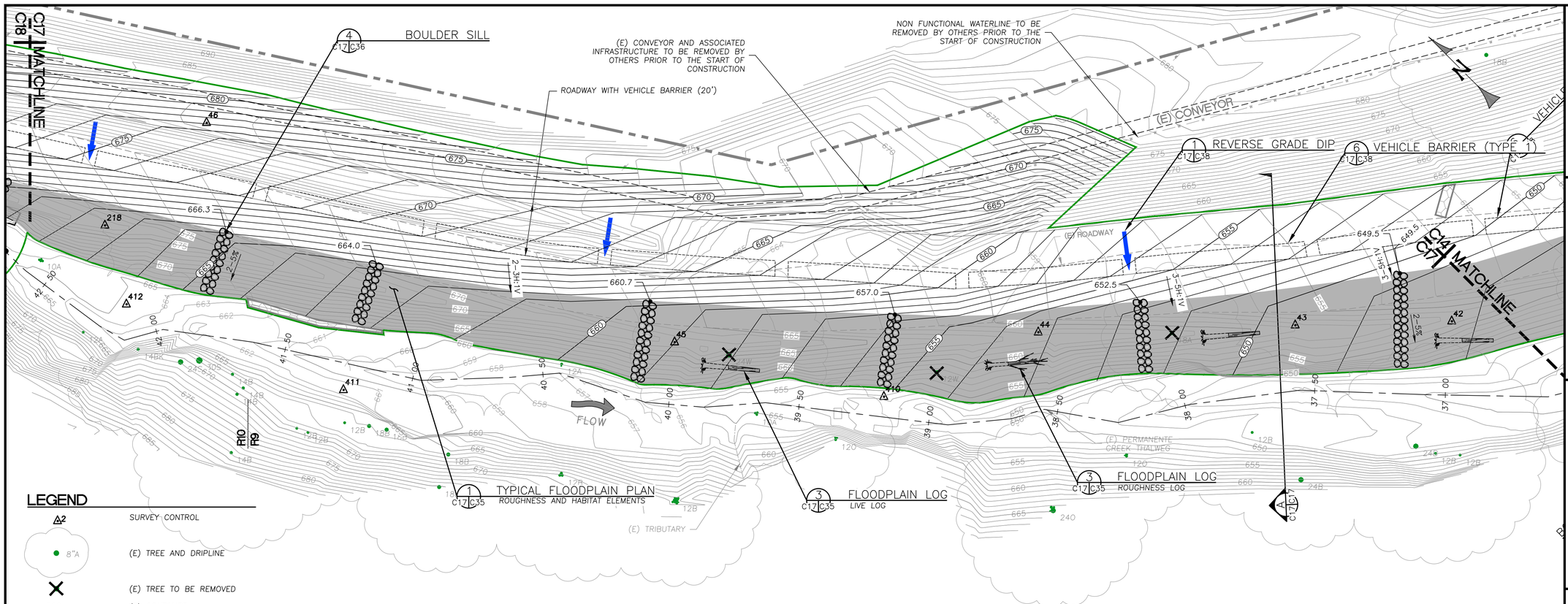
PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT GROUP

SEDIMENT REMOVAL AREA PROFILE AND SECTIONS

PERMANENTE CREEK RESTORATION PLAN
UPDATED 90% DESIGN
SANTA CLARA COUNTY CEQA REVIEW SUBMITTAL

DESIGNED BY:	B.Z.
DRAWN BY:	B.S.
CHECKED BY:	M.W.W.
DATE:	8/26/22
JOB NO.:	13-016

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"



LEGEND

- SURVEY CONTROL
- (E) TREE AND DRIPLINE
- (E) TREE TO BE REMOVED
- (E) CONTOURS
- PROPOSED CONTOURS
- (E) THALWEG ALIGNMENT
- (E) EDGE OF ROAD
- (E) WATER LINE
- (E) STORM DRAIN LINE
- (E) EXPOSED ROCK SLOPE PROTECTION
- LIMITS OF GRADING (APPROX.)
- FLOODPLAIN ARMOR
- ENGINEERED STREAMBED MATERIAL
- REACH DESIGNATIONS FROM THE "PERMANENTE CREEK LONG-TERM RESTORATION PLAN" (URS, 2011)
- RECLAMATION AREA PLAN BOUNDARY
- REVERSE GRADE DIP
- BOULDER SILL (WITH TOP ELEVATION)
- VEHICLE BARRIER

TREE REMOVAL SUMMARY

TREE SPECIES	DBH	NUMBER
ALDER	18"	1
WILLOW	12"	1
WILLOW	24"	1

CHANNEL WIDENING PLAN

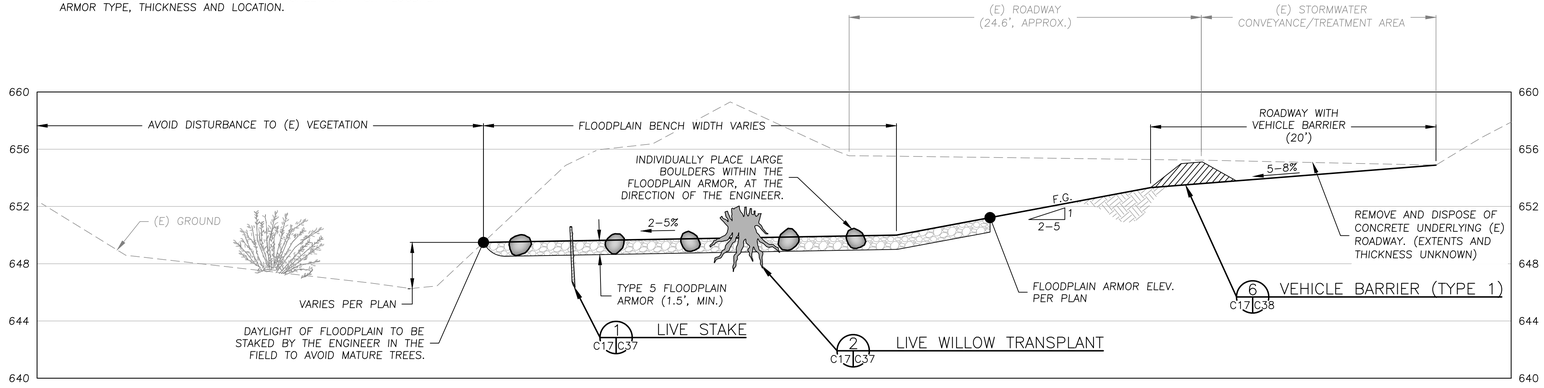
SCALE: 1" = 20'

NOTES:

1. THE PLAN EXTENT OF CONCRETE UNDERLYING THE ROADWAY IS NOT SHOWN. EXTENTS ARE UNKNOWN. REMOVE AND DISPOSE OF ALL CONCRETE UNDERLYING (E) ROADWAY AND ADJACENT AREAS.
2. SALVAGE TREES WITHIN AREAS TO BE GRADED PER THE TREE REMOVAL NOTES, SHEET C1.

FLOODPLAIN ARMOR NOTES:

SEE THE FLOODPLAIN ARMOR NOTES ON SHEET C11 FOR FLOODPLAIN ARMOR TYPE, THICKNESS AND LOCATION.



TYPICAL SECTION

SCALE: 1" = 5'

A C17|C17

NOTES:

SEE REVEGETATION SHEETS (L1-L5) FOR DETAILS REGARDING SPACING OF LIVE STAKES AND WILLOW TRANSPLANTS.

WATERWAYS CONSULTING INC.
509A SWIFT ST.
SANTA CRUZ, CA 95060
PH:(831)421-9291 // FAX:(888)819-6847
WWW.WATWAYS.COM

PRELIMINARY

NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:

LEHIGH HANSON HEIDELBERG CEMENT GROUP

CHANNEL WIDENING PLAN (5 OF 6)

PERMANENTE CREEK RESTORATION PLAN

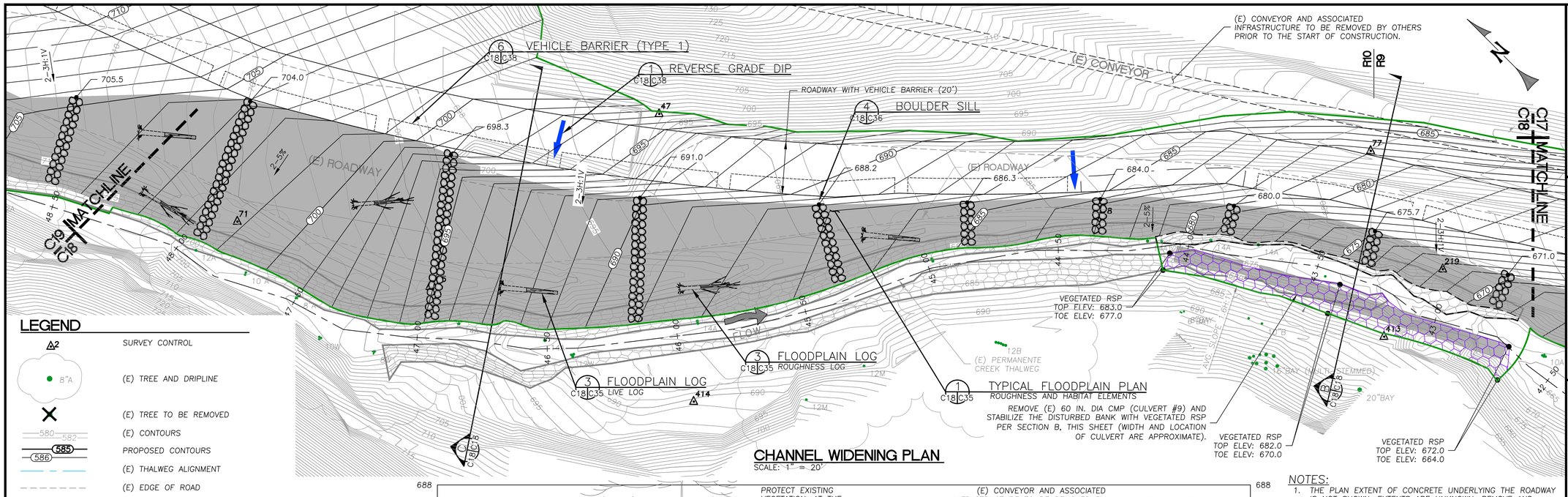
UPDATED 90% DESIGN

SANTA CLARA COUNTY CEQA REVIEW SUBMITTAL

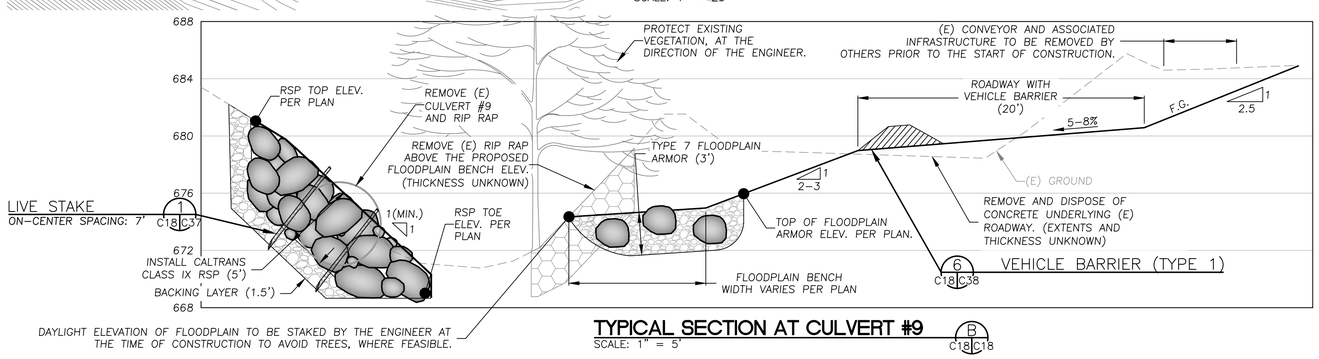
DESIGNED BY:	B.Z.
DRAWN BY:	B.M.S.
CHECKED BY:	M.W.W.
DATE:	8/26/22
JOB NO.:	13-016

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS

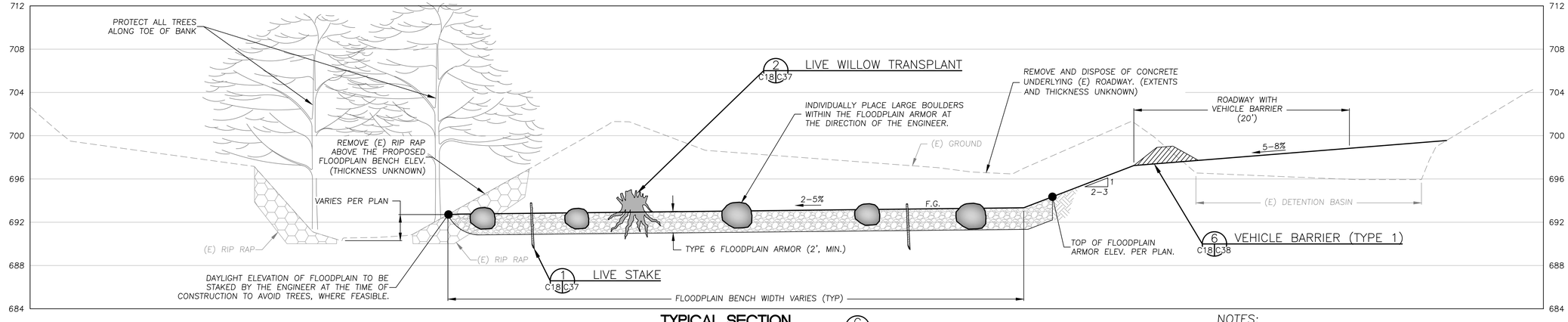
0 1"



CHANNEL WIDENING PLAN
SCALE: 1" = 20'



TYPICAL SECTION AT CULVERT #9
SCALE: 1" = 5'
B C18|C18



TYPICAL SECTION
SCALE: 1" = 5'
C C18|C18

LEGEND

- SURVEY CONTROL (A2)
- (E) TREE AND DRIPLINE (8"A)
- (E) TREE TO BE REMOVED
- (E) CONTOURS (580, 582)
- PROPOSED CONTOURS (585, 586)
- (E) THALWEG ALIGNMENT
- (E) EDGE OF ROAD
- (E) WATER LINE (W)
- (E) STORM DRAIN LINE (SD)
- (E) EXPOSED ROCK SLOPE PROTECTION
- LIMITS OF GRADING (APPROX.)
- FLOODPLAIN ARMOR
- ENGINEERED STREAMBED MATERIAL
- VEGETATED ROCK SLOPE PROTECTION
- ROAD DECOMMISSIONING AREA
- REACH DESIGNATIONS FROM THE "PERMANENTE CREEK LONG-TERM RESTORATION PLAN" (URS, 2011) (R9, R8)
- REVERSE GRADE DIP
- BOULDER SILL (WITH TOP ELEVATION) (577.5)
- VEHICLE BARRIER

NOTES:
1. THE PLAN EXTENT OF CONCRETE UNDERLYING THE ROADWAY IS NOT SHOWN. EXTENTS ARE UNKNOWN. REMOVE AND DISPOSE OF ALL CONCRETE UNDERLYING (E) ROADWAY AND ADJACENT AREAS.
2. SALVAGE TREES WITHIN AREAS TO BE GRADED PER THE TREE REMOVAL NOTES, SHEET C1.

VEGETATED RSP NOTES:
1. THE PROPOSED EXTENT AND TOP AND TOE ELEVATIONS OF THE VEGETATED RSP ARE APPROXIMATE. THE FINAL GEOMETRY WILL BE DETERMINED AT THE TIME OF CONSTRUCTION AND WILL BE BASED ON THE AREA OF BANK DISTURBED FOR THE REMOVAL OF CULVERT #9.

FLOODPLAIN ARMOR NOTES:
SEE THE FLOODPLAIN ARMOR NOTES ON SHEET C11 FOR FLOODPLAIN ARMOR TYPE, THICKNESS AND LOCATION.

TREE REMOVAL SUMMARY

TREE SPECIES	DBH	NUMBER
NONE	N/A	N/A

NOTES:
SEE REVEGETATION SHEETS (L1-L5) FOR DETAILS REGARDING SPACING OF LIVE STAKES AND WILLOW TRANSPLANTS.

WATERWAYS CONSULTING INC.
509A SWIFT ST.
SANTA CRUZ, CA 95060
PH:(831)421-9291 // FAX:(888)819-6847
WWW.WATWAYS.COM

PRELIMINARY
NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT GROUP

CHANNEL WIDENING PLAN (6 OF 6)

PERMANENTE CREEK RESTORATION PLAN
UPDATED 90% DESIGN
SANTA CLARA COUNTY CEQA REVIEW SUBMITTAL

DESIGNED BY:	B.Z.
DRAWN BY:	B.M.S.
CHECKED BY:	M.W.W.
DATE:	8/26/22
JOB NO.:	13-016

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

KEY NOTES:

1. THE GRADING PLAN REFLECTS THE LOWER LIMIT OF POTENTIAL DESIGN CHANNEL INVERT. REFER TO THE FIELD ENGINEERING NOTES ON SHEET C40 FOR A DESCRIPTION OF PROPOSED METHODOLOGY FOR "FIELD-FITTING" THE DESIGN PROFILE TO ACCOMMODATE UNKNOWN SUBSURFACE CONDITIONS.
2. POOL AND STEP GEOMETRY AND LOCATIONS ARE NOT SHOWN ON THE GRADING PLAN OR DESIGN PROFILE DUE TO UNKNOWN SUBSURFACE CONDITIONS. POOL AND STEP GEOMETRY AND LOCATIONS WILL BE DETERMINED AT THE TIME OF CONSTRUCTION BY THE ENGINEER TO CONFORM TO SUBSURFACE CONDITIONS, PER THE CASCADE AND STEP-POOL DETAILS ON SHEET C34.
3. THE PROJECT GEOTECHNICAL ENGINEER OR PROJECT GEOLOGIST MUST INSPECT THE SLOPE EXPOSED BELOW THE ROCK PILE, FOLLOWING THE REMOVAL OF THE ROCK PILE, TO EVALUATE THE NATURE AND STABILITY OF THE EXPOSED MATERIAL AND PREPARE RECOMMENDATIONS FOR STABILIZING THE SLOPE. FINAL SLOPE GEOMETRY WILL BE ADJUSTED, AS NECESSARY, PER THE GEOTECHNICAL ENGINEER'S OR PROJECT GEOLOGIST'S RECOMMENDATIONS ONCE THE ROCK PILE IS REMOVED. BENCHING OF THE SLOPE MAY BE REQUIRED.

UPPER LIMITS OF GRADING ALONG THE PROJECT AREA ARE APPROXIMATE

LIMITS OF (E) ROCK PILE (MAY 2022, APPROX.)

(E) ROCK PILE AND INTAKE TO CONVEYOR SYSTEM TO BE REMOVED BY LEHIGH PRIOR TO CONSTRUCTION. (PILE LIMITS AND INTAKE LOCATIONS SHOWN ARE APPROXIMATE.)

MAINTAIN (E) PARKING AREA

RETAIN POND 13B

24-INCH DIA. CMP
INV. IN: NOT SURVEYED
INV. OUT: 805.5
(CONFORM PIPE OUTLET TO THE FINISHED GRADE CONDITION AS DIRECTED BY THE ENGINEER)

BOULDER SILL 4 C19|C36

(N) ROAD

(E) ROAD

POND 13

FLOW

REMOVE 11.5' DIA. HALF CMP (CULVERT #11) AND ASSOCIATED CONCRETE HEADWALL AND DROP INLET.

REMOVE (E) DAM INCLUDING ALL CONCRETE AND STEEL COMPONENTS AND IMPOUNDED FINE SEDIMENT WITHIN THE POND. INSTALL BOULDER GRADE CONTROL PER TYPICAL SECTION AT WEIR, SHT. C36, IF THE UPPER LIMIT OF POTENTIAL DESIGN CHANNEL INVERT IS CONSTRUCTED

REMOVE 96" DIA. CMP (CULVERT #10). (EXISTING ALIGNMENT ESTIMATED)

REMOVE (E) RSP. THE EXTENT OF RSP REMOVAL WILL BE DETERMINED BY THE ENGINEER AT THE TIME OF CONSTRUCTION TO ENSURE A SMOOTH TRANSITION TO THE EXISTING CHANNEL

FLOODPLAIN LOG 3 C12|C35
ROUGHNESS LOG

TYPICAL FLOODPLAIN PLAN 4 C19|C35
ROUGHNESS AND HABITAT ELEMENTS

TYPICAL STEP-POOL AND CASCADE DETAILS 1 C19|C35

1 REVERSE GRADE DIP C19|C38

7 VEHICLE BARRIER (TYPE 2) C19|C38

(E) CONVEYOR, ASSOCIATED INFRASTRUCTURE, AND UTILITIES TO BE REMOVED BY LEHIGH PRIOR TO CONSTRUCTION.

6 VEHICLE BARRIER (TYPE 1) C19|C38

TRANSITION FROM 18' TO 20' ROADWAY WIDTH OVER 10 LF

C19 MATCHLINE C18

LEGEND

- (E) CONTOURS
- (N) CONTOURS
- (E) CONTOURS ESTIMATED BELOW ROCK PILE
- (E) TREE
- (E) TREE TO BE REMOVED
- (E) CULVERT
- (E) ROADWAY
- (E) THALWEG
- PROPOSED THALWEG
- LIMITS OF GRADING (APPROX.)
- FLOODPLAIN ARMOR
- ENGINEERED STREAMBED MATERIAL
- BOULDER SILL (WITH TOP ELEVATION, BOTH SIDES)
- SURVEY CONTROL POINT
- REVERSE GRADE DIP
- VEHICLE BARRIER

TREE REMOVAL SUMMARY

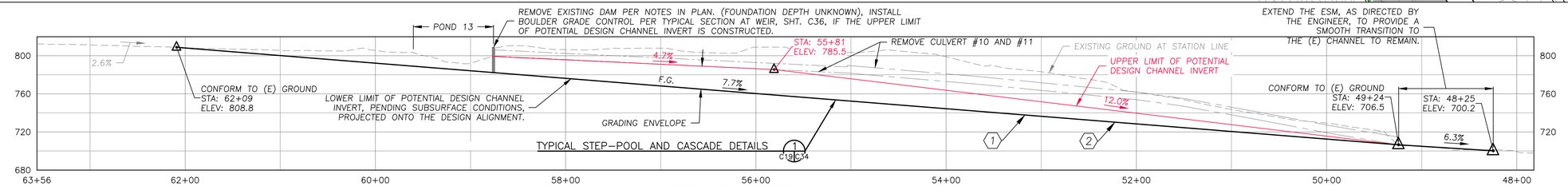
TREE SPECIES	DBH	NUMBER
ALDER	10"	1
ALDER	12"	1
MAPLE	12"	1

NOTES (CONTINUED):

4. CONSTRUCT AN OPEN CHANNEL THROUGH POND 13 MEETING THE DIMENSIONS SHOWN ON THE TYPICAL CHANNEL TREATMENT SECTION, SHEET C20, IF THE UPPER LIMIT OF POTENTIAL DESIGN CHANNEL INVERT IS FOLLOWED. THE CONSTRUCTED CHANNEL INVERT ELEVATION WILL BE DETERMINED BY THE ENGINEER AT THE TIME OF CONSTRUCTION BASED ON DOWNSTREAM BEDROCK ELEVATIONS, IN CONFORMANCE WITH THE FIELD ENGINEERING NOTES SHOWN ON SHEET C40.
5. INSTALL ENGINEERED STREAMBED MATERIAL AND FLOODPLAIN ARMOR PER THE TYPICAL CHANNEL TREATMENT SECTION, SHEET C20, EXCEPT AT LOCATIONS WHERE BEDROCK IS EXPOSED DURING CONSTRUCTION.
6. THE PLAN EXTENT OF CONCRETE UNDERLYING THE ROADWAY IS NOT SHOWN. EXTENTS ARE UNKNOWN. REMOVE AND DISPOSE OF ALL CONCRETE UNDERLYING (E) ROADWAY AND ADJACENT AREAS.
7. SALVAGE TREES WITHIN AREAS TO BE GRADED PER THE TREE REMOVAL NOTES, SHEET C1.

ROCK PILE AREA PLAN

SCALE: 1" = 50'



CHANNEL PROFILE

SCALE: 1" = 60'

WATERWAYS CONSULTING INC.
509A SWIFT ST.
SANTA CRUZ, CA 95060
PH:(831)421-9291 // FAX:(888)819-6847
WWW.WATWAYS.COM

PRELIMINARY

NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:

LEHIGH HANSON
HEIDELBERG CEMENT GROUP

ROCK PILE AREA PLAN

PERMANENTE CREEK RESTORATION PLAN

UPDATED 90% DESIGN

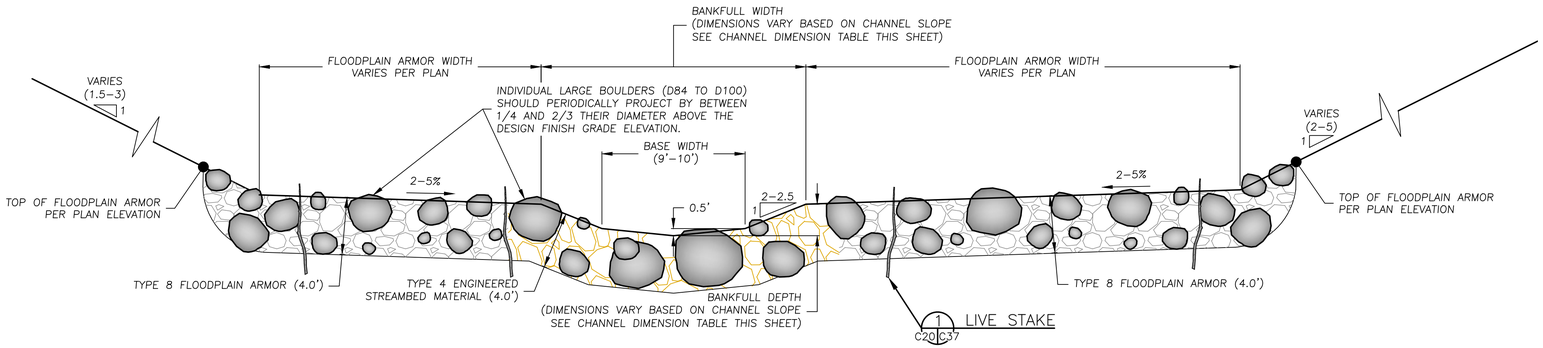
SANTA CLARA COUNTY CEQA REVIEW SUBMITTAL

DESIGNED BY:	B.M.Z.
DRAWN BY:	B.R.S
CHECKED BY:	M.W.W.
DATE:	8/26/22
JOB NO.:	13-016

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS

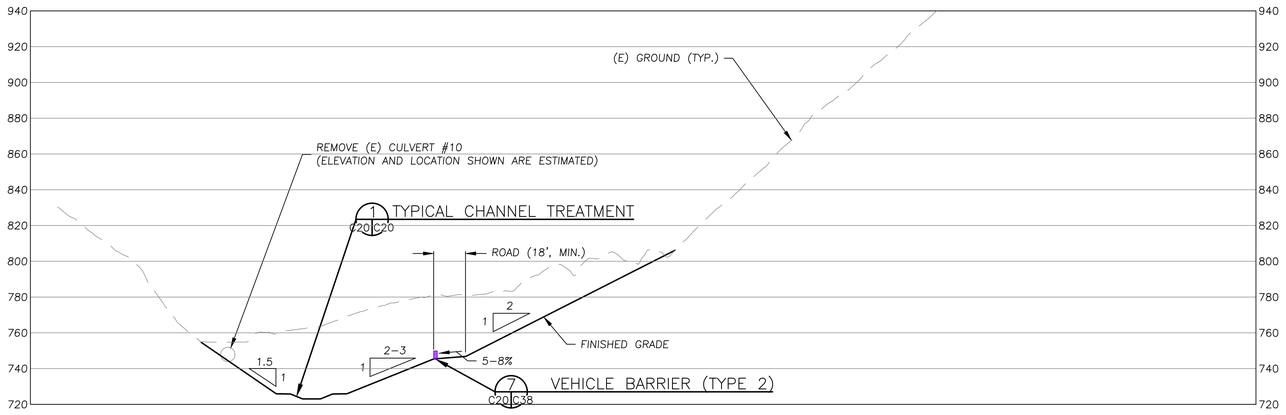
0 1"

CHANNEL DIMENSIONS FOR ROCKPILE AREA		
DESIGN SLOPE (%)	DESIGN DIMENSIONS	
	BANKFULL WIDTH	BANKFULL DEPTH
<4%	17.5'–21.5'	1.8'–2.2'
4%–8%	16.0'–20.0'	2.0'–2.4'
>8%	15.5'–18.5'	2.4'–2.8'

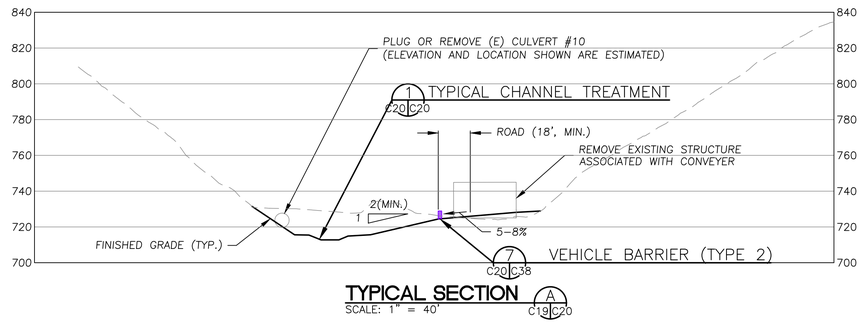


TYPICAL CHANNEL TREATMENT DETAIL
SCALE: 1" = 5'
C20,C21 1 C20

NOTES:
1. INSTALL TYPE 8 FLOODPLAIN ARMOR FROM STA. 48+75 TO 62+09.
2. INSTALL TYPE 4 ENGINEERED STREAMBED MATERIAL FROM STA 49+15 (APPROX.) TO 62+09.
3. SEE THE TYPICAL FLOODPLAIN ROUGHNESS AND HABITAT PLAN, SHEET C35 FOR INFORMATION REGARDING FEATURES NOT SHOWN ON THE TYPICAL TREATMENT DETAIL.



TYPICAL SECTION
SCALE: 1" = 40'
B C19 C20



TYPICAL SECTION
SCALE: 1" = 40'
A C19 C20

NOTES:
1. FINISHED GRADE SHOWN REPRESENTS THE LOWER LIMIT OF POTENTIAL DESIGN CHANNEL INVERT.
2. LEAVE 4'–5' WIDE OPENINGS IN K–RAIL EVERY 50–60 FEET TO ALLOW FOR UNOBSTRUCTED DRAINAGE FROM ROADWAY.
3. BACKFILL AREAS WHERE CULVERT REMOVAL OCCURS BELOW FINISHED GRADE BY PLACING TYPE 1 ENGINEERED STREAMBED MATERIAL, AS DIRECTED BY THE ENGINEER.

LEGEND
- EXISTING GROUND AT TIME OF SURVEY
- ESTIMATED EXISTING GROUND BELOW ROCK PILE
- FINISH GRADE

WATERWAYS CONSULTING INC.
509A SWIFT ST.
SANTA CRUZ, CA 95060
PH:(831)421-9291 // FAX:(888)819-6847
WWW.WATWAYS.COM

PRELIMINARY
NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT
GROUP

ROCK PILE AREA SECTIONS (1 OF 2)

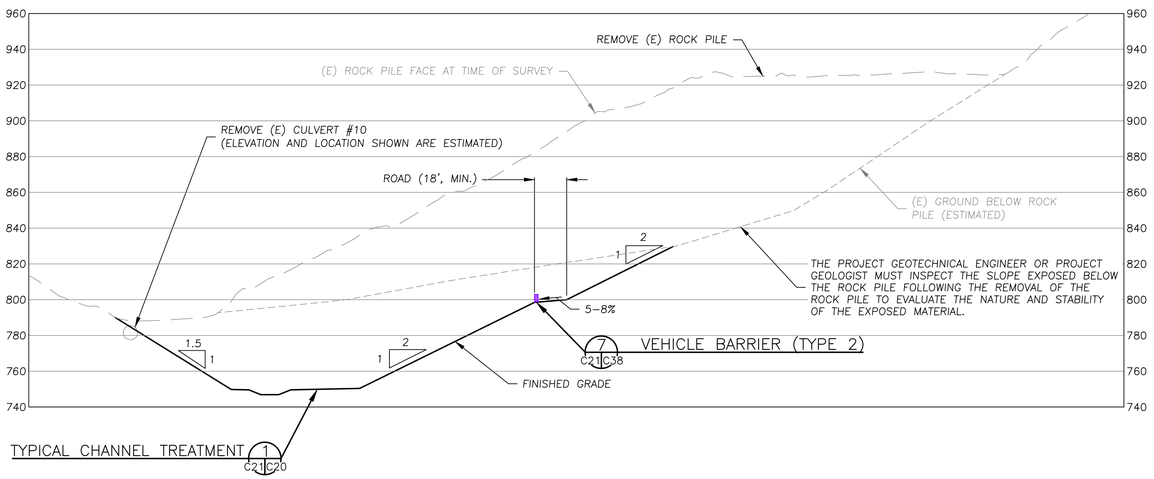
PERMANENTE CREEK
RESTORATION PLAN

UPDATED 90% DESIGN

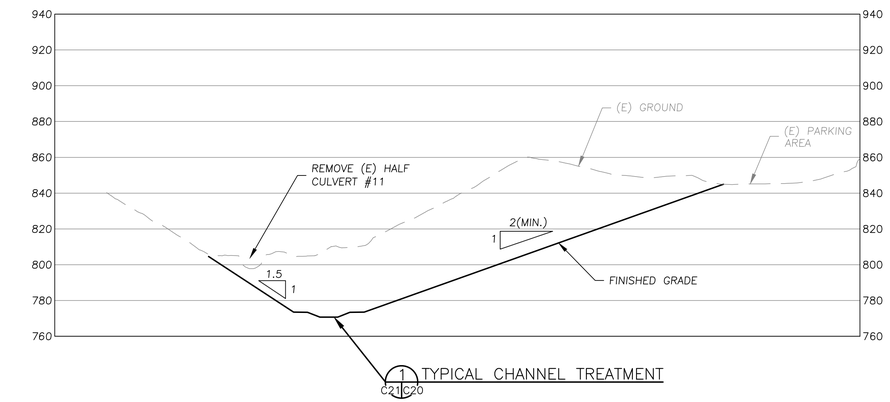
SANTA CLARA COUNTY
CEQA REVIEW SUBMITTAL

DESIGNED BY:	B.M.Z.
DRAWN BY:	B.R.S.
CHECKED BY:	M.W.W.
DATE:	8/26/22
JOB NO.:	13–016

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

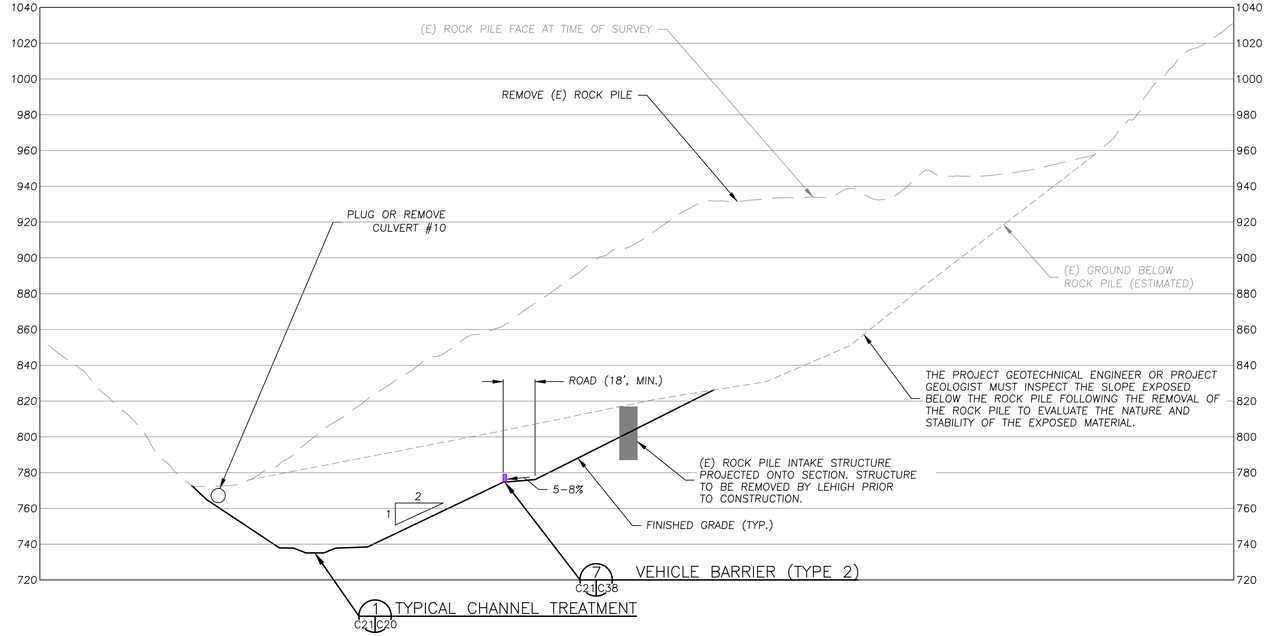


TYPICAL SECTION
SCALE: 1" = 40'
D
C19 C21



TYPICAL SECTION
SCALE: 1" = 40'
E
C19 C21

NOTE:
THE PROJECT GEOTECHNICAL ENGINEER OR PROJECT GEOLOGIST MUST INSPECT THE SLOPE EXPOSED BELOW THE ROCK PILE FOLLOWING THE REMOVAL OF THE ROCK PILE TO EVALUATE THE NATURE AND STABILITY OF THE EXPOSED MATERIAL.



TYPICAL SECTION
SCALE: 1" = 40'
C
C19 C21

LEGEND

- EXISTING GROUND AT TIME OF SURVEY
- ESTIMATED EXISTING GROUND BELOW ROCK PILE
- FINISH GRADE

NOTES:
1. FINISHED GRADE SHOWN REPRESENTS THE LOWER LIMIT OF POTENTIAL DESIGN CHANNEL INVERT.
2. LEAVE 4'-5' WIDE OPENINGS IN K-RAIL EVERY 50-60 FEET TO ALLOW FOR UNOBSTRUCTED DRAINAGE FROM ROADWAY.
3. BACKFILL AREAS WHERE CULVERT REMOVAL OCCURS BELOW FINISHED GRADE BY PLACING TYPE 1 ENGINEERED STREAMBED MATERIAL, AS DIRECTED BY THE ENGINEER.

WATERWAYS CONSULTING INC.
509A SWIFT ST.
SANTA CRUZ, CA 95060
PH:(831)421-9291 // FAX:(888)819-6847
WWW.WATWAYS.COM

PRELIMINARY
NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT GROUP

ROCK PILE AREA SECTIONS (2 OF 2)

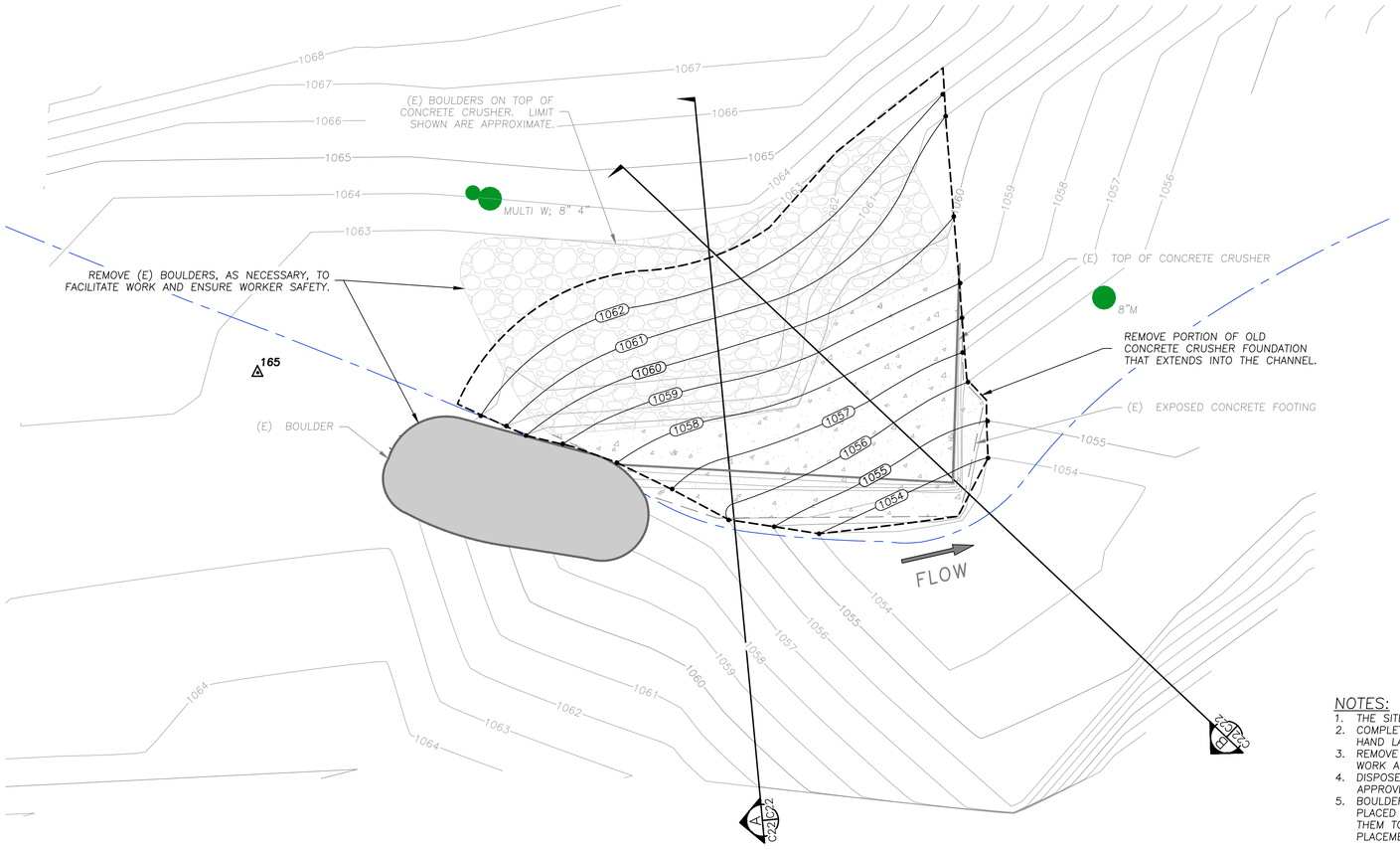
PERMANENTE CREEK RESTORATION PLAN
UPDATED 90% DESIGN
SANTA CLARA COUNTY CEQA REVIEW SUBMITTAL

DESIGNED BY:	B.M.Z.
DRAWN BY:	B.R.S.
CHECKED BY:	M.W.W.
DATE:	8/26/22
JOB NO.:	13-016

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

C21

21 OF 47



N

LEGEND

- EXISTING CONTOURS (85 — 86)
- PROPOSED CONTOURS (100, 101)
- EXISTING FLOW LINE
- SURVEY CONTROL POINT (2)
- EXISTING TREE (12"A)

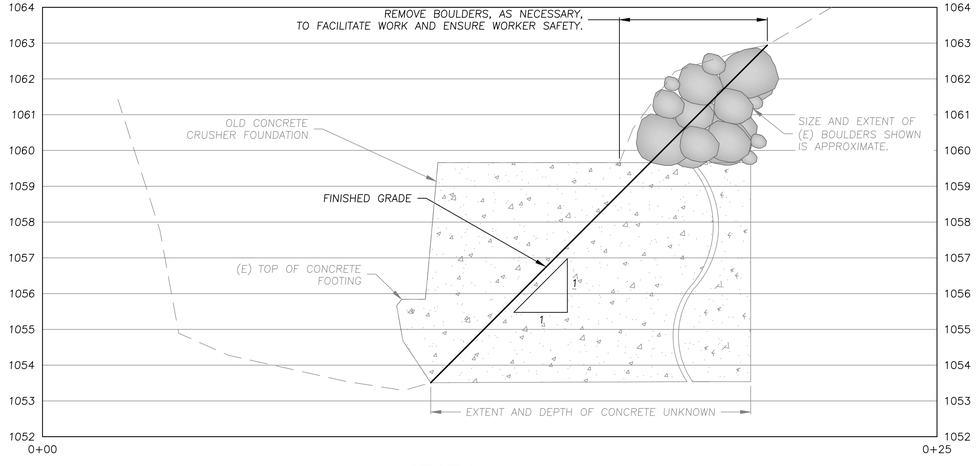
NOTES:

1. THE SITE IS NOT ACCESSIBLE TO VEHICLES.
2. COMPLETE WORK USING SMALL HAND-OPERATED EQUIPMENT AND HAND LABOR.
3. REMOVE BOULDERS AND DEBRIS, AS NECESSARY, TO FACILITATE WORK AND ENSURE WORKER SAFETY.
4. DISPOSE OF ALL REMOVED CONCRETE AND DEBRIS AT AN APPROVED, OFFSITE LOCATION.
5. BOULDERS REMOVED TO FACILITATE CONSTRUCTION MAY BE PLACED ON THE SLOPE IN A MANNER THAT WILL NOT ALLOW THEM TO ENTER THE CREEK. THE LOCATION FOR BOULDER PLACEMENT WILL BE FLAGGED IN THE FIELD BY THE ENGINEER.

OLD CRUSHER FOUNDATION SITE PLAN

SCALE: 1" = 2'

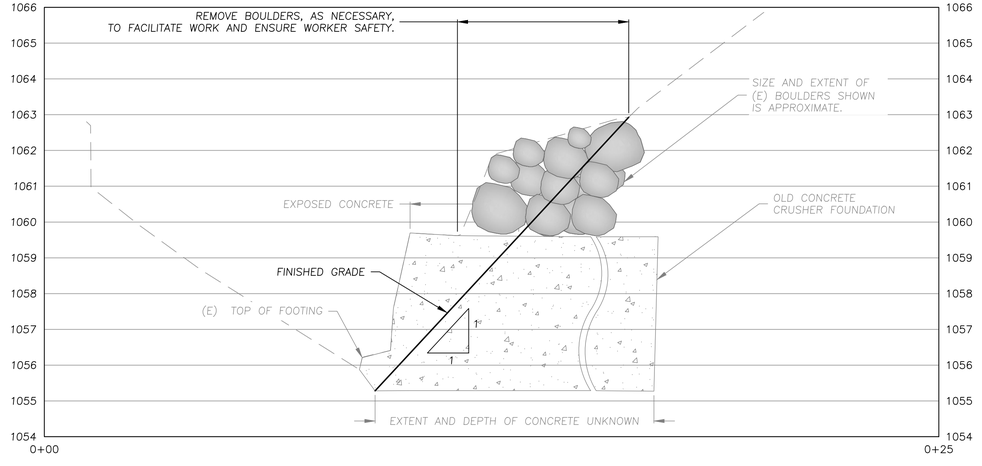
1 C23 C22



SECTION

SCALE: 1" = 2'

B C22 C22



SECTION

SCALE: 1" = 2'

A C22 C22

WATERWAYS CONSULTING INC.
509A SWIFT ST.
SANTA CRUZ, CA 95060
PH:(831)421-9291 // FAX:(888)819-6847
WWW.WATWAYS.COM

PRELIMINARY

NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT GROUP

OLD CRUSHER FOUNDATION SITE PLAN

PERMANENTE CREEK RESTORATION PLAN

UPDATED 90% DESIGN

SANTA CLARA COUNTY
CEQA REVIEW SUBMITTAL

DESIGNED BY:	–
DRAWN BY:	C.B.H.
CHECKED BY:	M.W.
DATE:	8/26/22
JOB NO.:	13-016

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS

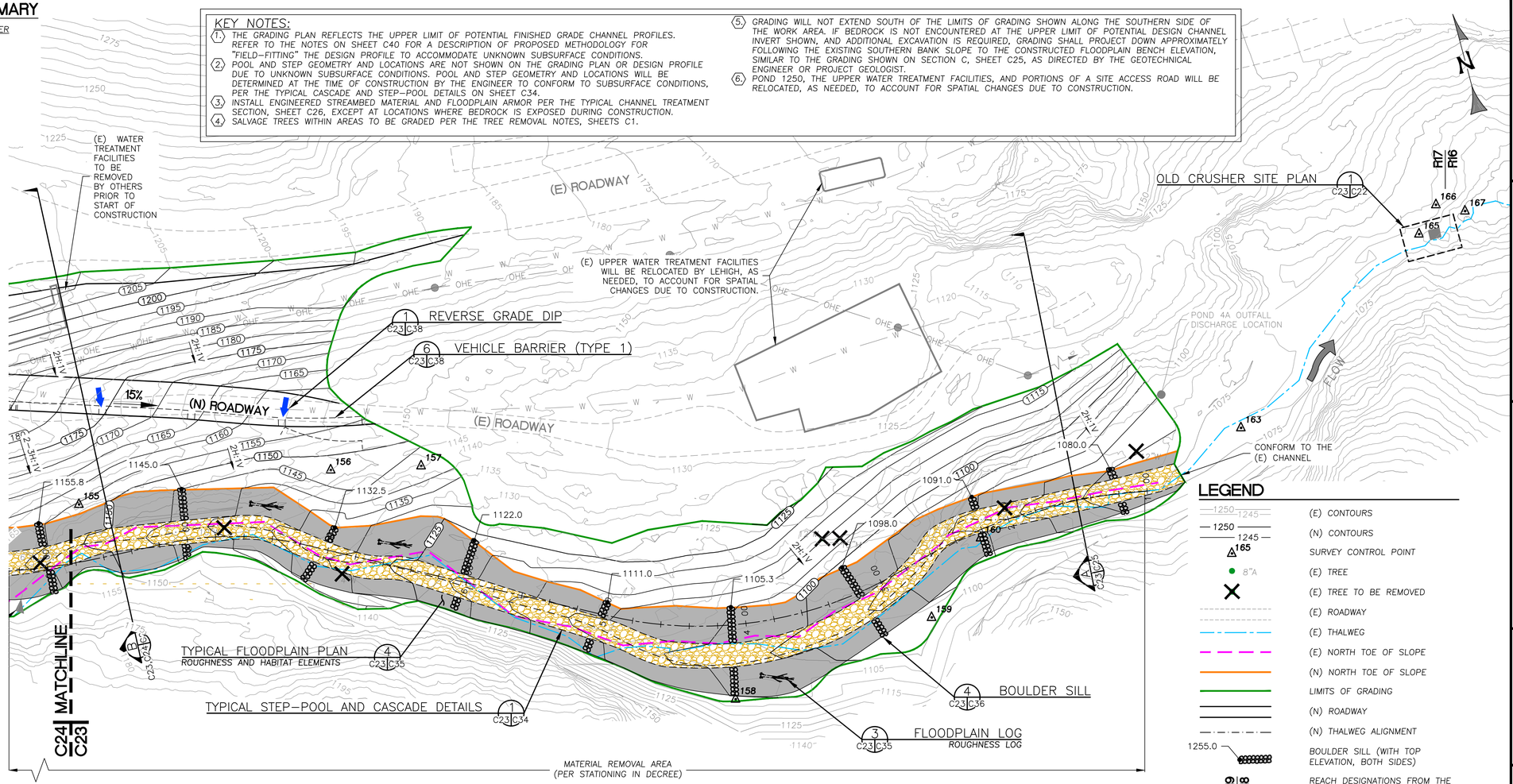
0 1"

TREE REMOVAL SUMMARY

TREE SPECIES	DBH	NUMBER
MADRONE	12"	1
MADRONE	18"	1
WILLOW	4"	1
WILLOW	6"	2
WILLOW	10"	1
WILLOW	12"	1

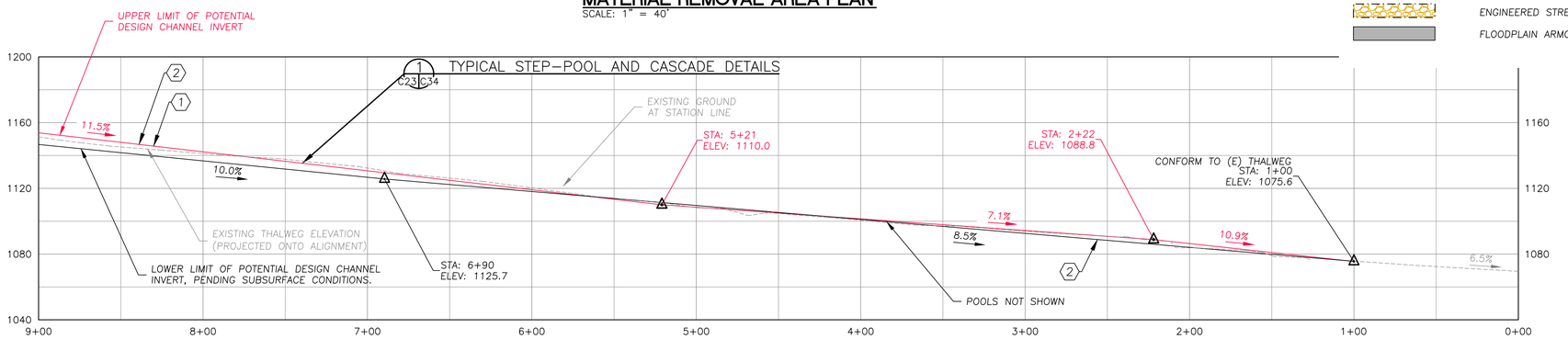
KEY NOTES:

1. THE GRADING PLAN REFLECTS THE UPPER LIMIT OF POTENTIAL FINISHED GRADE CHANNEL PROFILES. REFER TO THE NOTES ON SHEET C40 FOR A DESCRIPTION OF PROPOSED METHODOLOGY FOR "FIELD–FITTING" THE DESIGN PROFILE TO ACCOMMODATE UNKNOWN SUBSURFACE CONDITIONS.
2. POOL AND STEP GEOMETRY AND LOCATIONS ARE NOT SHOWN ON THE GRADING PLAN OR DESIGN PROFILE DUE TO UNKNOWN SUBSURFACE CONDITIONS. POOL AND STEP GEOMETRY AND LOCATIONS WILL BE DETERMINED AT THE TIME OF CONSTRUCTION BY THE ENGINEER TO CONFORM TO SUBSURFACE CONDITIONS, PER THE TYPICAL CASCADE AND STEP–POOL DETAILS ON SHEET C34.
3. INSTALL ENGINEERED STREAMBED MATERIAL AND FLOODPLAIN ARMOR PER THE TYPICAL CHANNEL TREATMENT SECTION, SHEET C26, EXCEPT AT LOCATIONS WHERE BEDROCK IS EXPOSED DURING CONSTRUCTION.
4. SALVAGE TREES WITHIN AREAS TO BE GRADED PER THE TREE REMOVAL NOTES, SHEETS C1.
5. GRADING WILL NOT EXTEND SOUTH OF THE LIMITS OF GRADING SHOWN ALONG THE SOUTHERN SIDE OF THE WORK AREA. IF BEDROCK IS NOT ENCOUNTERED AT THE UPPER LIMIT OF POTENTIAL DESIGN CHANNEL INVERT SHOWN, AND ADDITIONAL EXCAVATION IS REQUIRED, GRADING SHALL PROJECT DOWN APPROXIMATELY FOLLOWING THE EXISTING SOUTHERN BANK SLOPE TO THE CONSTRUCTED FLOODPLAIN BENCH ELEVATION, SIMILAR TO THE GRADING SHOWN ON SECTION C, SHEET C25, AS DIRECTED BY THE GEOTECHNICAL ENGINEER OR PROJECT GEOLOGIST.
6. POND 1250, THE UPPER WATER TREATMENT FACILITIES, AND PORTIONS OF A SITE ACCESS ROAD WILL BE RELOCATED, AS NEEDED, TO ACCOUNT FOR SPATIAL CHANGES DUE TO CONSTRUCTION.



MATERIAL REMOVAL AREA PLAN

SCALE: 1" = 40'



MATERIAL REMOVAL AREA CHANNEL PROFILE

SCALE: 1" = 40'

LEGEND

- (E) CONTOURS
- (N) CONTOURS
- SURVEY CONTROL POINT
- 8"A (E) TREE
- (E) TREE TO BE REMOVED
- (E) ROADWAY
- (E) THALWEG
- (E) NORTH TOE OF SLOPE
- (N) NORTH TOE OF SLOPE
- LIMITS OF GRADING
- (N) ROADWAY
- (N) THALWEG ALIGNMENT
- 1255.0 BOULDER SILL (WITH TOP ELEVATION, BOTH SIDES)
- R19 R18 REACH DESIGNATIONS FROM THE "PERMANENTE CREEK LONG–TERM RESTORATION PLAN" (URS, 2011)
- ENGINEERED STREAMBED MATERIAL
- FLOODPLAIN ARMOR

WATERWAYS CONSULTING INC.
509A SWIFT ST.
SANTA CRUZ, CA 95060
PH:(831)421-9291 // FAX:(888)819-6847
WWW.WATWAYS.COM

PRELIMINARY
NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT GROUP

MATERIAL REMOVAL AREA PLAN (1 OF 2)

PERMANENTE CREEK RESTORATION PLAN
UPDATED 90% DESIGN
SANTA CLARA COUNTY CEQA REVIEW SUBMITTAL

DESIGNED BY:	B.M.Z.
DRAWN BY:	B.M.S.
CHECKED BY:	M.W.W.
DATE:	8/26/22
JOB NO.:	13–016

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

C23 | 23 OF 47

LEGEND

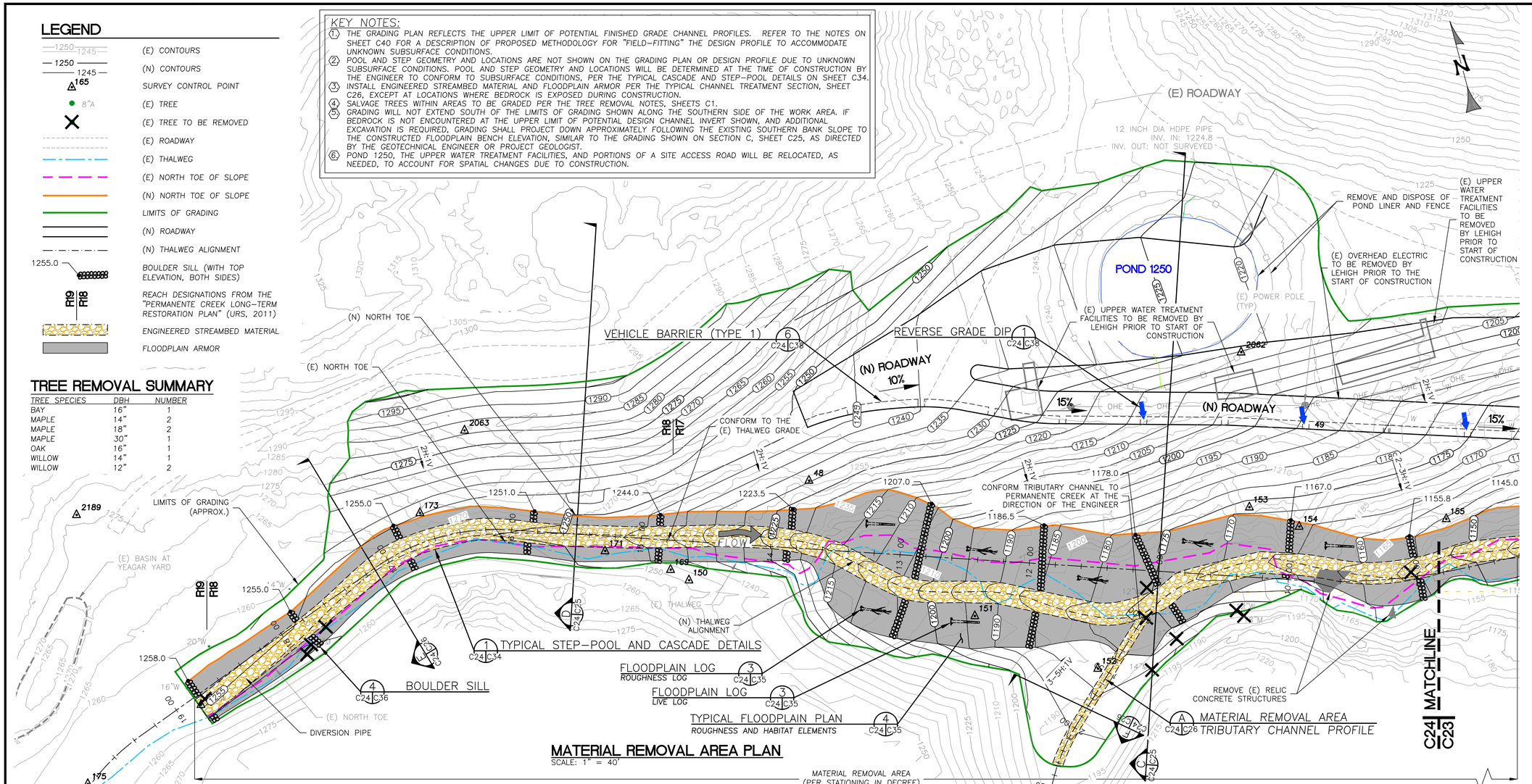
- (E) CONTOURS
- (N) CONTOURS
- SURVEY CONTROL POINT
- (E) TREE
- (E) TREE TO BE REMOVED
- (E) ROADWAY
- (E) THALWEG
- (E) NORTH TOE OF SLOPE
- (N) NORTH TOE OF SLOPE
- LIMITS OF GRADING
- (N) ROADWAY
- (N) THALWEG ALIGNMENT
- BOULDER SILL (WITH TOP ELEVATION, BOTH SIDES)
- REACH DESIGNATIONS FROM THE "PERMANENTE CREEK LONG-TERM RESTORATION PLAN" (URS, 2011)
- ENGINEERED STREAMBED MATERIAL
- FLOODPLAIN ARMOR

TREE REMOVAL SUMMARY

TREE SPECIES	DBH	NUMBER
BAY	16"	1
MAPLE	14"	2
MAPLE	18"	2
MAPLE	30"	1
OAK	16"	1
WILLOW	14"	1
WILLOW	12"	2

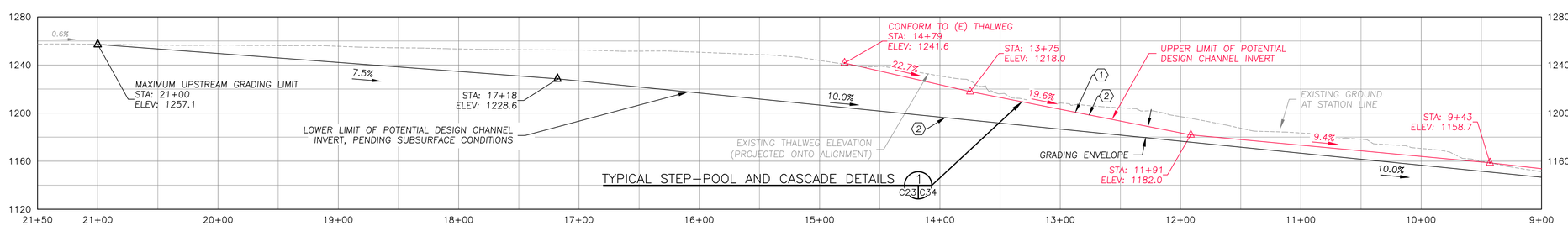
KEY NOTES:

1. THE GRADING PLAN REFLECTS THE UPPER LIMIT OF POTENTIAL FINISHED GRADE CHANNEL PROFILES. REFER TO THE NOTES ON SHEET C40 FOR A DESCRIPTION OF PROPOSED METHODOLOGY FOR "FIELD-FITTING" THE DESIGN PROFILE TO ACCOMMODATE UNKNOWN SUBSURFACE CONDITIONS.
2. POOL AND STEP GEOMETRY AND LOCATIONS ARE NOT SHOWN ON THE GRADING PLAN OR DESIGN PROFILE DUE TO UNKNOWN SUBSURFACE CONDITIONS. POOL AND STEP GEOMETRY AND LOCATIONS WILL BE DETERMINED AT THE TIME OF CONSTRUCTION BY THE ENGINEER TO CONFORM TO SUBSURFACE CONDITIONS, PER THE TYPICAL CASCADE AND STEP-POOL DETAILS ON SHEET C34.
3. INSTALL ENGINEERED STREAMBED MATERIAL AND FLOODPLAIN ARMOR PER THE TYPICAL CHANNEL TREATMENT SECTION, SHEET C26, EXCEPT AT LOCATIONS WHERE BEDROCK IS EXPOSED DURING CONSTRUCTION.
4. SALVAGE TREES WITHIN AREAS TO BE GRADED PER THE TREE REMOVAL NOTES, SHEETS C1.
5. GRADING WILL NOT EXTEND SOUTH OF THE LIMITS OF GRADING SHOWN ALONG THE SOUTHERN SIDE OF THE WORK AREA. IF BEDROCK IS NOT ENCOUNTERED AT THE UPPER LIMIT OF POTENTIAL DESIGN CHANNEL INVERT SHOWN, AND ADDITIONAL EXCAVATION IS REQUIRED, GRADING SHALL PROJECT DOWN APPROXIMATELY FOLLOWING THE EXISTING SOUTHERN BANK SLOPE TO THE CONSTRUCTED FLOODPLAIN BENCH ELEVATION, SIMILAR TO THE GRADING SHOWN ON SECTION C, SHEET C25, AS DIRECTED BY THE GEOTECHNICAL ENGINEER OR PROJECT GEOLOGIST.
6. POND 1250, THE UPPER WATER TREATMENT FACILITIES, AND PORTIONS OF A SITE ACCESS ROAD WILL BE RELOCATED, AS NEEDED, TO ACCOUNT FOR SPATIAL CHANGES DUE TO CONSTRUCTION.



MATERIAL REMOVAL AREA PLAN

SCALE: 1" = 40'



MATERIAL REMOVAL AREA CHANNEL PROFILE

SCALE: 1" = 50'

WATERWAYS CONSULTING INC.
509A SWIFT ST.
SANTA CRUZ, CA 95060
PH:(831)421-9291 // FAX:(888)819-6847
WWW.WATWAYS.COM

PRELIMINARY

NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT
GROUP

MATERIAL REMOVAL AREA PLAN (2 OF 2)

PERMANENTE CREEK RESTORATION PLAN

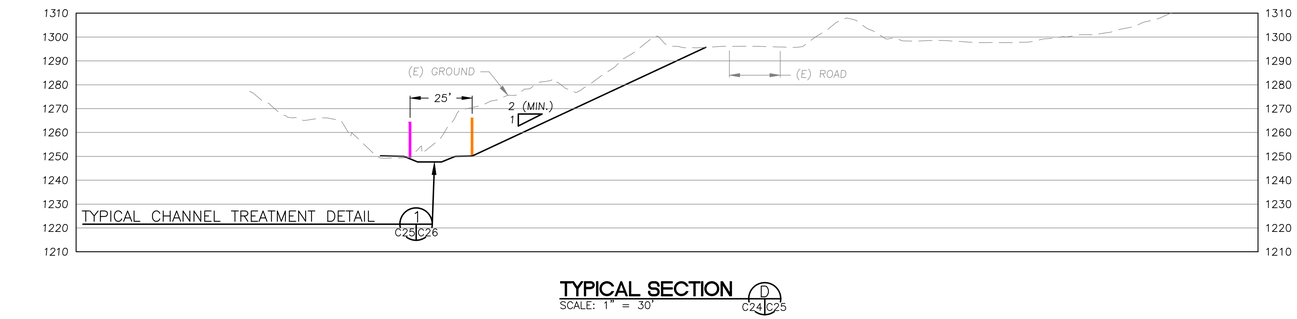
UPDATED 90% DESIGN

SANTA CLARA COUNTY CEQA REVIEW SUBMITTAL

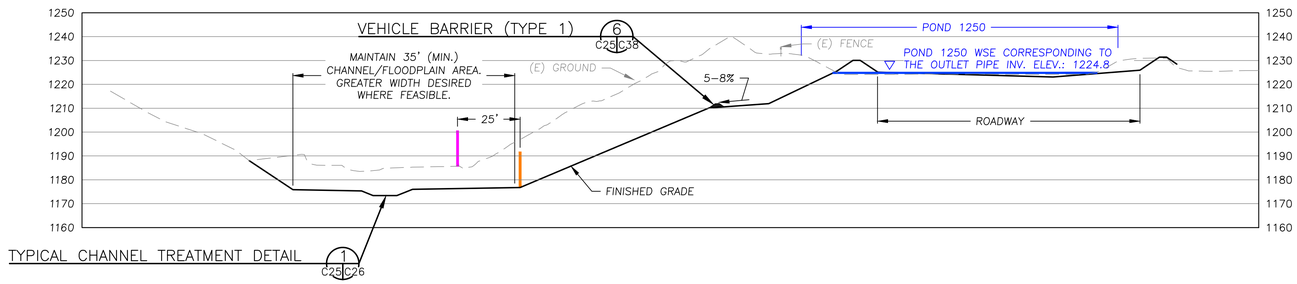
DESIGNED BY:	B.M.Z.
DRAWN BY:	B.M.S.
CHECKED BY:	M.W.W.
DATE:	8/26/22
JOB NO.:	13-016

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS

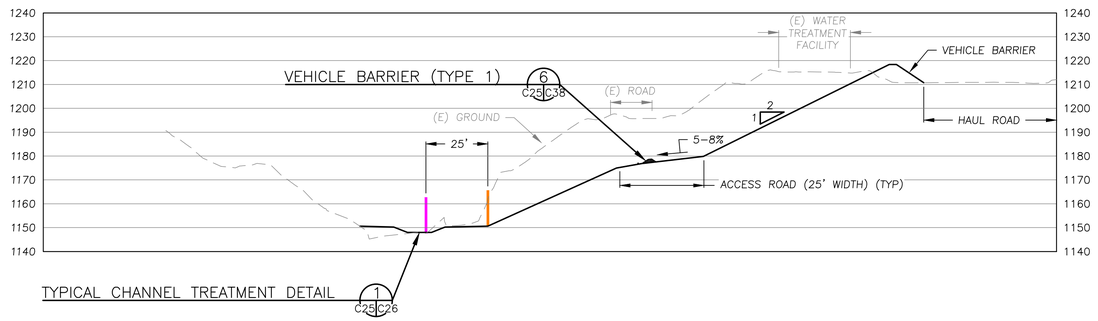
0 1"



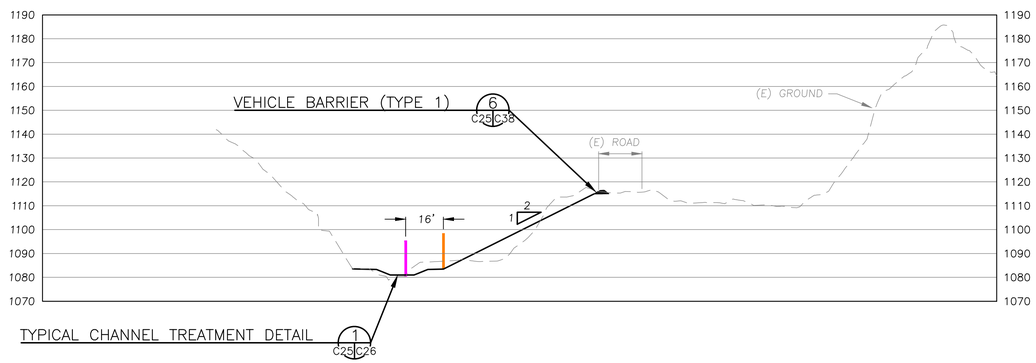
TYPICAL SECTION D
SCALE: 1" = 30' C24|C25



TYPICAL SECTION C
SCALE: 1" = 30' C24|C25



TYPICAL SECTION B
SCALE: 1" = 30' C23,C24|C25



TYPICAL SECTION A
SCALE: 1" = 30' C23|C25

NOTE:
1. FINISHED GRADE SHOWN REPRESENTS THE UPPER LIMIT OF POTENTIAL DESIGN CHANNEL INVERT.
2. LEAVE 4'-5' WIDE OPENINGS IN K-RAIL EVERY 50-60 FEET TO ALLOW FOR UNOBSTRUCTED DRAINAGE FROM ROADWAY.

LEGEND

(E) NORTH SLOPE TOE	PROPOSED NORTH SLOPE TOE

WATERWAYS CONSULTING INC.
509A SWIFT ST.
SANTA CRUZ, CA 95060
PH:(831)421-9291 // FAX:(888)819-6847
WWW.WATWAYS.COM

PRELIMINARY
NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT
GROUP

MATERIAL REMOVAL AREA SECTIONS (1 OF 2)

PERMANENTE CREEK RESTORATION PLAN

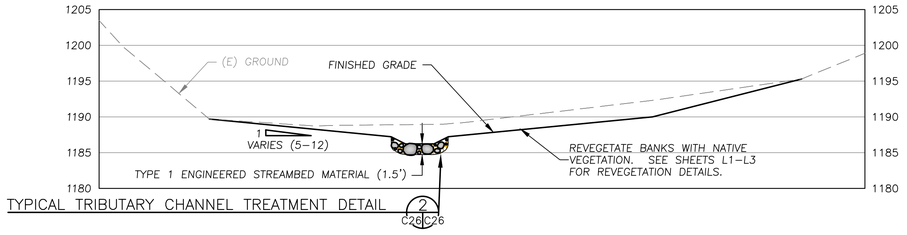
UPDATED 90% DESIGN

SANTA CLARA COUNTY CEQA REVIEW SUBMITTAL

DESIGNED BY:	B.M.Z.
DRAWN BY:	B.M.S.
CHECKED BY:	M.W.W.
DATE:	8/26/22
JOB NO.:	13-016

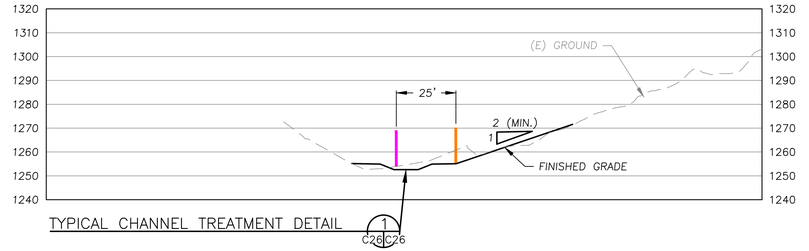
BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

C25



TYPICAL TRIBUTARY CHANNEL TREATMENT DETAIL 2 C26|C26

TYPICAL SECTION F
SCALE: 1" = 10' C24|C26



TYPICAL CHANNEL TREATMENT DETAIL 1 C26|C26

TYPICAL SECTION E
SCALE: 1" = 30' C24|C26

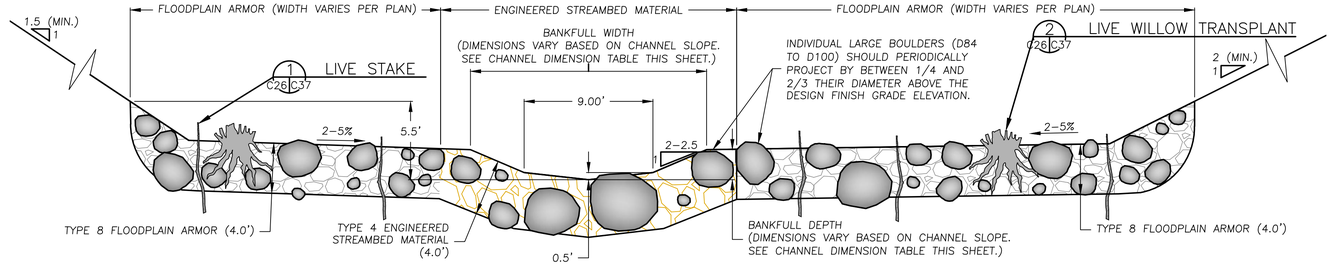
LEGEND

(E) NORTH SLOPE TOE

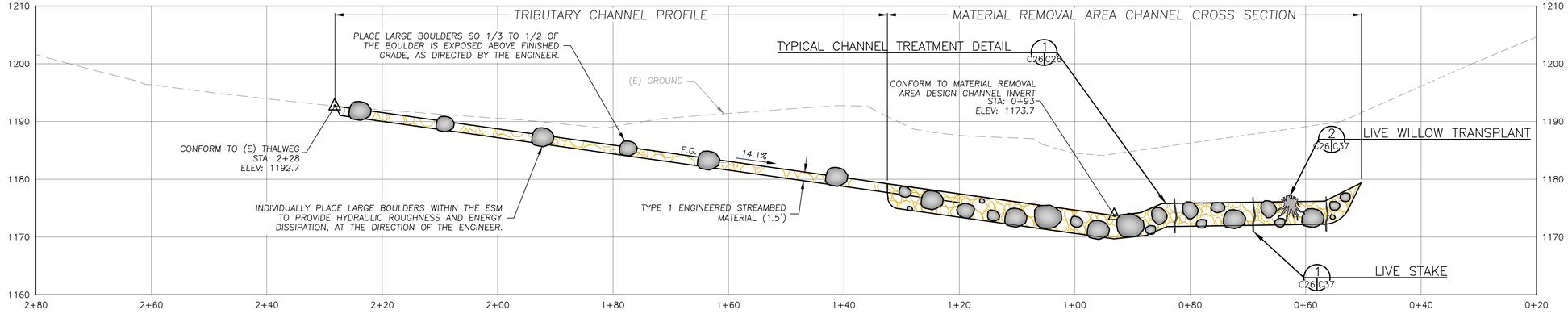
PROPOSED NORTH SLOPE TC

CHANNEL DIMENSIONS FOR OVERBURDEN REMOVAL AREA		
DESIGN SLOPE (%)	DESIGN DIMENSIONS	
	BANKFULL WIDTH	BANKFULL DEPTH
<4%	16'–20'	1.7'–2.1'
4%–8%	14.5'–18.5'	1.9'–2.3'
>8%	14'–18'	2.3'–2.7'

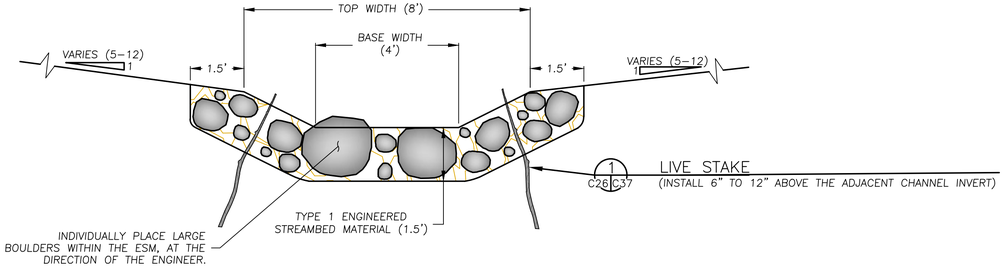
NOTES:
1. INSTALL TYPE 8 FLOODPLAIN ARMOR ALONG THE ENTIRE MATERIAL REMOVAL AREA PROJECT REACH WHERE FLOODPLAIN ARMOR IS SHOWN IN PLAN.
2. INSTALL TYPE 4 ENGINEERED STREAMBED MATERIAL ALONG THE ENTIRE MATERIAL REMOVAL AREA PROJECT REACH WHERE ESM IS SHOWN IN PLAN.
3. SEE THE TYPICAL FLOODPLAIN ROUGHNESS AND HABITAT PLAN, SHEET C35 FOR INFORMATION REGARDING FEATURES NOT SHOWN ON THE TYPICAL TREATMENT DETAIL.
4. FINISHED GRADE SHOWN REPRESENTS THE UPPER LIMIT OF POTENTIAL DESIGN CHANNEL INVERT.



TYPIAL CHANNEL TREATMENT DETAIL
SCALE: 1" = 5' 1 C25,C26|C26



MATERIAL REMOVAL AREA TRIBUTARY CHANNEL PROFILE
SCALE: 1" = 10' A C24|C26



TYPICAL TRIBUTARY CHANNEL TREATMENT DETAIL
SCALE: 1" = 2' 2 C26|C26

WATERWAYS CONSULTING INC.
509A SWIFT ST.
SANTA CRUZ, CA 95060
PH:(831)421-9291 // FAX:(888)819-6847
WWW.WATWAYS.COM

PRELIMINARY
NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT GROUP

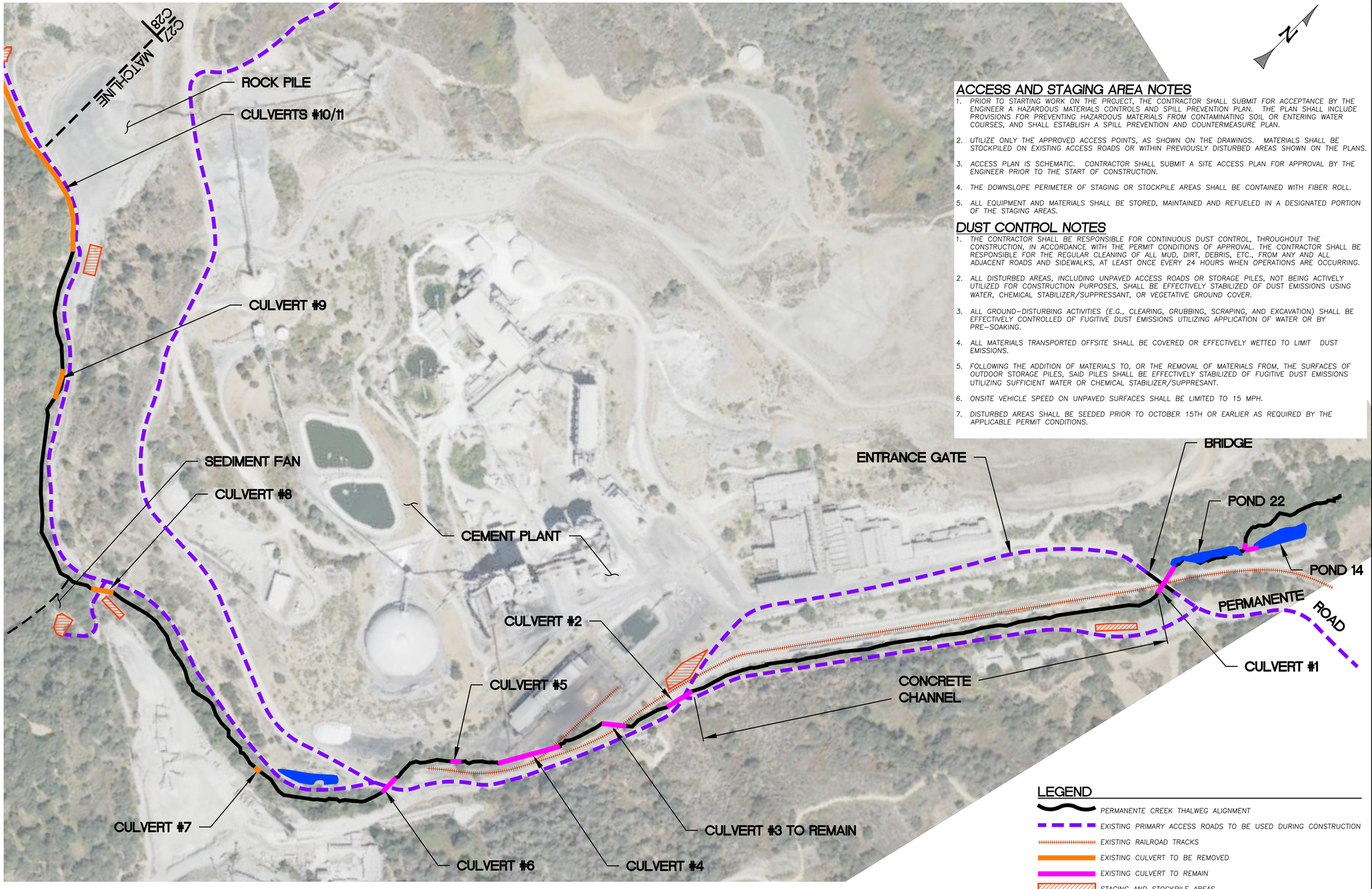
MATERIAL REMOVAL AREA SECTIONS (2 OF 2)

PERMANENTE CREEK RESTORATION PLAN
UPDATED 90% DESIGN
SANTA CLARA COUNTY CEQA REVIEW SUBMITTAL

DESIGNED BY:	B.Z.
DRAWN BY:	B.M.S.
CHECKED BY:	M.W.W.
DATE:	8/26/22
JOB NO.:	13-016

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

C26 | 26 OF 47



ACCESS AND STAGING PLAN
SCALE: 1"=200'

ACCESS AND STAGING AREA NOTES

1. PRIOR TO STARTING WORK ON THE PROJECT, THE CONTRACTOR SHALL SUBMIT FOR ACCEPTANCE BY THE ENGINEER A HAZARDOUS MATERIALS CONTROLS AND SPILL PREVENTION PLAN. THE PLAN SHALL INCLUDE PROVISIONS FOR PREVENTING HAZARDOUS MATERIALS FROM CONTAMINATING SOIL OR ENTERING WATER COURSES, AND SHALL ESTABLISH A SPILL PREVENTION AND COUNTERMEASURE PLAN.
2. UTILIZE ONLY THE APPROVED ACCESS POINTS, AS SHOWN ON THE DRAWINGS. MATERIALS SHALL BE STOCKPILED ON EXISTING ACCESS ROADS OR WITHIN PREVIOUSLY DISTURBED AREAS SHOWN ON THE PLANS.
3. ACCESS PLAN IS SCHEMATIC. CONTRACTOR SHALL SUBMIT A SITE ACCESS PLAN FOR APPROVAL BY THE ENGINEER PRIOR TO THE START OF CONSTRUCTION.
4. THE DOWNSLOPE PERIMETER OF STAGING OR STOCKPILE AREAS SHALL BE CONTAINED WITH FIBER ROLL.
5. ALL EQUIPMENT AND MATERIALS SHALL BE STORED, MAINTAINED AND REFUELED IN A DESIGNATED PORTION OF THE STAGING AREAS.

DUST CONTROL NOTES

1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CONTINUOUS DUST CONTROL, THROUGHOUT THE CONSTRUCTION, IN ACCORDANCE WITH THE PERMIT CONDITIONS OF APPROVAL. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE REGULAR CLEANING OF ALL MUD, DIRT, DEBRIS, ETC., FROM ANY AND ALL ADJACENT ROADS AND SIDEWALKS, AT LEAST ONCE EVERY 24 HOURS WHEN OPERATIONS ARE OCCURRING.
2. ALL DISTURBED AREAS, INCLUDING UNPAVED ACCESS ROADS OR STORAGE PILES, NOT BEING ACTIVELY UTILIZED FOR CONSTRUCTION PURPOSES, SHALL BE EFFECTIVELY STABILIZED OF DUST EMISSIONS USING WATER, CHEMICAL STABILIZER/SUPPRESSANT, OR VEGETATIVE GROUND COVER.
3. ALL GROUND-DISTURBING ACTIVITIES (E.G., CLEARING, GRUBBING, SCRAPING, AND EXCAVATION) SHALL BE EFFECTIVELY CONTROLLED OF FUGITIVE DUST EMISSIONS UTILIZING APPLICATION OF WATER OR BY PRE-SOAKING.
4. ALL MATERIALS TRANSPORTED OFFSITE SHALL BE COVERED OR EFFECTIVELY WETTED TO LIMIT DUST EMISSIONS.
5. FOLLOWING THE ADDITION OF MATERIALS TO, OR THE REMOVAL OF MATERIALS FROM, THE SURFACES OF OUTDOOR STORAGE PILES, SAID PILES SHALL BE EFFECTIVELY STABILIZED OF FUGITIVE DUST EMISSIONS UTILIZING SUFFICIENT WATER OR CHEMICAL STABILIZER/SUPPRESANT.
6. ONSITE VEHICLE SPEED ON UNPAVED SURFACES SHALL BE LIMITED TO 15 MPH.
7. DISTURBED AREAS SHALL BE SEEDED PRIOR TO OCTOBER 15TH OR EARLIER AS REQUIRED BY THE APPLICABLE PERMIT CONDITIONS.

WATERWAYS CONSULTING INC.
509A SWIFT ST.
SANTA CRUZ, CA 95060
PH:(831)421-9291 // FAX:(888)819-6847
WWW.WATWAYS.COM

PRELIMINARY
NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT GROUP

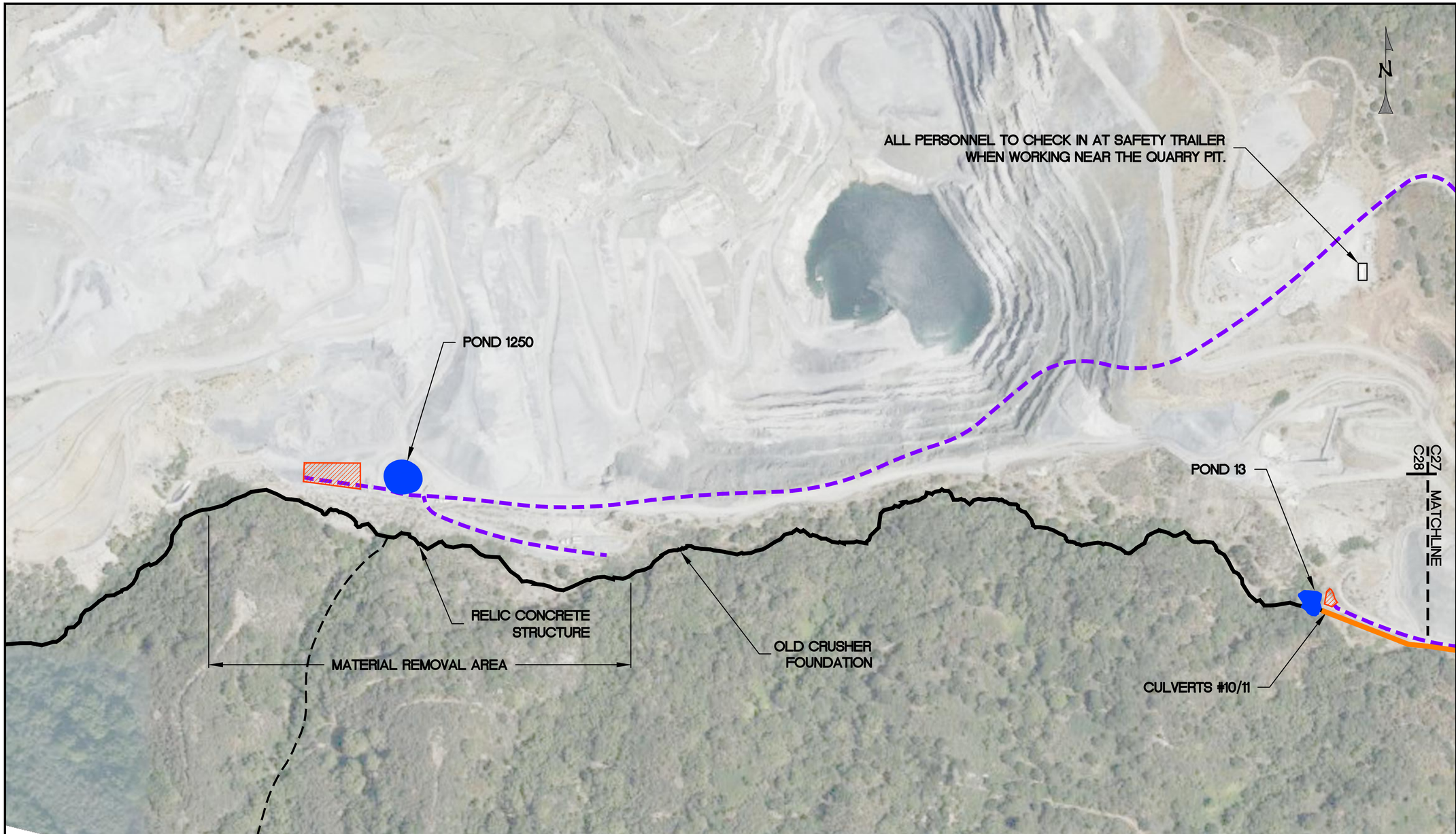
ACCESS AND STAGING PLAN
(1 OF 2)

PERMANENTE CREEK RESTORATION PLAN
UPDATED 90% DESIGN
SANTA CLARA COUNTY CEQA REVIEW SUBMITTAL

DESIGNED BY:	B.M.S.
DRAWN BY:	B.M.S.
CHECKED BY:	M.W.W.
DATE:	8/26/22
JOB NO.:	13-016

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

C27
27 OF 47



LEGEND

- PERMANENTE CREEK THALWEG ALIGNMENT
- EXISTING PRIMARY ACCESS ROADS TO BE USED DURING CONSTRUCTION
- EXISTING CULVERT TO BE REMOVED
- EXISTING CULVERT TO REMAIN
- STAGING AND STOCKPILE AREAS
- TRIBUTARY (RELEVANT TO PROJECT)

ACCESS AND STAGING PLAN

SCALE: 1" = 200'

WATERWAYS CONSULTING INC.
509A SWIFT ST.
SANTA CRUZ, CA 95060
PH:(831)421-9291 // FAX:(888)819-6847
WWW.WATWAYS.COM

PRELIMINARY

NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT GROUP

ACCESS AND STAGING PLAN (2 OF 2)

PERMANENTE CREEK RESTORATION PLAN

UPDATED 90% DESIGN

SANTA CLARA COUNTY CEQA REVIEW SUBMITTAL

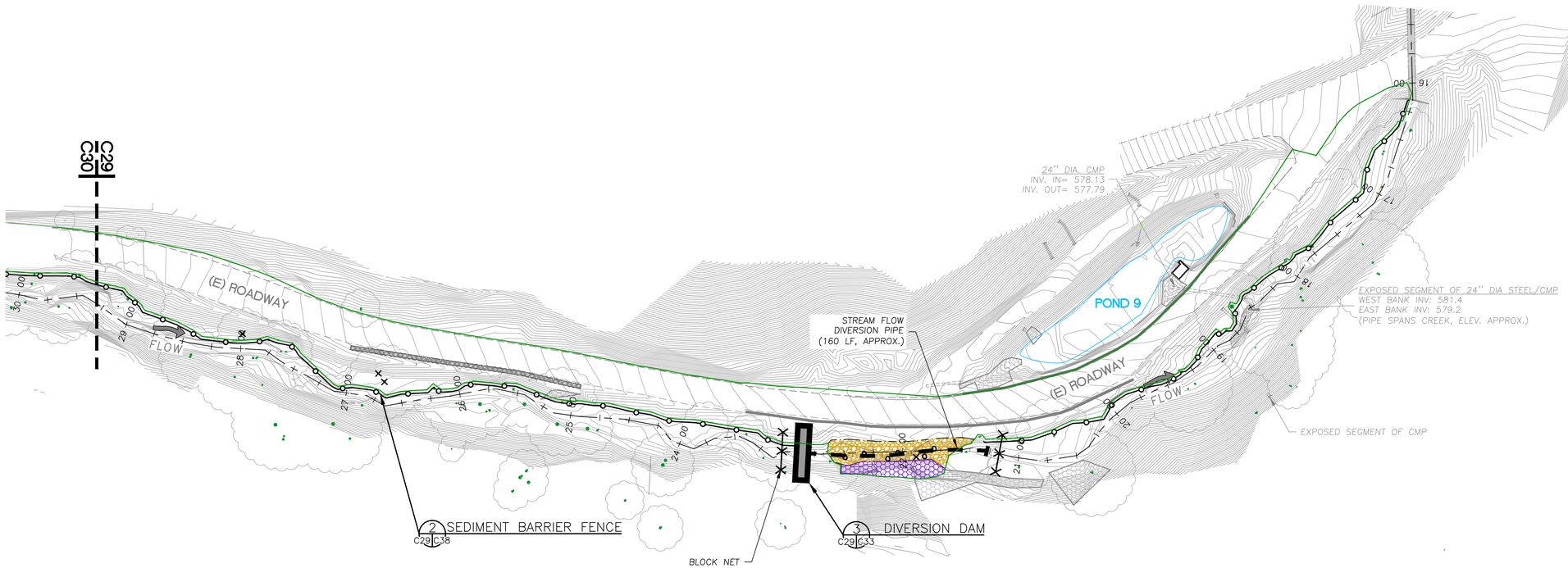
DESIGNED BY:	B.M.S.
DRAWN BY:	B.M.S.
CHECKED BY:	M.W.W.
DATE:	8/26/22
JOB NO.:	13-016

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS

0 1"

C28

28 OF 47



CHANNEL WIDENING DIVERSION AND EROSION CONTROL PLAN (1 OF 2)

SCALE: 1" = 50'

LEGEND

- EXISTING CONTOURS
- EXISTING TREE
- (E) ROAD
- SEDIMENT BARRIER FENCE
- PROPOSED FIBER ROLL
- LIMITS OF GRADING
- 30 00 — DESIGN ALIGNMENT

PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT
GROUP

PRELIMINARY

NOT FOR CONSTRUCTION

WATERWAYS CONSULTING INC.
509A SWIFT ST.
SANTA CRUZ, CA 95060
PH:(831)421-9291 // FAX:(888)819-6847
WWW.WATWAYS.COM

CHANNEL WIDENING DIVERSION AND EROSION CONTROL PLAN (1 OF 2)

PERMANENTE CREEK RESTORATION PLAN

UPDATED 90% DESIGN

SANTA CLARA COUNTY
CEQA REVIEW SUBMITTAL

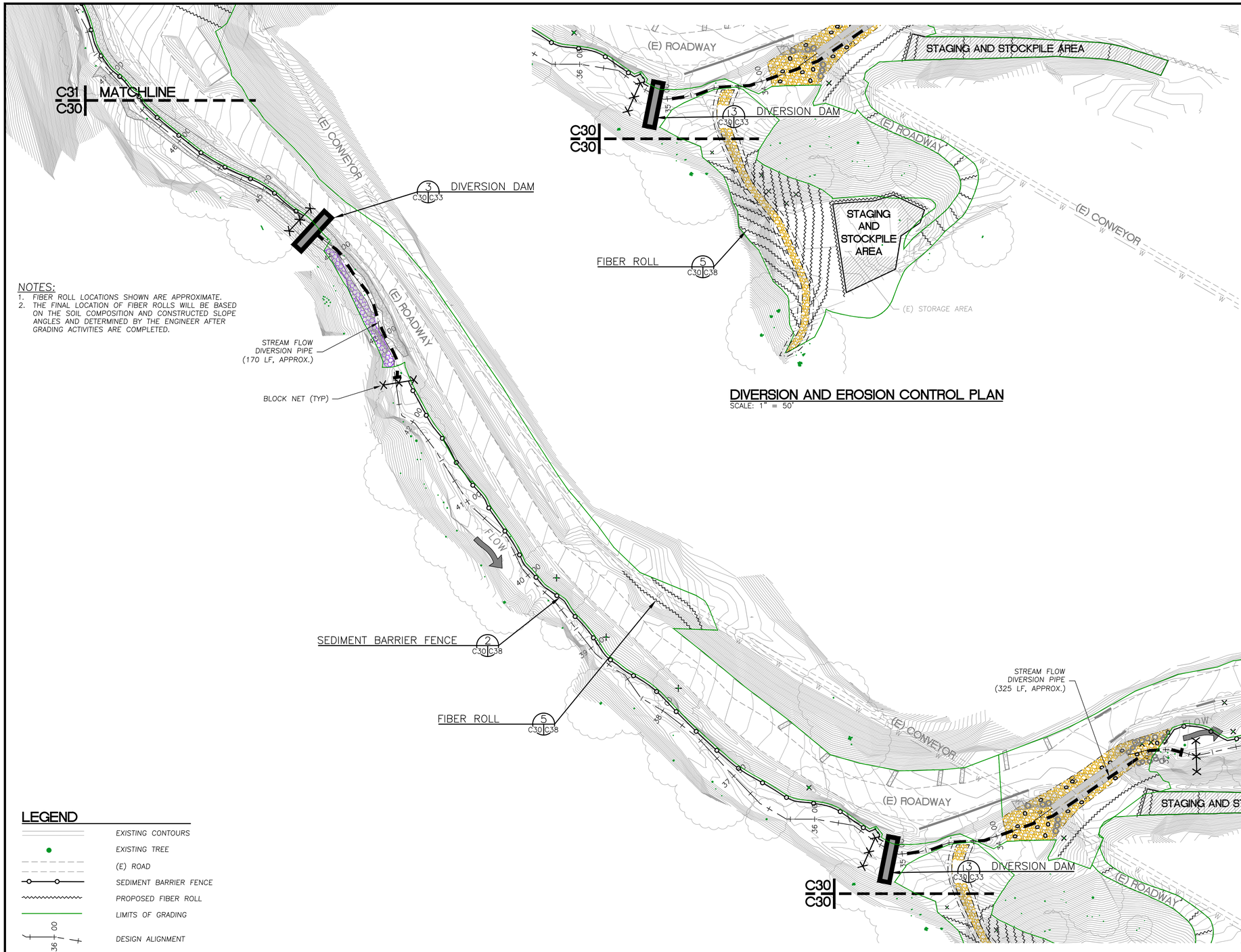
DESIGNED BY:	B.M.S.
DRAWN BY:	B.M.S.
CHECKED BY:	M.W.W.
DATE:	8/26/22
JOB NO.:	13-016

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS

0 1"

C29

29 OF 47



NOTES:
1. FIBER ROLL LOCATIONS SHOWN ARE APPROXIMATE.
2. THE FINAL LOCATION OF FIBER ROLLS WILL BE BASED ON THE SOIL COMPOSITION AND CONSTRUCTED SLOPE ANGLES AND DETERMINED BY THE ENGINEER AFTER GRADING ACTIVITIES ARE COMPLETED.

DIVERSION AND EROSION CONTROL PLAN
SCALE: 1" = 50'

CHANNEL WIDENING DIVERSION AND EROSION CONTROL PLAN (2 OF 2)
SCALE: 1" = 50'

LEGEND
- EXISTING CONTOURS
- EXISTING TREE
- (E) ROAD
- SEDIMENT BARRIER FENCE
- PROPOSED FIBER ROLL
- LIMITS OF GRADING
- 36 + 00 — DESIGN ALIGNMENT

WATERWAYS CONSULTING INC.
509A SWIFT ST.
SANTA CRUZ, CA 95060
PH:(831)421-9291 // FAX:(888)819-6847
WWW.WATWAYS.COM

PRELIMINARY
NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT
GROUP

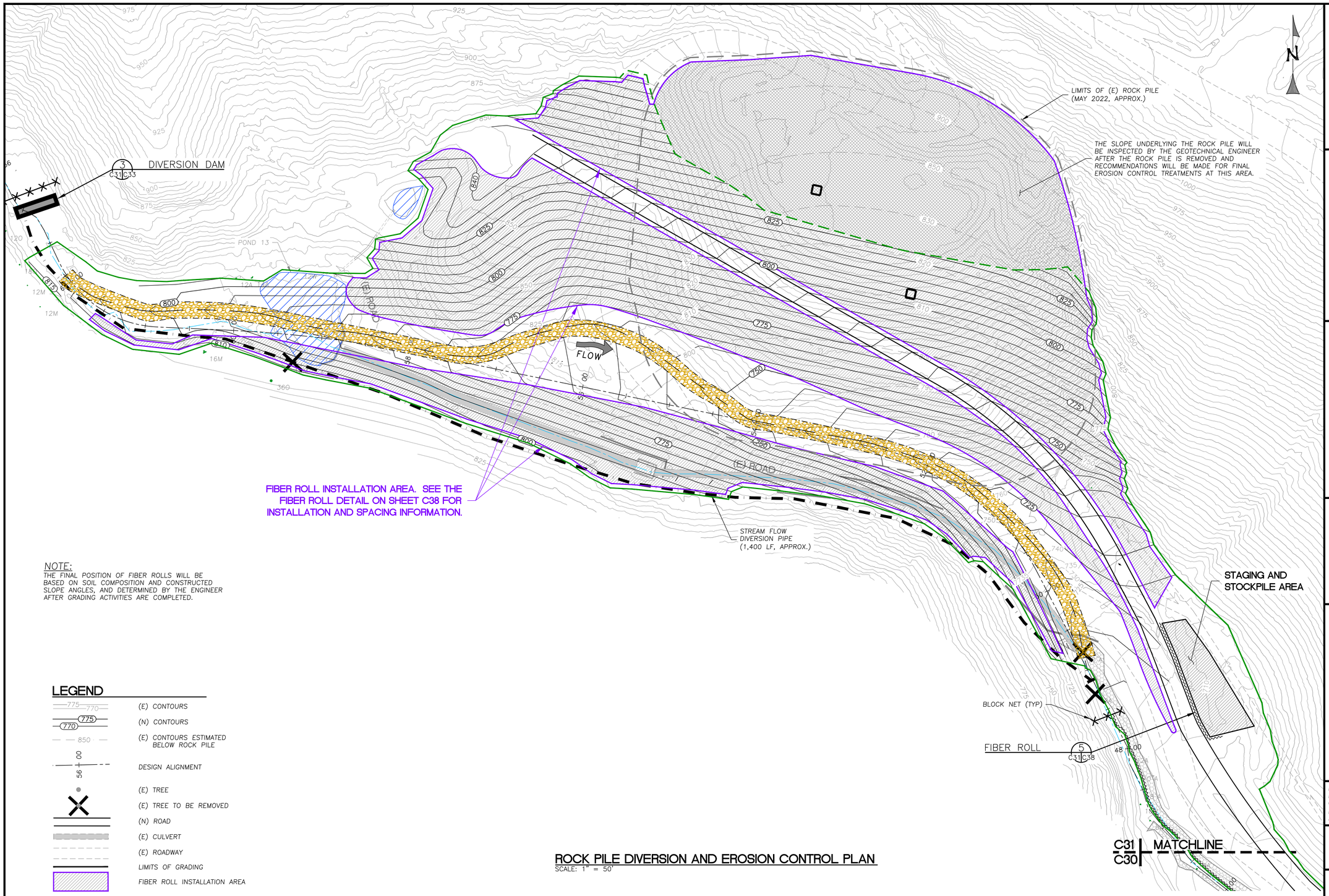
CHANNEL WIDENING DIVERSION AND EROSION CONTROL PLAN (2 OF 2)

PERMANENTE CREEK RESTORATION PLAN
UPDATED 90% DESIGN
SANTA CLARA COUNTY
CEQA REVIEW SUBMITTAL

DESIGNED BY:	B.M.S.
DRAWN BY:	B.M.S.
CHECKED BY:	M.W.W.
DATE:	8/26/22
JOB NO.:	13-016

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

C30 | 30 OF 47



NOTE:
THE FINAL POSITION OF FIBER ROLLS WILL BE BASED ON SOIL COMPOSITION AND CONSTRUCTED SLOPE ANGLES, AND DETERMINED BY THE ENGINEER AFTER GRADING ACTIVITIES ARE COMPLETED.

LEGEND

- (E) CONTOURS
- (N) CONTOURS
- (E) CONTOURS ESTIMATED BELOW ROCK PILE
- DESIGN ALIGNMENT
- (E) TREE
- (E) TREE TO BE REMOVED
- (N) ROAD
- (E) CULVERT
- (E) ROADWAY
- LIMITS OF GRADING
- FIBER ROLL INSTALLATION AREA

ROCK PILE DIVERSION AND EROSION CONTROL PLAN

SCALE: 1" = 50'

WATERWAYS CONSULTING INC.
509A SWIFT ST.
SANTA CRUZ, CA 95060
PH:(831)421-9291 // FAX:(888)819-6847
WWW.WATWAYS.COM

PRELIMINARY

NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:

LEHIGH HANSON
HEIDELBERG CEMENT GROUP

ROCK PILE AREA DIVERSION AND EROSION CONTROL PLAN

PERMANENTE CREEK RESTORATION PLAN

UPDATED 90% DESIGN

SANTA CLARA COUNTY CEQA REVIEW SUBMITTAL

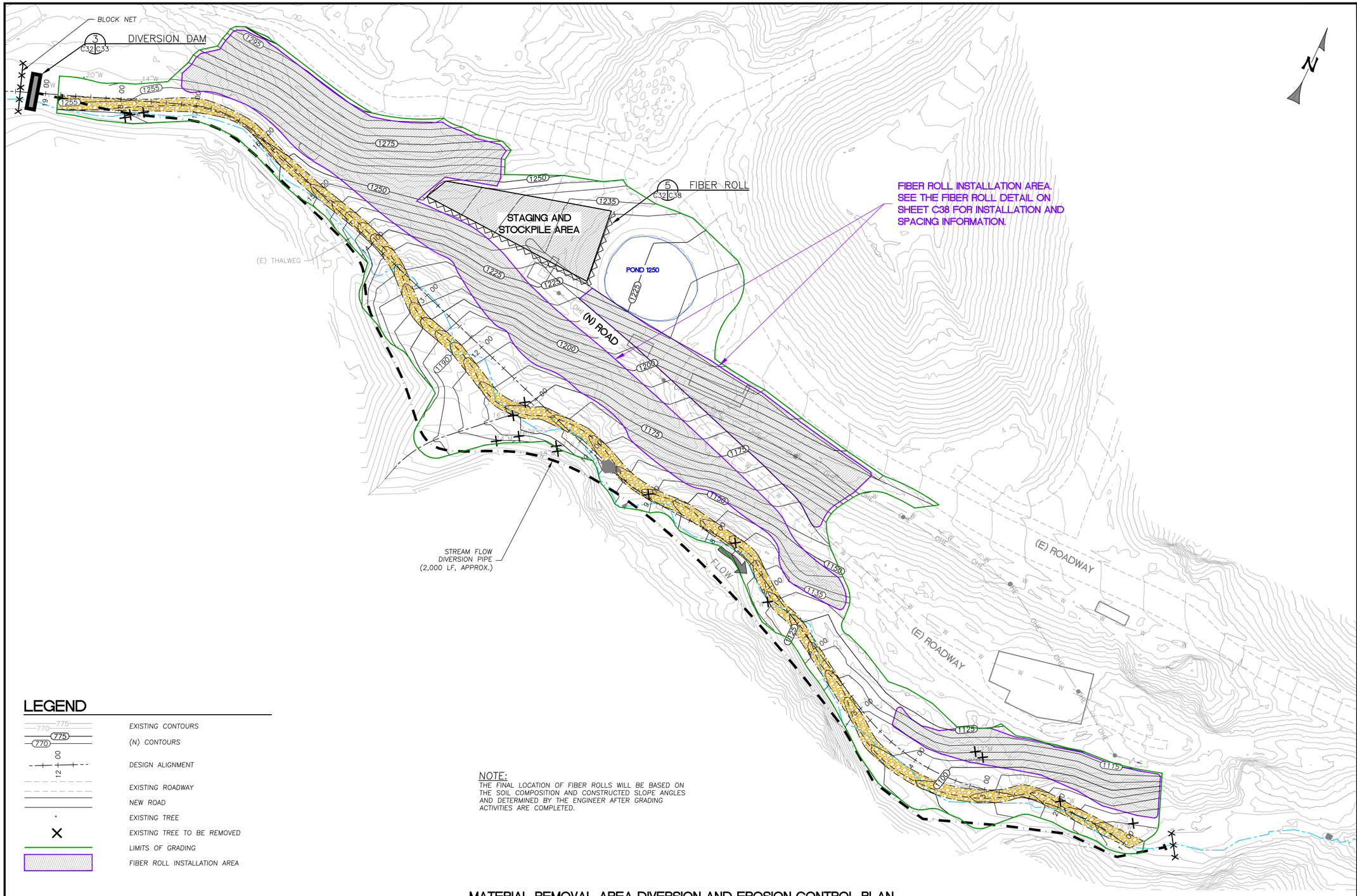
DESIGNED BY:	B.M.Z.
DRAWN BY:	B.R.S
CHECKED BY:	M.W.W.
DATE:	8/26/22
JOB NO.:	13-016

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS

0 1"

C31

31 OF 47



LEGEND

- EXISTING CONTOURS (775 / 770)
- (N) CONTOURS (775 / 770)
- DESIGN ALIGNMENT (12+00)
- EXISTING ROADWAY
- NEW ROAD
- EXISTING TREE
- EXISTING TREE TO BE REMOVED
- LIMITS OF GRADING
- FIBER ROLL INSTALLATION AREA

NOTE:
THE FINAL LOCATION OF FIBER ROLLS WILL BE BASED ON THE SOIL COMPOSITION AND CONSTRUCTED SLOPE ANGLES AND DETERMINED BY THE ENGINEER AFTER GRADING ACTIVITIES ARE COMPLETED.

MATERIAL REMOVAL AREA DIVERSION AND EROSION CONTROL PLAN

SCALE: 1" = 60'

WATERWAYS CONSULTING INC.
509A SWIFT ST.
SANTA CRUZ, CA 95060
PH:(831)421-9291 // FAX:(888)819-6847
WWW.WATWAYS.COM

PRELIMINARY

NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT
GROUP

MATERIAL REMOVAL AREA DIVERSION AND EROSION CONTROL PLAN

PERMANENTE CREEK
RESTORATION PLAN

UPDATED 90% DESIGN

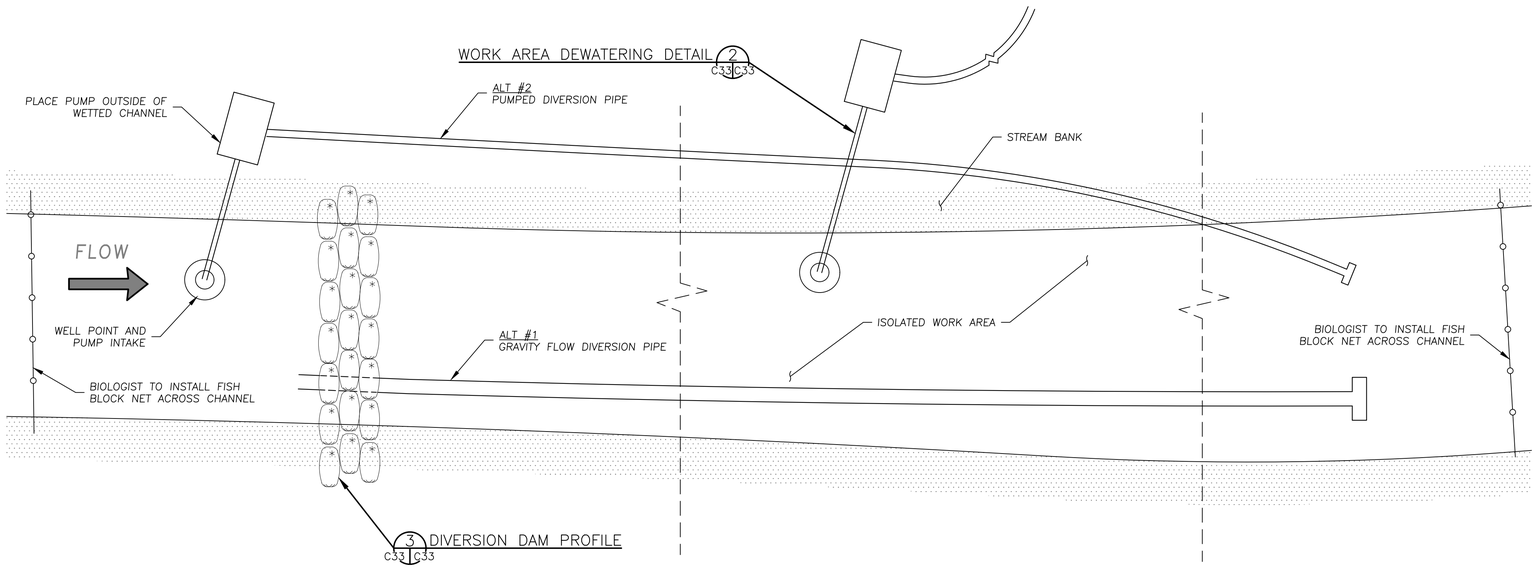
SANTA CLARA COUNTY
CEQA REVIEW SUBMITTAL

DESIGNED BY:	B.M.Z.
DRAWN BY:	B.M.S.
CHECKED BY:	M.W.W.
DATE:	8/26/22
JOB NO.:	13-016

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

C32

32 OF 47

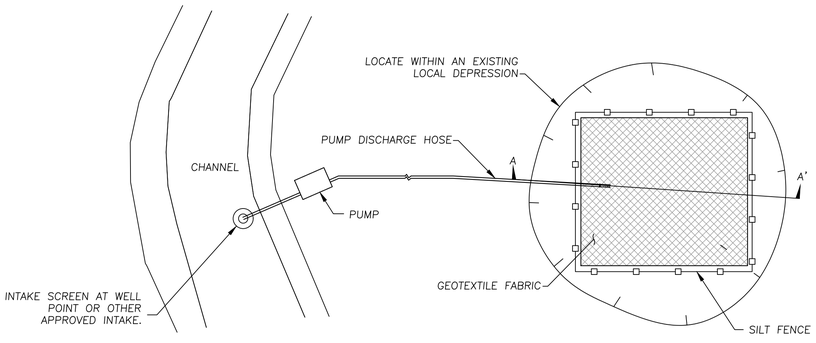


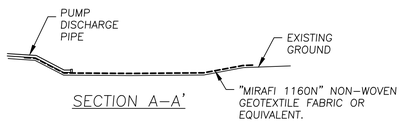
TYPICAL DEWATERING PLAN
N.T.S. 1 C33 C33

DIVERSION NOTES CONTINUED

1. GENERAL
 - 1.1. DIVERSION SYSTEMS SHALL BE INSTALLED TO DEWATER THE INDIVIDUAL PROJECT AREAS TO FACILITATE IN-STREAM CONSTRUCTION AND TO REDUCE THE POTENTIAL IMPACTS TO WATER QUALITY DOWNSTREAM OF THE PROJECT SITES.
 - 1.2. THE CONTRACTOR SHALL CONFIRM THAT A FAVORABLE LONG TERM WEATHER FORECAST (1 WEEK MIN.) IS OBSERVED PRIOR TO PLACEMENT OF DIVERSION STRUCTURE.
 - 1.3. PRIOR TO PLACEMENT OF DIVERSION STRUCTURE, FISH SHALL BE REMOVED FROM THE DIVERTED REACH, IN ACCORDANCE WITH SECTION 2.
 - 1.4. DIVERSION SYSTEM INSTALLATION SHALL NORMALLY BEGIN IN THE DOWNSTREAM AREA AND CONTINUE IN AN UPSTREAM DIRECTION. THE FLOW SHALL BE DIVERTED ONLY WHEN THE DIVERSION CONSTRUCTION IS COMPLETE.
 - 1.5. THE DIVERSION PLAN SHOWN IS SCHEMATIC. THE DESIGN AND IMPLEMENTATION OF THE DIVERSION DAM IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR PRIOR TO INSTALLATION. THE CONTRACTOR SHALL SUBMIT A DIVERSION PHASING PLAN TO THE ENGINEER FOR REVIEW AND APPROVAL. THE BASIC REQUIREMENTS OF THE DIVERSION PLAN ARE SHOWN.
 - 1.6. THE TYPICAL DEWATERING PLAN SHOWN DEPICTS TWO ALTERNATIVE TYPES OF DIVERSION STRUCTURES. AN AUTOMATIC BACKUP SYSTEM MUST BE INSTALLED IF ALTERNATIVE #2 (PUMPED DIVERSION) IS THE SOLE METHOD OF DIVERSION.*
 - 1.7. DIVERSION PIPES MAY BE RELOCATED DURING CONSTRUCTION.
 - 1.8. FOLLOWING ENGINEER'S APPROVAL OF THE COMPLETED WORK, DIVERSION SHALL BE REMOVED IMMEDIATELY, IN AN UPSTREAM DIRECTION.
2. FISH REMOVAL
 - 2.1. FISH SHALL BE REMOVED FROM THE DIVERTED REACHES BY A QUALIFIED FISHERIES BIOLOGIST, LICENSED FOR SUCH ACTIVITIES BY THE NATIONAL MARINE FISHERIES SERVICE AND THE CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE.
 - 2.2. BLOCK NETS SHALL BE PROVIDED AND INSTALLED BY THE FISHERIES BIOLOGIST. BLOCK NETS SHALL BE MAINTAINED BY THE CONTRACTOR BOTH UPSTREAM AND DOWNSTREAM OF THE WORK AREA, THROUGHOUT THE PERIOD OF CONSTRUCTION. MAINTENANCE INCLUDES PERIODIC REMOVAL OF ACCUMULATED DEBRIS, AS NECESSARY TO ENSURE FUNCTION. BLOCK NETS SHALL BE REMOVED BY THE FISHERIES BIOLOGIST AFTER THE DIVERSION IS REMOVED AND THE IN CHANNEL WORK AREA IS RE-WATERED.
3. DIVERSION SYSTEM
 - 3.1. THE CONTRACTOR SHALL INSTALL A TEMPORARY SEALED SANDBAG DAM TO CAPTURE AND DIVERT STREAM FLOW UPSTREAM OF THE PROJECT SITE. THE DAM AND METHOD OF SEALING SHALL BE PLACED AT AN APPROPRIATE DEPTH TO CAPTURE SUBSURFACE STREAM FLOW, AS NEEDED TO DEWATER THE STREAMBED.
 - 3.2. THE CONTRACTOR SHALL MAINTAIN THE DIVERSION DAM DURING THE COURSE OF CONSTRUCTION WORK.
 - 3.3. IN THE EVENT OF A SIGNIFICANT STORM, THE CONTRACTOR SHALL BE PREPARED TO TAKE NECESSARY MEASURES TO INSURE SAFE PASSAGE OF STORM WATER FLOW THROUGH THE PROJECT AREA, WITHOUT DAMAGE TO EXISTING STRUCTURES, OR INTRODUCTION OF EXCESSIVE SEDIMENT. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL TEMPORARY EROSION CONTROL B.M.P.'S.
4. DEWATERING OF CONSTRUCTION AREAS
 - 4.1. ANY DEWATERING ACTIVITIES WHICH MAY BE REQUIRED FOR CONSTRUCTION PURPOSES SHALL BE CONDUCTED IN A MANNER WHICH DOES NOT RESULT IN AN EXCEEDANCE OF ANY WATER QUALITY REQUIREMENTS ESTABLISHED BY THE CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD.
 - 4.2. DISCHARGE OF WATER FROM THE DEWATERED CONSTRUCTION SITE, EITHER BY GRAVITY OR PUMPING, SHALL BE PERFORMED IN A MANNER TO PREVENT EXCESSIVE TURBIDITY FROM ENTERING THE RECEIVING WATERWAYS AND TO PREVENT SCOUR AND EROSION OUTSIDE OF THE CONSTRUCTION SITE. PUMPED WATER SHOULD BE PRE-FILTERED WITH SAND/GRAVEL PACK AROUND SUMPS FOR SUBSURFACE FLOWS AND A SILT FENCE OR HAY BALES AROUND PUMPS FOR SURFACE FLOW. PUMPED WATER SHALL BE DISCHARGED INTO ISOLATED LOCAL DEPRESSIONS OR TREATMENT FACILITIES, AS NECESSARY TO MEET WATER QUALITY REQUIREMENTS. WHERE WATER TO BE DISCHARGED INTO THE CREEK WILL CREATE EXCESSIVE TURBIDITY, THE WATER SHALL BE ROUTED THROUGH A SEDIMENT INTERCEPTOR OR OTHER FACILITIES TO REMOVE SEDIMENT FROM WATER.
 - 4.3. CONTRACTOR SHALL SUPPLY ALL NECESSARY PUMPS, PIPING, FILTERS, SHORING, AND OTHER TOOLS AND MATERIALS NECESSARY FOR DEWATERING.

*IF AT ANY TIME A PUMP IS USED THAT DRAWS WATER FROM THE SURFACE WHERE AQUATIC ORGANISMS CAN BECOME ENTRAINED, THE PUMP SHALL BE SCREENED USING A MESH WITH A MAXIMUM OPENING SIZE OF 5 MILLIMETERS. CHECK THE SCREEN REGULARLY TO ENSURE IT IS FUNCTIONING AS INTENDED AND THAT ANIMALS ARE NOT BECOMING ENTRAPPED.

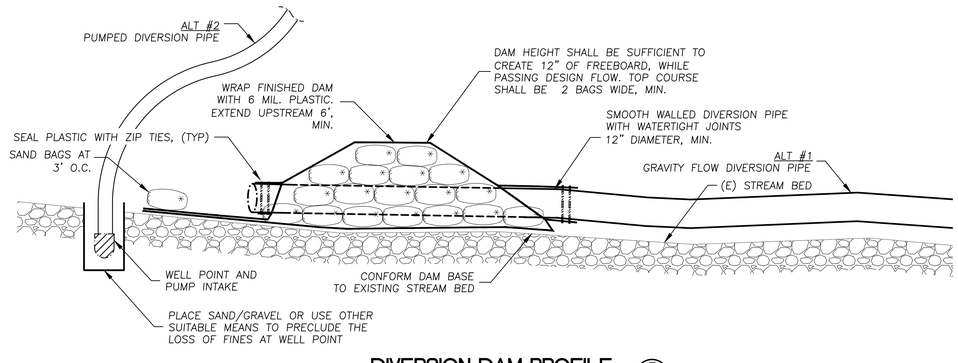




SECTION A-A'

DEWATERING DISCHARGE AREA NOTES:
1. DEWATERING SHALL COMPLY WITH ALL PROJECT PERMITS.
2. THIS DETAIL REPRESENTS A POTENTIAL OPTION FOR DEWATERING OF WORK AREAS.
3. TURBID WATER RESULTING FROM DEWATERING ACTIVITIES WILL EITHER BE TREATED OR DISCHARGED TO A LOCAL DEPRSSION(S) TO INFILTRATE OR EVAPORATE.
4. TURBID WATERS WILL NOT BE ALLOWED TO DISCHARGE INTO PERMANENTE CREEK.
5. PROPOSED FILTRATION METHODS WILL BE FIELD-FIT TO EXISTING CONDITIONS AT THE TIME OF CONSTRUCTION, AS APPROVED BY THE ENGINEER.
6. REMOVE ACCUMULATED SEDIMENT AT THE COMPLETION OF DEWATERING ACTIVITIES AND DISPOSE OF AT AN APPROVED LOCATION.

WORK AREA DEWATERING DETAIL
N.T.S. 2 C33 C33



DIVERSION DAM PROFILE
N.T.S. 3 C29,C30,C33 C33

NOTE: CONTRACTOR MAY USE ALTERNATE DAM DETAIL, SUBJECT TO APPROVAL OF THE ENGINEER AND THE PERMITTING AGENCIES.

WATERWAYS CONSULTING INC.
509A SWIFT ST.
SANTA CRUZ, CA 95060
PH:(831)421-9291 // FAX:(888)819-6847
WWW.WATWAYS.COM

PRELIMINARY
NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT GROUP

DEWATERING DETAILS (1 OF 6)

PERMANENTE CREEK RESTORATION PLAN
UPDATED 90% DESIGN
SANTA CLARA COUNTY CEQA REVIEW SUBMITTAL

DESIGNED BY:	–
DRAWN BY:	B.M.S.
CHECKED BY:	M.W.W.
DATE:	8/26/22
JOB NO.:	13-016

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

C33 | 33 OF 47

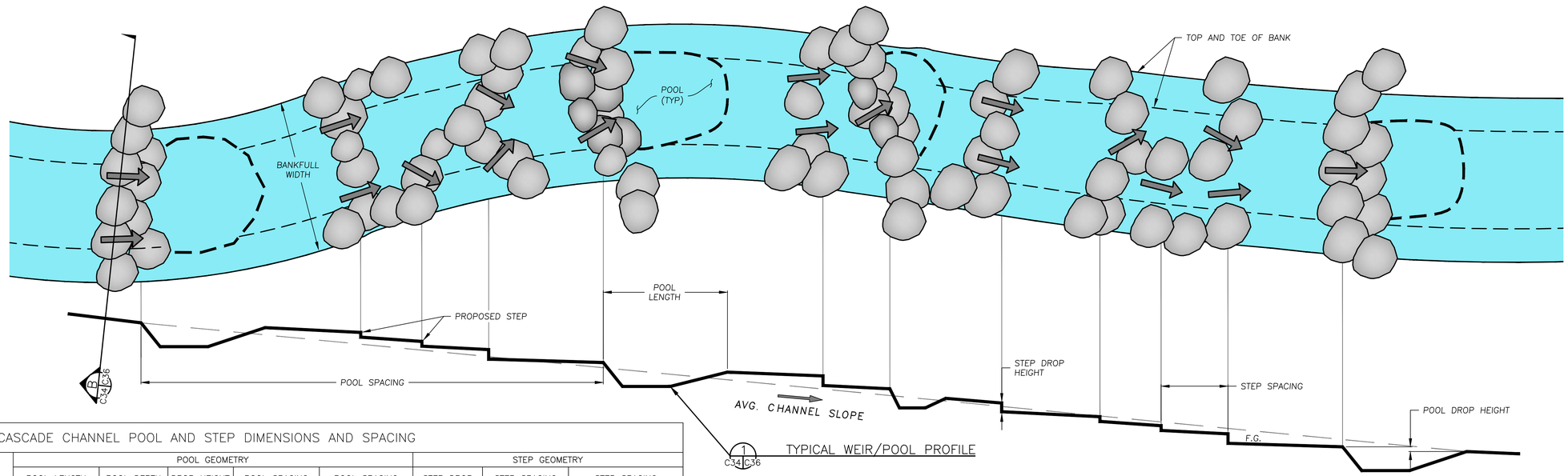


TABLE 1: CASCADE CHANNEL POOL AND STEP DIMENSIONS AND SPACING

AVERAGE CHANNEL SLOPE	POOL GEOMETRY					STEP GEOMETRY		
	POOL LENGTH (FT.)	POOL DEPTH (FT.)	DROP HEIGHT (FT.)	POOL SPACING (FT.)	POOL SPACING (BANKFULL WIDTHS)	STEP DROP HEIGHT (FT.)	STEP SPACING (FT.)	STEP SPACING (BANKFULL WIDTHS)
8%–12%	6–13	0.5–2	0.5–1	28–75	2–4	0.5–1	6–13	0.4–0.8

TYPICAL CASCADE REACH DETAIL (FOR ROCK PILE AND MATERIAL REMOVAL AREA)

SCALE: 1" = 6'

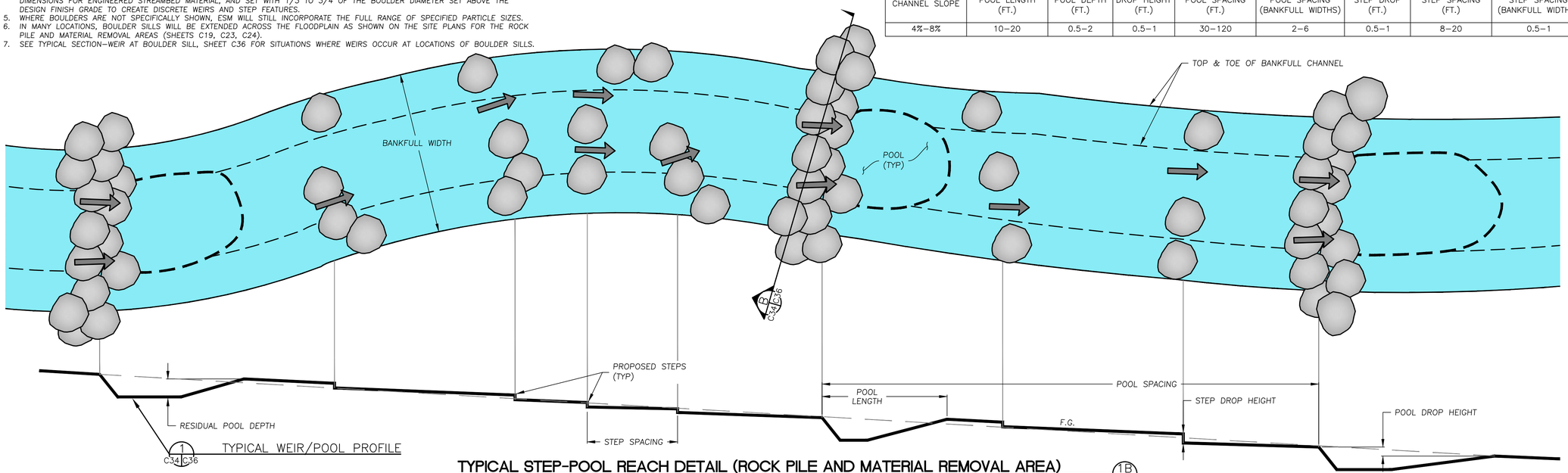
1A C19,C23,C24,C34

CONSTRUCTION NOTES:

1. THESE DETAILS ARE PROVIDED TO DEMONSTRATE GEOMETRY OF STEPS AND POOLS WITHIN STEP–POOL AND CASCADE REACHES.
2. CHANNEL GEOMETRY WILL BE CONSTRUCTED TO FOLLOW THE GUIDELINES PROVIDED IN TABLES 1 AND 2.
3. INDIVIDUAL POOLS AND STEPS WILL BE INSTALLED AS DIRECTED BY THE ENGINEER DURING INSTALLATION, IN ACCORDANCE WITH THE STANDARD GEOMETRY PROVIDED IN THE TABLES SHOWN HEREON.
4. INDIVIDUAL BOULDERS SHOWN IN PLAN VIEW REPRESENT TYPICAL PLACEMENT OF BOULDERS EXCEEDING THE SPECIFIED D50 DIMENSIONS FOR ENGINEERED STREAMBED MATERIAL, AND SET WITH 1/3 TO 3/4 OF THE BOULDER DIAMETER SET ABOVE THE DESIGN FINISH GRADE TO CREATE DISCRETE WEIRS AND STEP FEATURES.
5. WHERE BOULDERS ARE NOT SPECIFICALLY SHOWN, ESM WILL STILL INCORPORATE THE FULL RANGE OF SPECIFIED PARTICLE SIZES.
6. IN MANY LOCATIONS, BOULDER SILLS WILL BE EXTENDED ACROSS THE FLOODPLAIN AS SHOWN ON THE SITE PLANS FOR THE ROCK PILE AND MATERIAL REMOVAL AREAS (SHEETS C19, C23, C24).
7. SEE TYPICAL SECTION–WEIR AT BOULDER SILL, SHEET C36 FOR SITUATIONS WHERE WEIRS OCCUR AT LOCATIONS OF BOULDER SILLS.

TABLE 2: STEP–POOL CHANNEL: POOL AND STEP DIMENSIONS AND SPACING

AVERAGE CHANNEL SLOPE	POOL GEOMETRY					STEP GEOMETRY		
	POOL LENGTH (FT.)	POOL DEPTH (FT.)	DROP HEIGHT (FT.)	POOL SPACING (FT.)	POOL SPACING (BANKFULL WIDTHS)	STEP DROP (FT.)	STEP SPACING (FT.)	STEP SPACING (BANKFULL WIDTHS)
4%–8%	10–20	0.5–2	0.5–1	30–120	2–6	0.5–1	8–20	0.5–1



TYPICAL STEP-POOL REACH DETAIL (ROCK PILE AND MATERIAL REMOVAL AREA)

SCALE: 1" = 6'

1B C19,C23,C24,C34

WATERWAYS CONSULTING INC.
509A SWIFT ST.
SANTA CRUZ, CA 95060
PH:(831)421-9291 // FAX:(888)819-6847
WWW.WATWAYS.COM

PRELIMINARY
NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT GROUP

TYPICAL CASCADE AND STEP-POOL REACH DETAILS (2 OF 6)

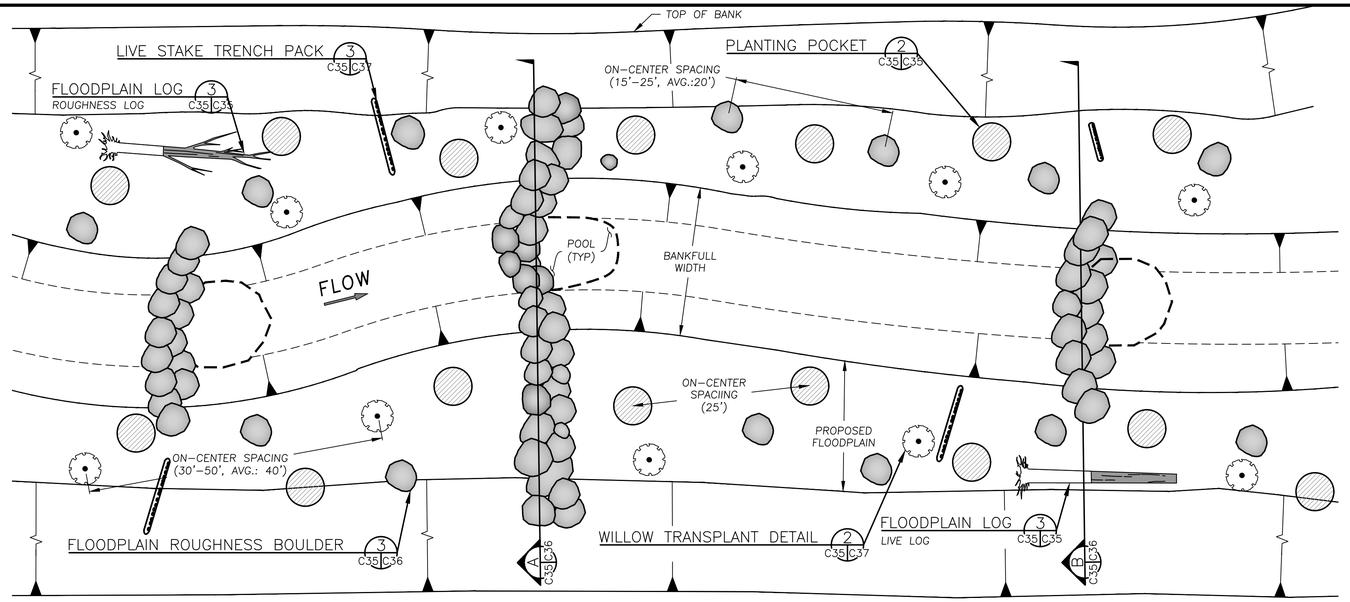
PERMANENTE CREEK RESTORATION PLAN

UPDATED 90% DESIGN

SANTA CLARA COUNTY CEQA REVIEW SUBMITTAL

DESIGNED BY:	–
DRAWN BY:	B.M.S.
CHECKED BY:	M.W.W.
DATE:	8/26/22
JOB NO.:	13-016

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"



TYPICAL FLOODPLAIN ROUGHNESS AND HABITAT PLAN (FOR ROCK PILE AND MATERIAL REMOVAL AREA)

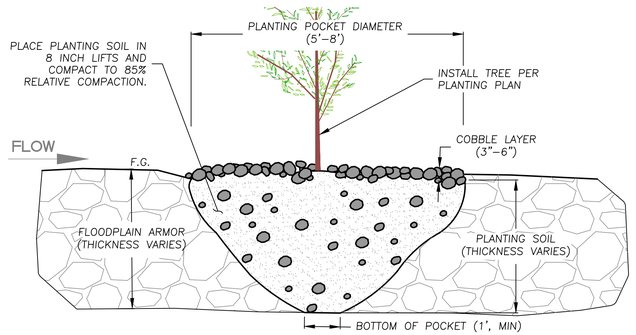
SCALE: 1" = 10'

4 C19,C23,C24,C35

PLANTING SOIL NOTES

1. PLANTING SOIL SHALL CONSIST OF NATIVE SOILS EXCAVATED DURING PROJECT CONSTRUCTION.
2. OBTAIN PLANTING SOIL FROM EXCAVATED AREAS THAT ARE WITHIN 3 FEET OF EXISTING GROUND, PRIOR TO DISTURBANCE.
3. PLANTING SOIL SHALL MEET THE FOLLOWING GRADATION:

U.S. SIEVE SIZE	PERCENT PASSING (BY WEIGHT)
6"	100
3"	90–95
1"	80–90
No.4	60–80
No.40	30–60
No.100	15–30



PLANTING POCKET

SCALE: 1" = 2'

2 C35 C35

FLOODPLAIN LOG NOTES:

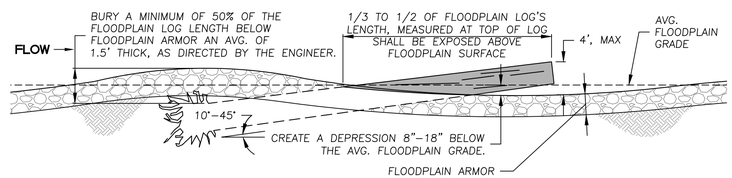
1. FLOODPLAIN LOGS SHALL BE SALVAGED WITH ROOTWADS INTACT.
2. TRIM ROOTS SO THE ROOTWAD DIAMETER IS 3'-5'.
3. FLOODPLAIN LOGS SHALL CONSIST OF BOTH ROUGHNESS LOGS AND LIVE LOGS, AS SHOWN ON RELEVANT SITE PLANS.

LIVE LOGS

1. SALVAGE ALL WILLOWS SHOWN FOR REMOVAL FOR USE AS LIVE LOGS.
2. REMOVAL ALL LIMBS FROM LIVE LOGS, MAKING CLEAN CUTS.

ROUGHNESS LOGS

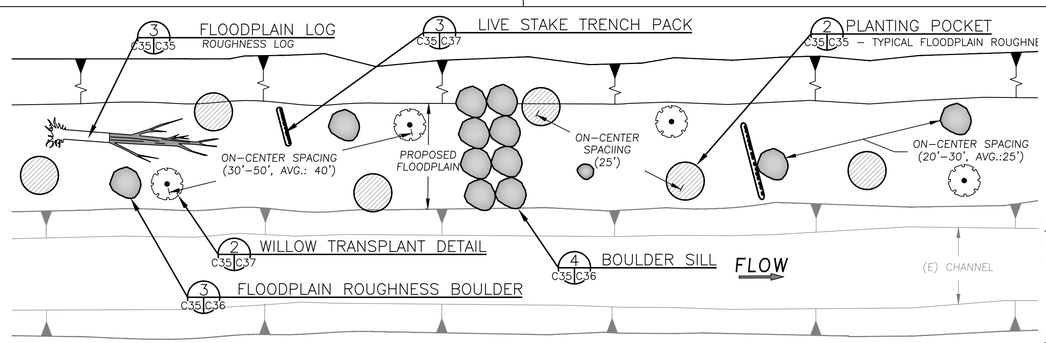
1. ALL SPECIES SHOWN FOR REMOVAL, OTHER THAN WILLOW, SHALL BE SALVAGED FOR USE AS ROUGHNESS LOGS.
2. REMOVE THE LIMBS ALONG THE LOWER HALF OF THE TREE. RETAIN THE LIMBS ALONG THE UPPER HALF TO ADD ADDITIONAL ROUGHNESS AND COMPLEXITY TO THE FLOODPLAIN.



FLOODPLAIN LOG

SCALE: 1" = 5'

3 C11,C12,C13,C14,C17,C18,C19,C23,C24,C35 C35



TYPICAL FLOODPLAIN ROUGHNESS AND HABITAT PLAN (FOR CHANNEL WIDENING)

SCALE: 1" = 10'

1 C11,C12,C13,C14,C17,C18,C35

LIVE STAKE TRENCH PACK NOTES:

1. LIVE STAKE TRENCH PACK LOCATIONS SHOWN ARE SCHEMATIC. TRENCH PACK LOCATION WILL BE STAKED IN THE FIELD BY THE ENGINEER.
2. INSTALL 30–50 LF (AVERAGE 40 LF) OF TRENCH PACK FOR EVERY 100 LF OF CONSTRUCTED CHANNEL.

PLANTING POCKET NOTES:

1. INSTALL CONTAINER PLANTS IN THE PLANTING POCKETS PER THE REVEGETATION PLANS SHEETS L4 AND L5.

WATERWAYS CONSULTING INC.
509A SWIFT ST.
SANTA CRUZ, CA 95060
PH:(831)421-9291 // FAX:(888)819-6847
WWW.WATWAYS.COM

PRELIMINARY

NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT
GROUP

TYPICAL FLOODPLAIN ROUGHNESS AND HABITAT PLAN DETAILS (3 OF 6)

PERMANENTE CREEK RESTORATION PLAN

UPDATED 90% DESIGN

SANTA CLARA COUNTY
CEQA REVIEW SUBMITTAL

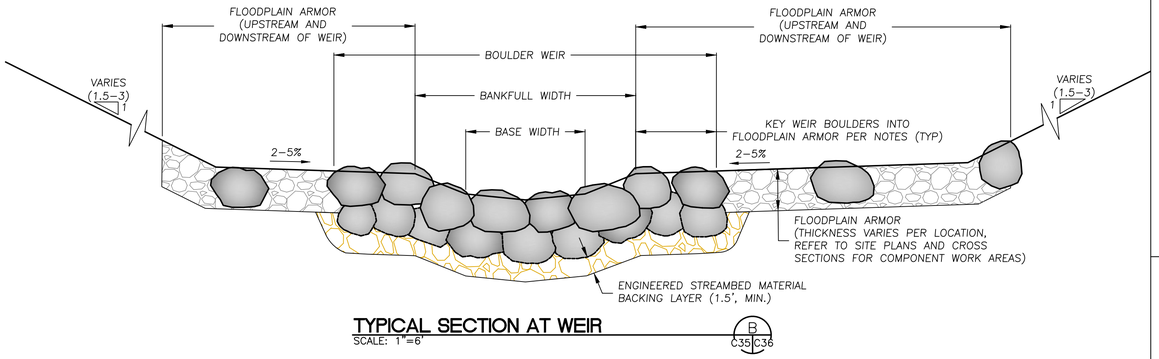
DESIGNED BY:	–
DRAWN BY:	B.M.S.
CHECKED BY:	M.W.W.
DATE:	8/26/22
JOB NO.:	13-016

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS

0 1"

C35

35 OF 47



TYPICAL SECTION AT WEIR

SCALE: 1"=6'

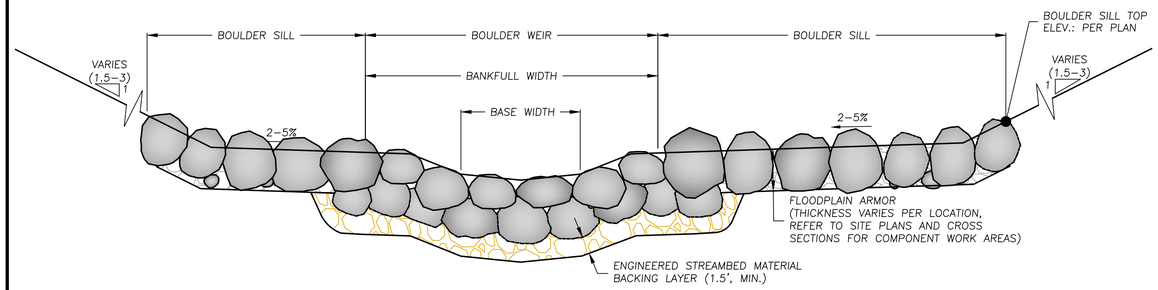
B C35|C36

NOTES:

1. CULVERT 7 AND 8 REMOVAL AREAS:
   WEIR BOULDER SIZE SHALL MEET THE MATERIAL SPECIFICATIONS FOR "WEIR BOULDERS (CULVERT 7 AND 8 REMOVAL AREAS)" SHOWN ON SHEET C39. KEY THE WEIR BOULDERS 3–5 FEET INTO THE ADJACENT FLOODPLAIN ARMOR.

2. ROCK PILE AND MATERIAL REMOVAL AREAS:
   WEIR BOULDER SIZE SHALL MEET THE MATERIAL SPECIFICATIONS FOR WEIR AND STEP BOULDERS INCLUDED IN THE "CONSTRUCTION NOTES" ON SHEET C34. KEY THE WEIR BOULDERS AT THE HEAD OF EACH CONSTRUCTED POOL 5–7 FEET INTO THE ADJACENT FLOODPLAIN ARMOR.

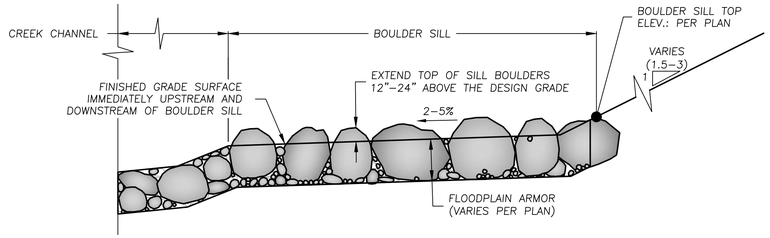
3. REFER TO COMPONENT WORK AREA CROSS SECTIONS FOR BANKFULL AND BASE WIDTH DIMENSIONS.



TYPICAL SECTION – WEIR AT BOULDER SILL

SCALE: 1"=6'

A C35|C36

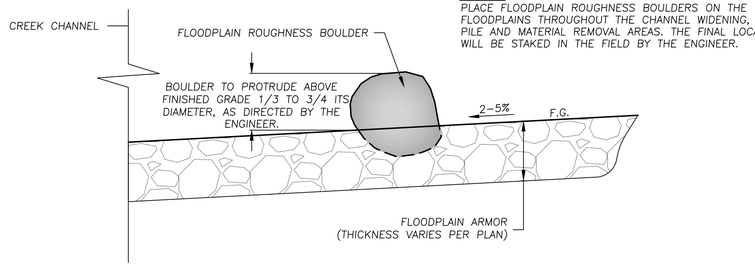


TYPICAL BOULDER SILL

SCALE: N.T.S.

4 C11,C12,C13,C14,C35|C36

BOULDER SILL NOTE:
SILL WIDTH (MEASURED PARALLEL TO FLOW) SHALL BE 6 FEET.

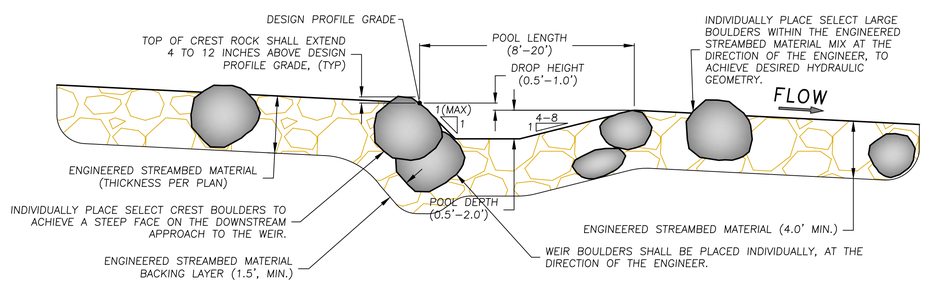


NOTE:
PLACE FLOODPLAIN ROUGHNESS BOULDERS ON THE FLOODPLAINS THROUGHOUT THE CHANNEL WIDENING, ROCK PILE AND MATERIAL REMOVAL AREAS. THE FINAL LOCATIONS WILL BE STAKED IN THE FIELD BY THE ENGINEER.

FLOODPLAIN ROUGHNESS BOULDER

SCALE: 1"=3'

3 C35|C36



TYPICAL WEIR/POOL PROFILE

SCALE: 1" = 5'

1 C11,C15|C36

WATERWAYS CONSULTING INC.
509A SWIFT ST.
SANTA CRUZ, CA 95060
PH:(831)421-9291 // FAX:(888)819-6847
WWW.WATWAYS.COM

PRELIMINARY
NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT GROUP

TYPICAL BOULDER WEIR, SILL, AND POOL DETAILS (4 OF 6)

PERMANENTE CREEK RESTORATION PLAN

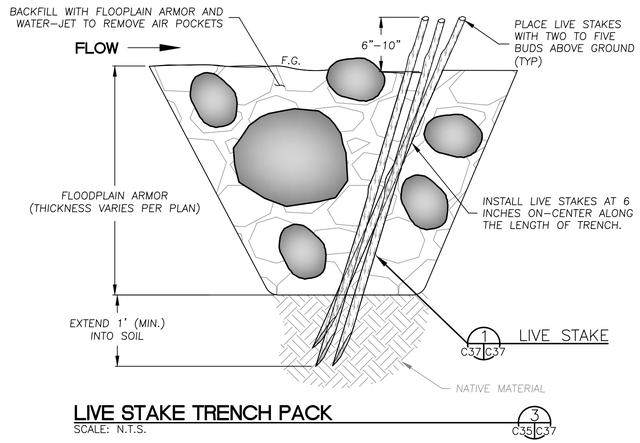
UPDATED 90% DESIGN

SANTA CLARA COUNTY
CEQA REVIEW SUBMITTAL

DESIGNED BY:	–
DRAWN BY:	B.M.S.
CHECKED BY:	M.W.W.
DATE:	8/26/22
JOB NO.:	13-016

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

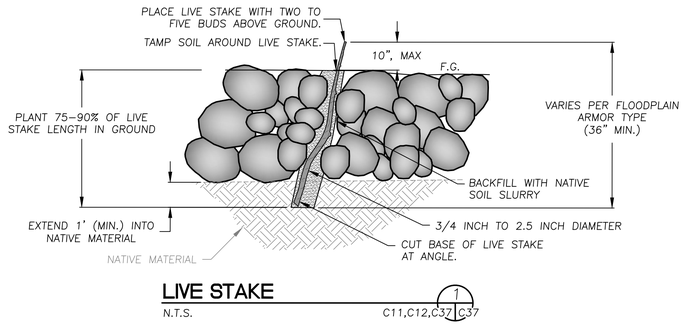
C36



LIVE STAKE TRENCH PACK

SCALE: N.T.S.

3
C35 C37



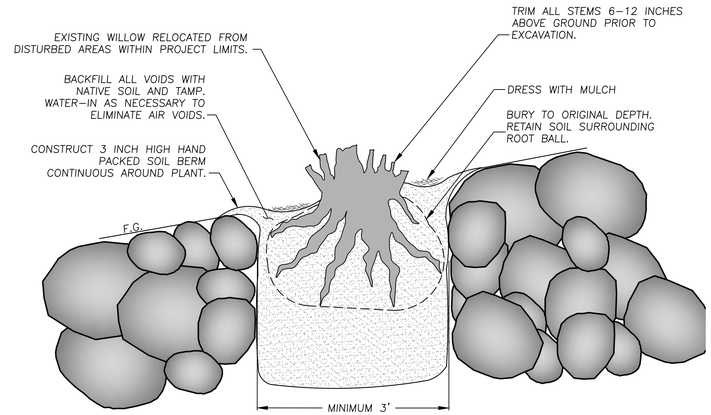
LIVE STAKE

N.T.S.

1
C11,C12,C37 C37

LIVE STAKE NOTES:

1. INSTALL LIVE STAKES WITHIN ENGINEERED STREAMBED MATERIAL, FLOODPLAIN ARMOR AND RSP.
2. EXTEND LIVE STAKES THROUGH SPECIFIED ROCK MATERIAL TO CONTACT SOIL.
3. CUT TOP ENDS OF STAKES BLUNT AND BASAL ENDS ANGLED AT 45 DEGREES.
4. AFTER PLACEMENT, BACKFILL AND WATER–JET ALL VOIDS AROUND LIVE STAKES TO REMOVE AIR POCKETS.
5. AFTER INSTALLATION CLEANLY CUT EACH STAKE TO LEAVE 6–10 INCHES EXPOSED.



WILLOW TRANSPLANT DETAIL

SCALE: N.T.S.

2
C11,C12,C35 C37

WILLOW TRANSPLANT NOTES:

1. GENERAL
   1.1. SEE THE TREE REMOVAL NOTES ON SHEET C1 AND THE TYPICAL FLOODPLAIN AND HABITAT PLANS ON SHEET C35 FOR WILLOW TRANSPLANT INSTALLATION LOCATIONS.
2. SALVAGE:
   2.1. LIVE SHRUBS TO BE SALVAGED FOR TRANSPLANTING WILL BE FLAGGED IN THE FIELD BY THE ENGINEER.
   2.2. PRIOR TO REMOVAL, CUT BRANCHES TO 6–12 INCHES ABOVE THE ROOT CROWN, USING SHARP, CLEAN TOOLS.
   2.3. REMOVE THE ROOTWAD AND A MINIMUM EIGHTEEN INCH LAYER (AT SIDES AND BASE) OF ROOTS AND SOIL FROM THE GROUND AND EITHER TRANSPORT DIRECTLY TO THE PROPOSED LOCATION FOR INSTALLATION, OR STORE AS OUTLINED BELOW. PERFORM SALVAGE AND RELOCATION IN SUCH A MANNER AS TO MINIMIZE HANDLING AND ASSOCIATED DISTURBANCE TO THE SOIL BOUND BY THE ROOTS.
   2.4. IMMEDIATELY COVER LIVE SHRUBS WITH A SINGLE LAYER OF SATURATED BURLAP TO PREVENT DESICCATION OF THE ROOTS, AND PLACE UNDER SHADE COVERING IF THE LIVE SHRUB IS NOT PLANTED WITHIN FIFTEEN MINUTES OF SALVAGE. MAINTAIN SATURATION OF THE BURLAP AND SOIL MASS UNTIL PLANTED.
   2.5. DO NOT STACK LIVE SHRUBS ON TOP OF ONE ANOTHER DURING STORAGE.
   2.6. IN NO EVENT SHALL SALVAGED ROOTWADS BE STORED FOR PERIODS EXCEEDING 72 HOURS, WITHOUT PRIOR WRITTEN PERMISSION OF THE ENGINEER.
3. INSTALLATION
   3.1. PLACE THE EXCAVATED ROOTWAD IN A PRE–PREPARED HOLE. FILL THE HOLE WITH WATER IMMEDIATELY PRIOR TO PLANTING. SCARIFY THE SIDES OF THE PLANTING HOLE PRIOR TO PLANTING.
   3.2. REMOVE BURLAP PRIOR TO PLANTING. BACKFILL THE HOLE HALF WAY WITH NATIVE SOIL AND JET WITH WATER TO REMOVE VOIDS AFTER PLACEMENT. CONTINUE TO ADD SOIL AND WATER UNTIL THE SATURATED BACKFILL MATERIAL COVERS THE TOP OF THE ROOT CROWN TO THE APPROXIMATE ORIGINAL DEPTH OF SOIL, PRIOR TO SALVAGE.

WATERWAYS CONSULTING INC.
509A SWIFT ST.
SANTA CRUZ, CA 95060
PH:(831)421-9291 // FAX:(888)819-6847
WWW.WATWAYS.COM

PRELIMINARY

NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:

LEHIGH HANSON
HEIDELBERG CEMENT GROUP

TYP WILLOW LIVE STAKE TRENCH PACK + RELOCATION DETAILS (5 OF 6)

PERMANENTE CREEK RESTORATION PLAN

UPDATED 90% DESIGN

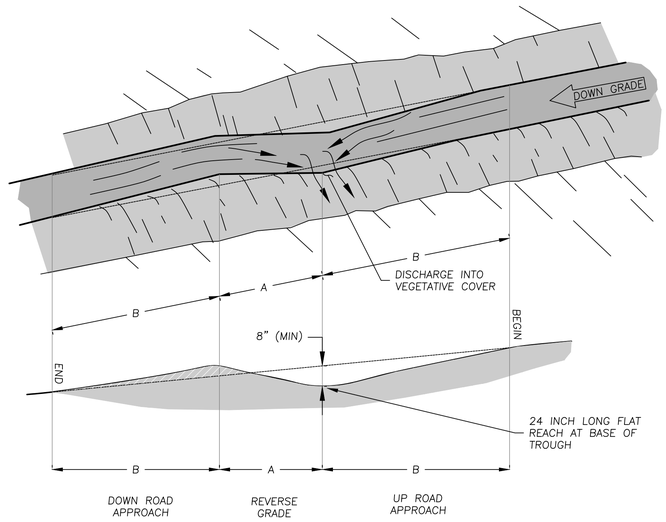
SANTA CLARA COUNTY
CEQA REVIEW SUBMITTAL

DESIGNED BY:	–
DRAWN BY:	B.M.S.
CHECKED BY:	M.W.W.
DATE:	8/26/22
JOB NO.:	13–016

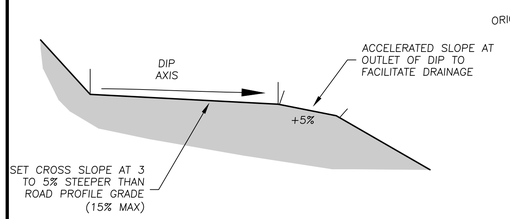
BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS

0 1"

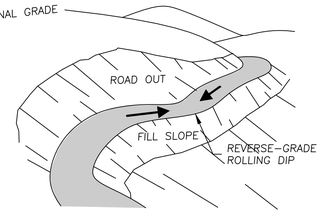
C37



REVERSE GRADE DIP OVERVIEW



ROAD SECTION

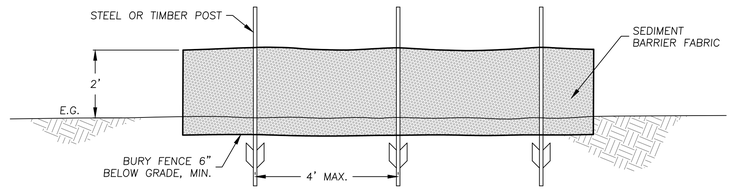


OBLIQUE VIEW

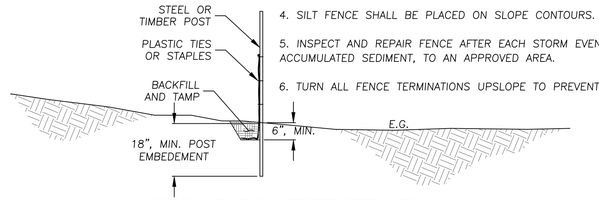
ROAD GRADE (%)	TROUGH	A: REVERSE GRADE	B: UP ROAD APPROACH DOWN ROAD TRAIL	
	MINIMUM DEPTH BELOW DONWSLOPE CREST	MINIMUM DISTANCE AND GRADE FROM TROUGH AXIS TO DOWNROAD CREST (FT)	DISTANCE FROM UP-ROAD START OF ROLLING DIP TO TROUGH AXIS (FT)	GRADE (%)
<5	8 INCHES	15 FEET AT 5%	17	10
5 TO 10			30	15
10 TO 15			60	20
>15		7 FEET AT 10%	60	25

NOTES
1. CUT DIP INTO THE ROAD WITH THE DOWN ROAD APPROACH BUILT UP ON COMPACTED FILL.
2. CONSTRUCT DIP TO A MINIMUM OF 8 INCHES DEEP AND INCORPORATE A 2 FOOT LONG FLAT REACH AT THE BASE OF THE TROUGH (UNLESS OTHERWISE DIRECTED).
3. SLOPE THE DOWNROAD REVERSE GRADE AT 5% FOR A MINIMUM OF 7 FEET, TO 10% FOR MINIMUM OF 15 FEET, TO FORM THE MINIMUM 8 INCH DEEP DIP. ON ROADS STEEPER THAN 15% A STEEPER REVERSE-GRADE DIP MAY BE REQUIRED.
4. OUTSLOPE DIP AXIS 3-5% GREATER THAN ROAD GRADE TO MAXIMUM 15%. DIP AXIS MAY BE SKEWED DOWN ROAD AT 30 DEGREES TO FACILITATE INSTALLATION OF DIPS ON STEEPER GRADES.
5. DO NOT PUSH MATERIAL OVER THE EDGE OF SLOPE. ALL EXCAVATED MATERIAL SHALL BE USED TO CONSTRUCT THE DOWN ROAD APPROACH.
6. DIP LOCATIONS SHOWN ON THE DRAWINGS ARE APPROXIMATE. FINAL LOCATIONS WILL BE STAKED IN THE FIELD BY THE ENGINEER.
7. ON EXISTING ROADS BUILD DOWNSLOPE LIP WITH COMPACTED FILL

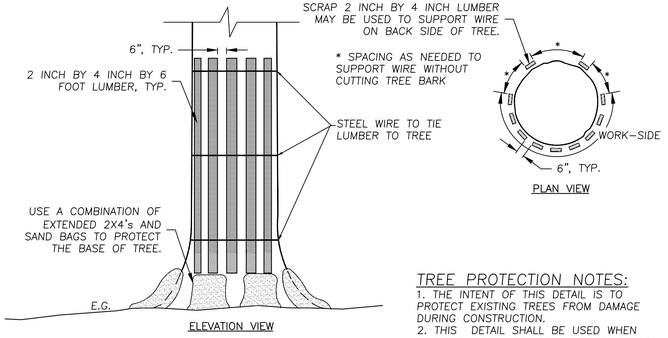
REVERSE GRADE ROLLING DIP (1)
SCALE: N.T.S. C11,C12,C13,C14,C17,C18,C19,C19,C23,C24|C38



SEDIMENT BARRIER FENCE NOTES
1. LEHIGH WILL COORDINATE WITH USFWS STAFF DURING THE SECTION 7 CONSULTATION TO IDENTIFY AN APPROPRIATE FABRIC FOR USE AS A SEDIMENT BARRIER.
2. DIG TRENCH FIRST, THEN ERECT FENCE IN TRENCH. BACKFILL AND COMPACT SOIL TO SECURE FABRIC.
3. PROVIDE 1' MINIMUM OVERLAP AT FENCE SPLICES.
4. SILT FENCE SHALL BE PLACED ON SLOPE CONTOURS.
5. INSPECT AND REPAIR FENCE AFTER EACH STORM EVENT AND REMOVE ACCUMULATED SEDIMENT, TO AN APPROVED AREA.
6. TURN ALL FENCE TERMINATIONS UPSLOPE TO PREVENT FLANKING.



SEDIMENT BARRIER FENCE (2)
SCALE: 1"=2' C29,C30|C38

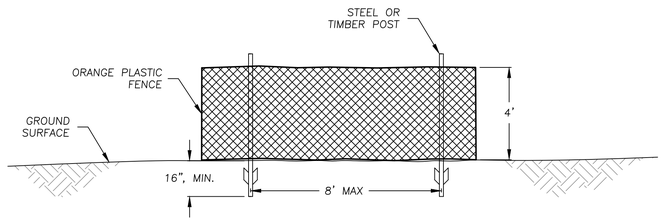


ELEVATION VIEW

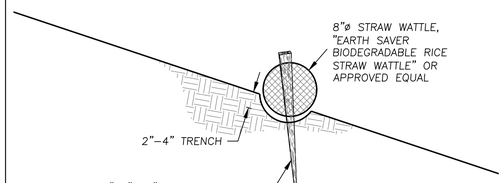
PLAN VIEW

TREE PROTECTION NOTES:
1. THE INTENT OF THIS DETAIL IS TO PROTECT EXISTING TREES FROM DAMAGE DURING CONSTRUCTION.
2. THIS DETAIL SHALL BE USED WHEN WORKING WITHIN 10' OF AN EXISTING TREE TO REMAIN, AS DIRECTED BY THE ENGINEER.
3. DO NOT DAMAGE OR REMOVE TREES UNLESS NOTED OTHERWISE ON THE PLANS OR AS DIRECTED BY THE ENGINEER.
4. LUMBER, WIRE, AND SANDBAGS MAY BE REUSED AT OTHER TREES, AS WORK PROGRESSES.

TREE PROTECTION DETAIL (3)
SCALE: 1"=2' C11,C12,C13,C14|C38



BOUNDARY FENCE DETAIL (4)
SCALE: 1"=3' C38

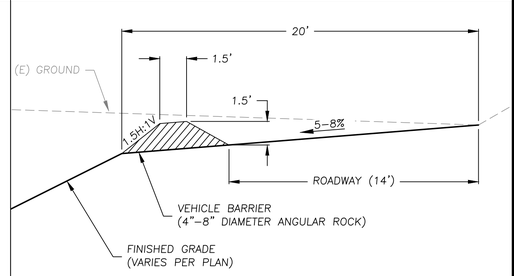


FIBER ROLL (5)
SCALE: 1"=1' C30|C38

FIBER ROLL NOTES:
1. INSTALL FIBERS WITH THE SPACING SHOWN IN TABLE 2.
2. CLEAR THE BOTTOM OF TRENCH OF OBSTRUCTIONS INCLUDING ROCKS, CLODS, AND DEBRIS GREATER THAN ONE INCH IN DIAMETER BEFORE FIBER ROLL INSTALLATION.
3. INSTALL FIBER ROLLS PARALLEL TO THE SLOPE CONTOUR. ANGLE THE TERMINUS OF ROWS UP-SLOPE AT 45 DEGREES FOR A DISTANCE OF THREE FEET. WHERE FIBER ROLLS MEET, PROVIDE AN OVERLAP OF 1.5 FEET, WITH ADJACENT ROLLS TIGHTLY ABUTTING EACH OTHER.

TABLE 2: FIBER ROLL SPACING

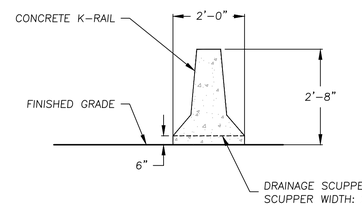
SLOPE INCLINATION	SPACING ALONG SLOPE
2H:1V AND STEEPER	10 FEET
4H:1V TO 2H:1V	15 FEET
10H:1V TO 4H:1V	20 FEET
FLATTER THAN 10H:1V	MAX. 50 FEET



NOTES:
1. VEHICLE BARRIERS ARE DESIGNED FOR VEHICLES WITH A MAXIMUM AXLE HEIGHT OF 1.5 FEET FROM THE GROUND SURFACE.
2. LEAVE 4 TO 5 FOOT WIDE OPENINGS IN VEHICLE BARRIER EVERY 50-60 FEET TO ALLOW FOR UNOBSTRUCTED DRAINAGE FROM ROADWAY.
3. CONSTRUCTION VEHICLE BARRIER OF 10" - 16" DIAMETER ANGULAR ROCK FROM STA. 44+25 TO 44+75 AT THE CHANNEL WIDENING AREA.

VEHICLE BARRIER (TYPE 1) (6)
SCALE: 1"=5' C11,C12,C13,C14|C38

NOTES:
LEAVE 4'-5' WIDE OPENINGS IN VEHICLE BARRIER EVERY 50-60 FEET TO ALLOW FOR UNOBSTRUCTED DRAINAGE FROM ROADWAY.



VEHICLE BARRIER (TYPE 2) (7)
SCALE: 1"=2' C19,C20,C21|C38

WATERWAYS CONSULTING INC.
509A SWIFT ST.
SANTA CRUZ, CA 95060
PH:(831)421-9291 / FAX:(888)819-6847
WWW.WATWAYS.COM

PRELIMINARY
NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT GROUP

DETAILS (6 OF 6)

PERMANENTE CREEK RESTORATION PLAN
UPDATED 90% DESIGN
SANTA CLARA COUNTY
CEQA REVIEW SUBMITTAL

DESIGNED BY: -
DRAWN BY: B.M.S.
CHECKED BY: M.W.W.
DATE: 8/26/22
JOB NO.: 13-016

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

C38 | 38 OF 47

ROCK SPECIFICATIONS

THERE ARE EIGHT CLASSES OF ROCK SPECIFIED ON THIS PROJECT;
(1) – ENGINEERED STREAMBED MATERIAL
(2) – FLOODPLAIN ARMOR
(3) – ROCK SLOPE PROTECTION (RSP)
(4) – WEIR BOULDERS
(5) – SILL BOULDERS
(6) – FLOODPLAIN ROUGHNESS BOULDERS
(7) – BACKING LAYER
(8) – STREAM SUBSTRATE

ALL ROCK SHALL CONFORM TO THE FOLLOWING QUALITY REQUIREMENTS:

1) RESISTANT TO WEATHERING AND WATER ACTION AND FREE OF ORGANIC OR OTHER UNSUITABLE MATERIAL. DO NOT USE SHALE, ROCK WITH SHALE SEAMS, OR OTHER FISSILE OR FISSURED ROCK THAT MAY BREAK INTO SMALLER PIECES IN THE PROCESS OF HANDLING AND PLACING.
2) SUB–ROUNDED TO ANGULAR IN SHAPE.
3) GRANITE OR HAVE A SPECIFIC GRAVITY EQUAL TO OR GREATER THAN THAT OF GRANITE.
4) COLOR AND TEXTURE CONSTANT THROUGHOUT THE STOCKPILE.

PROVIDE SAMPLES OF EACH GRADATION SPECIFIED FOR APPROVAL BY THE ENGINEER, PRIOR TO STOCKPILING AT INDIVIDUAL PROJECT AREAS.

INDIVIDUAL ROCK CLASSES AND PLACEMENT METHODS ARE FURTHER DEFINED AS FOLLOWS:

1 – ENGINEERED STREAMBED MATERIAL

ENGINEERED STREAMBED MATERIAL SHALL CONSIST OF SANDS, GRAVELS, COBBLES, AND BOULDERS FREE OF ORGANIC MATTER, AND MEETING THE FOLLOWING GRADATION SPECIFICATIONS (REFER TO DRAWINGS FOR TYPE LOCATIONS):

TYPE 1 GRADATION:

PERCENT OF MIX (BY WEIGHT)	SIZE RANGE (INCHES)
20	12–24
30	6–12
30	2–6
12	0.08–2
8	<0.08

TYPE 2 GRADATION:

PERCENT OF MIX (BY WEIGHT)	SIZE RANGE (INCHES)
20	24–36
30	16–24
20	6–16
10	2–6
12	0.08–2
8	<0.08

TYPE 3 GRADATION:

PERCENT OF MIX (BY WEIGHT)	SIZE RANGE (INCHES)
20	30–42
30	16–30
20	6–16
10	2–6
12	0.08–2
8	<0.08

TYPE 4 GRADATION:

PERCENT OF MIX (BY WEIGHT)	SIZE RANGE (INCHES)
20	48–60
30	24–48
20	10–24
10	2–10
12	0.08–2
8	<0.08

A) PLACE ENGINEERED STREAMBED MATERIAL TO THE LINES, GRADES AND THICKNESSES SHOWN ON THE DRAWINGS, OR AS DIRECTED BY THE ENGINEER. UNIFORMLY DISTRIBUTE LARGE STONES TO PRODUCE THE REQUIRED GRADATION OF ROCK. PREVENT CONTAMINATION OF ROCK MATERIALS BY EXCAVATION AND/OR EARTH MATERIALS.

B) FOLLOWING PLACEMENT, WATER–JET VOIDS WITHIN ROCK TO IMPROVE COMPACTION AND EMBED THE FINES WITHIN THE MIX. START JETTING AT THE UPSTREAM LIMITS OF PLACEMENT AND PROGRESS DOWNSTREAM. CONTINUE JETTING UNTIL THE TURBIDITY LEVELS OF RUNOFF PRODUCED FROM THE JETTING PROCESS HAVE REACHED AN ACCEPTABLE LEVEL AS DETERMINED BY THE ENGINEER. RETAIN ALL SEDIMENT–LADEN RUNOFF GENERATED BY THE JETTING OPERATIONS SO ENTRAINED SEDIMENT CAN SETTLE OUT OR BE PUMPED TO A SETTLING TANK OR SIMILAR DEVICE TO REDUCE TURBIDITY TO ACCEPTABLE LEVELS, IN COMPLIANCE WITH PERMIT CONDITIONS, PRIOR TO DISCHARGE TO THE CREEK. DISPOSE OF ALL CAPTURED SEDIMENT AT AN APPROVED LOCATION.

2 – FLOODPLAIN ARMOR

FLOODPLAIN ARMOR MATERIAL SHALL CONSIST OF SANDS, GRAVELS, COBBLES, AND BOULDERS FREE OF ORGANIC MATTER, AND MEETING THE FOLLOWING GRADATION SPECIFICATIONS (REFER TO DRAWINGS FOR TYPE LOCATIONS):

TYPE 5 GRADATION:

COMPLY WITH THE ENGINEERED STREAMBED MATERIAL TYPE 1 GRADATION.

TYPE 6 GRADATION:

PERCENT OF MIX (BY WEIGHT)	SIZE RANGE (INCHES)
20	16–30
30	10–16
20	4–10
10	2–4
12	0.08–2
8	<0.08

TYPE 7 GRADATION:

COMPLY WITH THE ENGINEERED STREAMBED MATERIAL TYPE 3 GRADATION.

TYPE 8 GRADATION:

COMPLY WITH THE ENGINEERED STREAMBED MATERIAL TYPE 4 GRADATION.

A) PLACE FLOODPLAIN ARMOR MATERIAL TO THE LINES, GRADES AND DEPTHS SHOWN ON THE DRAWINGS, OR AS DIRECTED BY THE ENGINEER. UNIFORMLY DISTRIBUTE LARGE STONES TO PRODUCE THE REQUIRED GRADATION OF ROCK. PREVENT CONTAMINATION OF ROCK MATERIALS BY EXCAVATION AND/OR EARTH MATERIALS.

B) FOLLOWING PLACEMENT, WATER–JET VOIDS WITHIN ROCK TO IMPROVE COMPACTION AND EMBED THE FINES WITHIN THE MIX. START JETTING AT THE UPSTREAM LIMITS OF PLACEMENT AND PROGRESS DOWNSTREAM. CONTINUE JETTING UNTIL THE TURBIDITY LEVELS OF RUNOFF PRODUCED FROM THE JETTING PROCESS HAVE REACHED AN ACCEPTABLE LEVEL AS DETERMINED BY THE ENGINEER. RETAIN ALL SEDIMENT–LADEN RUNOFF GENERATED BY THE JETTING OPERATIONS SO ENTRAINED SEDIMENT CAN SETTLE OUT OR BE PUMPED TO A SETTLING TANK OR SIMILAR DEVICE TO REDUCE TURBIDITY TO ACCEPTABLE LEVELS, IN COMPLIANCE WITH PERMIT CONDITIONS, PRIOR TO DISCHARGE TO THE CREEK. DISPOSE OF ALL CAPTURED SEDIMENT AT AN APPROVED LOCATION.

3 – ROCK SLOPE PROTECTION

A) ROCK SLOPE PROTECTION (RSP) SHALL CONFORM TO SECTION 72–2.02 MATERIALS OF THE STANDARD SPECIFICATIONS AND MEET THE MATERIAL GRADATIONS SHOWN ON THE DRAWINGS WHERE PROPOSED RSP IS SHOWN.

B) BACKFILL VOIDS WITHIN THE ROCK SLOPE PROTECTION USING STREAM SUBSTRATE. NATIVE STREAMBED MATERIAL MAY BE USED AS STREAM SUBSTRATE IF IT MEETS THE GRADATION REQUIREMENTS FOR STREAM SUBSTRATE.

C) PLACE BACKFILL MATERIAL TO MATCH THE FINISHED SURFACE OF THE RSP AND WATER–JET TO FILL ALL VOIDS, AS DIRECTED BY THE ENGINEER.

ROCK SLOPE PROTECTION FABRIC
1. PLACE GEOTEXTILE FABRIC BELOW ROCK SLOPE PROTECTION.
2. USE NON–WOVEN, GEOTEX 1601, AS MANUFACTURED BY SYNTHETIC INDUSTRIES; OR MIRAFI 1160N, AS MANUFACTURED BY TC MIRAFI; OR APPROVED EQUAL.

INSTALLATION
1. PREPARE SURFACE TO RECEIVE THE GEOTEXTILE TO A RELATIVELY SMOOTH CONDITION, FREE OF OBSTRUCTIONS, DEPRESSIONS, DEBRIS, AND SOFT OR LOW DENSITY POCKETS OF MATERIAL.
2. PLACE AND SECURE A LAYER OF GEOTEXTILE FABRIC BELOW THE FIRST ROCK LAYER. AT THE TIME OF INSTALLATION, THE GEOTEXTILE WILL BE REJECTED IF IT HAS DEFECTS, RIPS, HOLES, FLAWS, DETERIORATION, OR DAMAGE INCURRED DURING MANUFACTURE, TRANSPORTATION, OR STORAGE.
3. PLACE GEOTEXTILE WITH THE LONG DIMENSION PARALLEL TO FLOW AND LAID SMOOTH AND FREE OF TENSION, STRESS, FOLDS, WRINKLES, OR CREASES.

4 – WEIR BOULDERS (CULVERT 7 AND 8 REMOVAL AREAS)

A) WEIR BOULDERS SHALL HAVE A MINIMUM Y–AXIS DIMENSION OF 4 FEET AND A MINIMUM WEIGHT OF 3 TONS.

5 – SILL BOULDERS

A) SILL BOULDERS SHALL BE BETWEEN THE D84–D100 OF THE SPECIFIED FLOODPLAIN ARMOR GRADATION AT THE LOCATION OF THE SILL.

6 – FLOODPLAIN ROUGHNESS BOULDERS

A) FLOODPLAIN ROUGHNESS BOULDERS SHALL MEET THE D84 (MIN.) OF THE SPECIFIED FLOODPLAIN ARMOR GRADATION AT THE LOCATION OF THE FLOODPLAIN ROUGHNESS BOULDER.

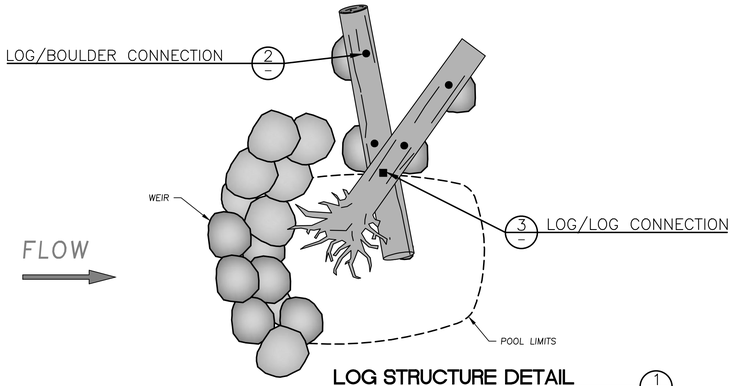
7 – BACKING LAYER

A) THE BACKING LAYER SHALL CONSIST OF A 50/50 MIX OF CALTRANS CLASS III RSP AND STREAM SUBSTRATE.

8 – STREAM SUBSTRATE

A) NATIVE STREAMBED MATERIAL CAN BE USED AS STREAM SUBSTRATE IF IT MEETS THE FOLLOWING MATERIAL GRADATION. FINAL DETERMINATION WILL BE MADE BY THE ENGINEER.

US SIEVE SIZE	PERCENT PASSING
12"	100%
6"	50–70%
3"	20–40%
No. 10	5–10%

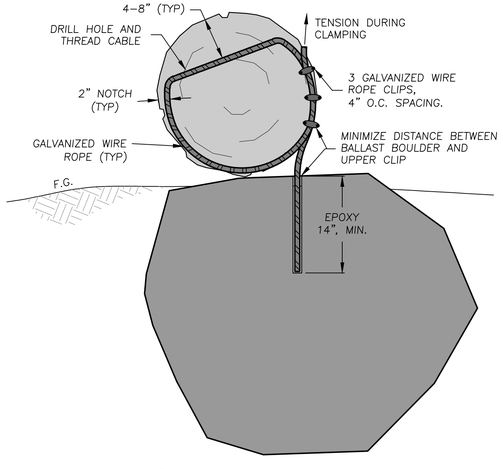


LOG STRUCTURE DETAIL 1
SCALE: NOT TO SCALE
C11,C14,C39

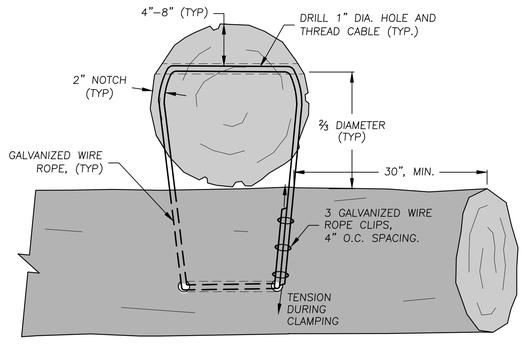
LOG STRUCTURE NOTES:

1. PLACEMENT LOCATIONS: LOG AND BOULDER LOCATIONS SHOWN ON DRAWINGS ARE APPROXIMATE. EXACT LOCATIONS SHALL BE AS DIRECTED BY THE ENGINEER.
2. CONNECTIONS: CONNECTIONS SHALL CONSIST OF TWO (2) LOG/BOULDER CONNECTIONS AND ONE (1) LOG/LOG CONNECTION PER LOG, AS SHOWN ON DETAILS 2 AND 3, THIS SHT.. OR AS DIRECTED BY THE ENGINEER. TENSION ALL CONNECTIONS PRIOR TO CLAMPING TO REMOVE SLACK AND MINIMIZE MOVEMENT. ALL CONNECTIONS SHALL BE PLACED TO MINIMIZE VISUAL IMPACT.
3. LOGS: LOGS SHALL BE REDWOOD OR FIR. EACH LOG STRUCTURE SHALL CONSIST OF ONE LOG WITH ROOTWAD ATTACHED AND ONE LOG WITHOUT ROOTWAD. ALL LOGS SHALL BE SOUND AND FREE OF SIGNIFICANT DECAY, MEETING THE FOLLOWING CRITERIA:
   A. DIAMETER: 24 – 36 INCH (MIN. 24 INCHES AT ANY POINT)
   B. LENGTH: 20 – 30 FEET
4. BALLAST BOULDERS: BALLAST BOULDERS WILL BE SUB–ROUNDED TO SUB–ANGULAR WITH A MINIMUM WEIGHT OF 2.5 TONS (5,000 POUNDS). PLACE TWO BALLAST BOULDERS PER LOG, MINIMUM.
5. CABLE: ALL CABLE SHALL BE 5/8" GALVANIZED WIRE ROPE WITH A MINIMUM BREAKING STRENGTH OF 25,000 LBS. ALL CABLE TO BE SECURED WITH A MINIMUM OF THREE GALVANIZED WIRE ROPE CLIPS AT EACH END, WITH 4", MIN. SPACING BETWEEN CLAMPS AND 2", MIN. DISTANCE TO CABLE ENDS. CABLE SHALL BE THOROUGHLY CLEANED WITH A SOLUTION OF MURIATIC ACID OR WITH ACETONE TO REMOVE ALL GREASE OR OIL FROM BONDED LENGTH. CABLES SHALL BE TENSIONED PRIOR TO CLAMPING TO REMOVE ALL SLACK FROM CABLE, AFTER EPOXY IS ALLOWED TO SET UP OVERNIGHT PER THE EPOXY NOTES BELOW.
6. HOLE PLACEMENT/PREPARATION: HOLES FOR ANCHORING INTO BOULDERS/ROCK FACE SHALL BE DRILLED WHERE ROCK IS SOUND, WHERE NO FAULTS OR FRACTURES ARE VISIBLE. HOLE DIAMETER SHALL BE NOT MORE THAN 1/8" GREATER THAN THAT OF THE ANCHOR/CABLE. HOLES SHALL BE DRILLED TO ALIGN WITH FINAL ORIENTATION OF TENSILE FORCES IN THE ANCHOR/CABLE, TO MINIMIZE BENDING AT THE ROCK SURFACE. HOLES SHALL BE PROPERLY CLEANED OF ALL DUST AND DEBRIS USING COMPRESSED AIR PRIOR TO INSTALLATION OF CABLE/ANCHOR. THE ENGINEER SHALL INSPECT AND APPROVE ALL HOLES PRIOR TO EPOXY PLACEMENT.
7. EPOXY: FILL THE HOLE APPROXIMATELY 2/3 WITH EPOXY BEFORE INSERTING THE CABLE TO THE BOTTOM OF THE HOLE. ALLOW ADHESIVE TO SET UP OVERNIGHT BEFORE APPLYING TENSION TO CABLE.

   ANCHORING ADHESIVE SHALL BE A TWO–COMPONENT 100% SOLIDS EPOXY BASED SYSTEM SUPPLIED IN MANUFACTURER'S STANDARD CARTRIDGE AND DISPENSED THROUGH A STATIC–MIXING NOZZLE SUPPLIED BY THE MANUFACTURER. EPOXY SHALL MEET THE MINIMUM REQUIREMENTS OF ASTM C–881 SPECIFICATION FOR TYPE I, II, IV, AND V, GRADE 3, CLASS B AND C AND MUST DEVELOP MINIMUM 12,650 PSI COMPRESSIVE YIELD STRENGTH AFTER 7 DAY CURE. EPOXY MUST HAVE A HEAT REFLECTION TEMPERATURE OF A MINIMUM 136 DEGREES FAHRENHEIT (58 DEGREES CELSIUS). ADHESIVE SHALL BE EPOXY–TIE SET FROM SIMPSON STRONG–TIE, DUBLIN, CA, OR APPROVED EQUIVALENT. FILL THE HOLE APPROXIMATELY 2/3 WITH POLYESTER EPOXY RESIN BEFORE INSERTING CABLE TO THE BOTTOM OF THE HOLE. TAKE CARE TO ENSURE HIGH BOND STRENGTH, AND AVOID CONTAMINATION. ALLOW ADHESIVE TO SET UP OVERNIGHT BEFORE APPLYING TENSION TO CABLE.
8. LOG STRUCTURE DESIGNS ARE SHOWN CONCEPTUALLY DUE TO THE INHERENT VARIABILITY OF MATERIAL PROPERTIES. THE DESIGN REQUIRES THAT THE ENGINEER WILL OBSERVE CONSTRUCTION OF THE LOG STRUCTURES TO ENSURE THE INTENT OF THE DESIGN IS MET. OBSERVATIONS MUST INCLUDE LOG AND BOULDER SELECTION, PLACEMENT, AND BACKFILLING. ANY LOG STRUCTURES CONSTRUCTED WITHOUT THE ENGINEER PRESENT ON–SITE MAY RESULT IN REJECTION OF THE WORK BY THE ENGINEER.



LOG/BOULDER CONNECTION 2
SCALE: 1" = 1'



LOG/LOG CONNECTION 3
SCALE: 1" = 1'

WATERWAYS CONSULTING INC.
509A SWIFT ST.
SANTA CRUZ, CA 95060
PH:(831)421-9291 // FAX:(888)819-6847
WWW.WATWAYS.COM

PRELIMINARY
NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT GROUP

LOG STRUCTURE DETAILS AND ROCK SPECIFICATIONS

PERMANENTE CREEK RESTORATION PLAN
UPDATED 90% DESIGN
SANTA CLARA COUNTY
CEQA REVIEW SUBMITTAL

DESIGNED BY:	B.M.Z.
DRAWN BY:	B.M.Z.
CHECKED BY:	M.W.W.
DATE:	8/26/22
JOB NO.:	13–016

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

GENERAL NOTES CONTINUED

1. ALL CONSTRUCTION AND MATERIALS SHALL CONFORM TO THE 2015 EDITION OF THE STATE OF CALIFORNIA STANDARD SPECIFICATIONS, ISSUED BY THE DEPARTMENT OF TRANSPORTATION (HEREAFTER REFERRED TO AS "STANDARD SPECIFICATIONS").

2. NOTIFY THE ENGINEER AT LEAST 48 HOURS PRIOR TO CONSTRUCTION. THE ENGINEER OR A DESIGNATED REPRESENTATIVE SHALL MONITOR THE CONSTRUCTION PROCESS, AS NECESSARY, TO ENSURE PROPER INSTALLATION PROCEDURES.

3. EXISTING UNDERGROUND UTILITY LOCATIONS:

   A. PRIOR TO BEGINNING WORK, CONTACT ALL UTILITIES COMPANIES WITH REGARD TO WORKING OVER, UNDER, OR AROUND EXISTING FACILITIES AND TO OBTAIN INFORMATION REGARDING RESTRICTIONS THAT ARE REQUIRED TO PREVENT DAMAGE TO THE FACILITIES.

   B. LOCATIONS SHOWN ARE COMPILED FROM INFORMATION SUPPLIED BY THE APPROPRIATE UTILITY AGENCIES AND FROM FIELD MEASUREMENTS TO ABOVE GROUND FEATURES READILY VISIBLE AT THE TIME OF SURVEY. LOCATIONS SHOWN ARE APPROXIMATE. THE CONTRACTOR IS CAUTIONED THAT ONLY ACTUAL EXCAVATION WILL REVEAL THE DIMENSIONS, SIZES, MATERIALS, LOCATIONS, AND DEPTH OF UNDERGROUND UTILITIES.

   C. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR THE LOCATION AND/OR PROTECTION OF ALL EXISTING AND PROPOSED PIPING, UTILITIES, TRAFFIC SIGNAL EQUIPMENT (BOTH ABOVE GROUND AND BELOW GROUND), STRUCTURES, AND ALL OTHER EXISTING IMPROVEMENTS THROUGHOUT CONSTRUCTION.

   D. PRIOR TO COMMENCING FABRICATION OR CONSTRUCTION, DISCOVER OR VERIFY THE ACTUAL DIMENSIONS, SIZES, MATERIALS, LOCATIONS, AND ELEVATIONS OF ALL EXISTING UTILITIES AND POTHOLE THOSE AREAS WHERE POTENTIAL CONFLICTS ARE LIKELY OR DATA IS OTHERWISE INCOMPLETE.

   E. CONTRACTOR SHALL TAKE APPROPRIATE MEASURES TO PROTECT EXISTING UTILITIES DURING CONSTRUCTION OPERATIONS, AND SHALL BE SOLELY RESPONSIBLE FOR THE COST OF REPAIR/REPLACEMENT OF ANY EXISTING UTILITIES DAMAGED DURING CONSTRUCTION. CONTRACTOR TO CALL UNDERGROUND SERVICE ALERT (1-800-642-2444) TO LOCATE ALL UNDERGROUND UTILITY LINES PRIOR TO COMMENCING CONSTRUCTION.

   F. UPON LEARNING OF THE EXISTENCE AND/OR LOCATIONS OF ANY UNDERGROUND FACILITIES NOT SHOWN OR SHOWN INACCURATELY ON THE PLANS OR NOT PROPERLY MARKED BY THE UTILITY OWNER, IMMEDIATELY NOTIFY THE UTILITY OWNER AND THE CITY BY TELEPHONE AND IN WRITING.

   G. UTILITY RELOCATIONS REQUIRED FOR THE CONSTRUCTION OF THE PROJECT FACILITIES WILL BE PERFORMED BY THE UTILITY COMPANY, UNLESS OTHERWISE NOTED.

12. SHOULD THE CONTRACTOR DISCOVER ANY DISCREPANCIES BETWEEN THE CONDITIONS EXISTING IN THE FIELD AND THE INFORMATION SHOWN ON THESE DRAWINGS, NOTIFY THE ENGINEER PRIOR TO PROCEEDING WITH CONSTRUCTION.

13. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO BE FULLY INFORMED OF AND TO COMPLY WITH ALL LAWS, ORDINANCES, CODES, REQUIREMENTS AND STANDARDS WHICH IN ANY MANNER AFFECT THE COURSE OF CONSTRUCTION OF THIS PROJECT, THOSE ENGAGED OR EMPLOYED IN THE CONSTRUCTION AND THE MATERIALS USED IN THE CONSTRUCTION.

14. ANY TESTS, INSPECTIONS, SPECIAL OR OTHERWISE, THAT ARE REQUIRED BY THE BUILDING CODES, LOCAL BUILDING DEPARTMENTS, OR THESE PLANS, SHALL BE DONE BY AN INDEPENDENT INSPECTION COMPANY. JOB SITE VISITS BY THE ENGINEER DO NOT CONSTITUTE AN OFFICIAL INSPECTION. OBSERVATION AND TESTING SERVICES ARE REQUIRED BY THE GEOTECHNICAL ENGINEER OR PROJECT GEOLOGIST AS OUTLINED IN THE GEOTECHNICAL REPORT. IT IS THE CONTRACTORS RESPONSIBILITY TO ENSURE THAT THE WORK IS COORDINATED WITH THE GEOTECHNICAL ENGINEER OR PROJECT GEOLOGIST AND THAT REQUIRED TESTS AND INSPECTIONS ARE PERFORMED.

15. PROJECT SCHEDULE: PRIOR TO COMMENCEMENT OF WORK, CONTRACTOR SHALL PROVIDE ENGINEER A DETAILED CONSTRUCTION SCHEDULE FOR APPROVAL. THE CONTRACTOR SHALL NOT BEGIN ANY CONSTRUCTION WORK UNTIL THE PROJECT SCHEDULE AND WORK PLAN IS APPROVED BY THE ENGINEER. ALL CONSTRUCTION SHALL BE CLOSELY COORDINATED WITH THE ENGINEER SO THAT THE QUALITY OF WORK CAN BE CHECKED FOR APPROVAL. THE CONTRACTOR SHALL PURSUE WORK IN A CONTINUOUS AND DILIGENT MANNER TO ENSURE A TIMELY COMPLETION OF THE PROJECT.

16. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DESIGN, PERMITTING, INSTALLATION, AND MAINTENANCE OF ANY AND ALL TRAFFIC CONTROL MEASURES DEEMED NECESSARY.

17. THE CONTRACTOR SHALL BE RESPONSIBLE FOR GENERAL SAFETY DURING CONSTRUCTION. ALL WORK SHALL CONFORM TO PERTINENT SAFETY REGULATIONS AND CODES. THE CONTRACTOR SHALL BE SOLELY AND COMPLETELY RESPONSIBLE FOR FURNISHING, INSTALLING, AND MAINTAINING ALL WARNING SIGNS AND DEVICES NECESSARY TO SAFEGUARD THE GENERAL PUBLIC AND THE WORK, AND PROVIDE FOR THE PROPER AND SAFE ROUTING OF VEHICULAR AND PEDESTRIAN TRAFFIC DURING THE PERFORMANCE OF THE WORK. THE CONTRACTOR SHALL BE SOLELY AND COMPLETELY RESPONSIBLE FOR COMPLIANCE WITH ALL APPLICABLE PROVISIONS OF OSHA IN THE CONSTRUCTION PRACTICES FOR ALL EMPLOYEES DIRECTLY ENGAGED IN THE CONSTRUCTION OF THIS PROJECT.

18. CONSTRUCTION CONTRACTOR AGREES THAT IN ACCORDANCE WITH GENERALLY ACCEPTED CONSTRUCTION PRACTICES, CONSTRUCTION CONTRACTOR WILL BE REQUIRED TO ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THE PROJECT, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY; THAT THIS REQUIREMENT SHALL BE MADE TO APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS, AND CONSTRUCTION CONTRACTOR FURTHER AGREES TO DEFEND, INDEMNIFY AND HOLD DESIGN PROFESSIONAL HARMLESS FROM ANY AND ALL LIABILITY, REAL OR ALLEGED, IN CONNECTION WITH THE PERFORMANCE OF WORK ON THIS PROJECT, EXCEPTION LIABILITY ARISING FROM THE SOLE NEGLIGENCE OF DESIGN PROFESSIONAL. NEITHER THE PROFESSIONAL ACTIVITIES OF CONSULTANT NOR THE PRESENCE OF CONSULTANT OR HIS OR HER EMPLOYEES OR SUB-CONSULTANTS AT A CONSTRUCTION SITE SHALL RELIEVE THE CONTRACTOR AND ITS SUBCONTRACTORS OF THEIR RESPONSIBILITIES INCLUDING, BUT NOT LIMITED TO, CONSTRUCTION MEANS, METHODS, SEQUENCE, TECHNIQUES OR PROCEDURES NECESSARY FOR PERFORMING, SUPERINTENDING OR COORDINATING ALL PORTIONS OF THE WORK OF CONSTRUCTION IN ACCORDANCE WITH THE CONTRACT DOCUMENTS AND APPLICABLE HEALTH OR SAFETY REQUIREMENTS OF ANY REGULATORY AGENCY OR OF STATE LAW.

19. THE CONTRACTOR SHALL MAINTAIN A CURRENT, COMPLETE, AND ACCURATE RECORD OF ALL AS-BUILT DEVIATIONS FROM THE CONSTRUCTION AS SHOWN ON THESE DRAWINGS AND SPECIFICATIONS, FOR THE PURPOSE OF PROVIDING THE ENGINEER OF RECORD WITH A BASIS FOR THE PREPARATION OF RECORD DRAWINGS.

20. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING THE SITE IN A NEAT AND ORDERLY MANNER THROUGHOUT THE CONSTRUCTION PROCESS. ALL MATERIALS SHALL BE STORED WITHIN APPROVED STAGING AREAS.

21. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION AND PRESERVATION OF ALL SURVEY MONUMENTS OR PROPERTY CORNERS. DISTURBED MONUMENTS SHALL BE RESTORED BACK TO THEIR ORIGINAL LOCATION AND SHALL BE CERTIFIED BY A REGISTERED CIVIL ENGINEER OR LAND SURVEYOR AT THE EXPENSE OF THE CONTRACTOR.

DEMOLITION NOTES

1. THE REMOVAL OF EXISTING IMPROVEMENTS SHALL BE PERFORMED IN ACCORDANCE WITH SECTION 15 OF THE STANDARD SPECIFICATIONS.

2. EXISTING IMPROVEMENTS, ADJACENT PROPERTY, TREES AND PLANTS, UTILITIES AND OTHER FACILITIES THAT ARE NOT REMOVED SHALL BE PROTECTED FROM INJURY OR DAMAGE RESULTING FROM THE CONTRACTOR'S OPERATIONS IN ACCORDANCE WITH SECTION 15.1 OF THE STANDARD SPECIFICATIONS.

EARTHWORK NOTES

1. GRADING SUMMARY:

OUTSIDE RECLAMATION AREA PLAN BOUNDARY
CHANNEL WIDENING AREA:
CUT VOLUME = 8,300 CY
FILL VOLUME= 200 CY
NET (CUT)= 8,100 CY

WITHIN RECLAMATION AREA PLAN BOUNDARY
CHANNEL WIDENING AREA:
CUT VOLUME = 14,000 CY
FILL VOLUME= 1,400 CY
NET (CUT)= 12,600 CY

SEDIMENT FAN AREA:
CUT VOLUME = 5,000 CY
FILL VOLUME= 0 CY
NET (CUT)= 5,000 CY

ROCK PILE AREA:
CUT VOLUME = 420,000 CY
FILL VOLUME= 1,600 CY
NET (CUT)= 418,400 CY

MATERIAL REMOVAL AREA:
CUT VOLUME = 141,000 CY
FILL VOLUME= 1,000 CY
NET (CUT)= 140,000 CY

PROJECT TOTAL
CUT VOLUME = 580,000 CY
FILL VOLUME= 4,000 CY
NET (CUT)= 576,000 CY

THE ABOVE QUANTITIES ARE APPROXIMATE IN-PLACE VOLUMES CALCULATED AS THE DIFFERENCE BETWEEN EXISTING GROUND AND THE PROPOSED FINISH GRADE, PREPARED FOR PERMITTING PURPOSES ONLY. EXISTING GROUND IS DEFINED BY THE TOPOGRAPHIC CONTOURS AND/OR SPOT ELEVATIONS ON THE PLAN. PROPOSED FINISH GRADE IS DEFINED AS THE DESIGN SURFACE ELEVATION OF EARTH TO BE CONSTRUCTED, AS SHOWN ON THE DRAWINGS. THE QUANTITIES HAVE NOT BEEN FACTORED TO INCLUDE ALLOWANCES FOR BULKING, CLEARING AND GRUBBING, SUBSIDENCE, SHRINKAGE, OVER EXCAVATION, AND RECOMPACTION, UNDERGROUND UTILITY AND SUBSTRUCTURE SPOILS AND CONSTRUCTION METHODS. QUANTITIES ARE SUBJECT TO CHANGE, PENDING EXCAVATION AND INSPECTION OF SUBSURFACE CONDITIONS AT THE "ROCK PILE" AND "OVERBURDEN REMOVAL" AREAS, WHICH WILL ULTIMATELY DETERMINE FINISH GRADE AT THESE TWO AREAS.

THE CONTRACTOR SHALL PERFORM AN INDEPENDENT EARTHWORK ESTIMATE FOR THE PURPOSE OF PREPARING BID PRICES FOR EARTHWORK. THE BID PRICE SHALL INCLUDE COSTS FOR ANY NECESSARY IMPORT AND PLACEMENT OF EARTH MATERIALS OR THE EXPORT AND PROPER DISPOSAL OF EXCESS OR UNSUITABLE EARTH MATERIALS.

2. ALL EXCESS SOILS WILL BE USED ON SITE, AS APPROPRIATE, FOR RECLAMATION PURPOSES AS DIRECTED BY THE GEOTECHNICAL ENGINEER OR PROJECT GEOLOGIST.

3. CLEARING AND GRUBBING, SUBGRADE PREPARATION AND EARTHWORK SHALL BE PERFORMED IN ACCORDANCE WITH SECTION 19 OF THE STANDARD SPECIFICATIONS, THESE DRAWINGS, AND THE TECHNICAL SPECIFICATIONS.

4. UNSUITABLE SOIL OR MATERIALS, NOT TO BE INCLUDED IN THE WORK INCLUDE:

   A. ORGANIC MATERIALS SUCH AS PEAT, MULCH, ORGANIC SILT OR SOD.
   B. SOILS CONTAINING EXPANSIVE CLAYS.
   C. MATERIAL CONTAINING EXCESSIVE MOISTURE.
   D. POORLY GRADED COURSE MATERIAL, PARTICLE SIZE IN EXCESS OF 6 INCHES.
   E. MATERIAL WHICH WILL NOT ACHIEVE SPECIFIED DENSITY OR BEARING.

5. FINE GRADING ELEVATIONS AND SLOPES NOT SHOWN SHALL BE DETERMINED BY THE CONTRACTOR IN THE FIELD TO OBTAIN DRAINAGE IN THE DIRECTION INDICATED. ALL FINAL GRADING SHALL BE SUBJECT TO APPROVAL OF THE ENGINEER.

6. THE TOP 6" OF SUBGRADE UNDER ALL PAVED SURFACES SUBJECT TO VEHICULAR USE SHALL BE COMPACTED TO A MINIMUM OF 95% RELATIVE COMPACTION, IN ACCORDANCE WITH ASTM-D1557 STANDARD. ALL OTHER FILL TO BE COMPACTED TO A MINIMUM OF 90% MAXIMUM DENSITY AS DETERMINED BY ASTM-D1557 AND SO CERTIFIED BY TESTS AND REPORTS FROM THE ENGINEER IN CHARGE OF THE GRADING CERTIFICATION.

7. FILL MATERIAL SHALL BE SPREAD IN LIFTS OF APPROXIMATELY 8 INCHES, MOISTENED OR DRIED TO NEAR OPTIMUM MOISTURE CONTENT AND RECOMPACTED. THE MATERIALS FOR ENGINEERED FILL SHALL BE APPROVED BY A REGISTERED GEOTECHNICAL ENGINEER OR PROFESSIONAL GEOLOGIST. ANY IMPORTED MATERIALS MUST BE APPROVED BEFORE BEING BROUGHT TO THE SITE. THE MATERIALS USED SHALL BE FREE OF ORGANIC MATTER AND OTHER DELETERIOUS MATERIALS.

8. ALL CONTACT SURFACES BETWEEN ORIGINAL GROUND AND RECOMPACTED FILL SHALL BE EITHER HORIZONTAL OR VERTICAL. ALL ORGANIC MATERIAL SHALL BE REMOVED AND THE REMAINING SURFACE SCARIFIED TO A DEPTH OF AT LEAST 12 INCHES, UNLESS DEEPER EXCAVATION IS REQUIRED BY THE ENGINEER.

GENERAL EROSION CONTROL NOTES

1. A DETAILED EROSION AND SEDIMENT CONTROL PLAN WILL BE PREPARED BY THE ENGINEER, PRIOR TO FINALIZATION OF THE CONSTRUCTION DOCUMENTS.

2. CONTRACTOR SHALL BE FAMILIAR WITH THE CONDITIONS OF APPROVAL OF ALL REQUIRED PROJECT PERMITS AND SHALL IMPLEMENT ALL REQUIRED BMP'S PRIOR TO COMMENCING GRADING OPERATIONS

3. CONTRACTOR SHALL UTILIZE ONLY THE APPROVED HAUL ROADS AND ACCESS POINTS (AS SHOWN ON THE DRAWINGS) FOR TRANSPORT OF MATERIALS AND EQUIPMENT.

4. BETWEEN OCTOBER 15 AND APRIL 15, EXPOSED SOIL SHALL BE PROTECTED FROM EROSION AT ALL TIMES. DURING CONSTRUCTION SUCH PROTECTION MAY CONSIST OF MULCHING AND/OR PLANTING OF NATIVE VEGETATION OF ADEQUATE DENSITY. BEFORE COMPLETION OF THE PROJECT, ANY EXPOSED SOIL ON DISTURBED SLOPES SHALL BE PERMANENTLY PROTECTED FROM EROSION.

5. REMAIN AVAILABLE AT ALL TIMES FOR EMERGENCY WORK THAT MAY BE REQUIRED DURING THE RAINY SEASON (OCTOBER 15 THROUGH APRIL 15). NECESSARY MATERIALS SHALL BE AVAILABLE AND STOCKPILED AT CONVENIENT LOCATIONS TO FACILITATE RAPID CONSTRUCTION OF TEMPORARY DEVICES.

6. CONSTRUCT TEMPORARY EROSION CONTROL MEASURES AS SHOWN ON THE DRAWINGS AND/OR AS DIRECTED BY THE ENGINEER TO CONTROL DRAINAGE WHICH HAS BEEN AFFECTED BY GRADING AND/OR TRENCHING OPERATIONS.

7. CONSTRUCT AND MAINTAIN EROSION CONTROL MEASURES TO PREVENT THE DISCHARGE OF EARTHEN MATERIALS TO THE CREEK FROM DISTURBED AREAS UNDER CONSTRUCTION AND FROM COMPLETED CONSTRUCTION AREAS.

8. INSTALL ALL PROTECTIVE DEVICES AT THE END OF EACH WORK DAY WHEN THE FIVE-DAY RAIN PROBABILITY EQUALS OR EXCEEDS 50 PERCENT AS DETERMINED FROM THE NATIONAL WEATHER SERVICE FORECAST OFFICE: WWW.SRH.NOAA.GOV.

9. AFTER A RAINSTORM REMOVE ACCUMULATED SEDIMENT AND DEBRIS FROM ALL EROSION CONTROL MEASURES.

10. KEEP IN FORCE ALL EROSION CONTROL DEVICES AND MODIFY THOSE DEVICES AS SITE PROGRESS DICTATES.

11. MONITOR THE EROSION CONTROL DEVICES DURING STORMS AND MODIFY THEM IN ORDER TO PREVENT PROGRESS OF ANY ONGOING EROSION.

12. CONTACT THE ENGINEER IN THE EVENT THAT THE EROSION CONTROL PLAN AS DESIGNED REQUIRES ANY SUBSTANTIAL REVISIONS.

FIELD ENGINEERING NOTES

(FOR ROCK PILE AREA AND MATERIAL REMOVAL AREA CONSTRUCTION)

1. GENERAL

THESE DRAWINGS WERE DEVELOPED WITH THE GOAL OF CREATING MORE NATURAL CONDITIONS, WHILE MAINTAINING A RELATIVELY UNIFORM PROFILE GRADIENT WITHIN THE PROPOSED LIMITS OF DISTURBANCE TO IMPROVE CHANNEL STABILITY AND ENHANCE ECOLOGICAL FUNCTION. THE DRAWINGS WERE PREPARED WITHOUT FULL KNOWLEDGE OF SUBSURFACE CONDITIONS, INCLUDING THE ELEVATION OF UNDERLYING BEDROCK OR ALLUVIAL MATERIALS THAT WOULD INDICATE THE LOCATION OF THE PRE-DISTURBANCE CHANNEL PROFILE IN REACHES 18-17 AND 13-11. THE DESIGN APPROACH FOR THESE REACHES WILL EMPLOY FIELD ENGINEERING AND A FIELD DIRECTED CONSTRUCTION APPROACH TO MAXIMIZE CHANNEL STABILITY, WHILE AVOIDING EXCAVATION INTO NATIVE BEDROCK. THE FINAL CONSTRUCTED GEOMETRY WILL BE DIRECTED BY THE ENGINEER IN THE FIELD, PENDING SUBSURFACE CONDITIONS, AS DESCRIBED BELOW.

1.1. THE ROCK PILE AREA (REACHES 13-11) IS EXPECTED TO BE CONSTRUCTED PRIOR TO THE MATERIAL REMOVAL AREA. EXPERIENCE GAINED FROM THE FIELD DIRECTED CONSTRUCTION APPROACH AT THE ROCK PILE AREA WILL BE USED TO REFINE THE DESIGN FOR THE MATERIAL REMOVAL AREA.

2. PROFILE

2.1. GENERAL. THE FINISHED GRADE ELEVATION OF THE FLOWLINE WILL GENERALLY FALL BETWEEN THE UPPER AND LOWER LIMITS SHOWN ON THE DRAWINGS, DEFINED THERE AS THE "GRADING ENVELOPE," EXCEPT WHERE THE LOCATION OF EXISTING BEDROCK REQUIRES DEVIATION. THE LOWER LIMIT OF THE ENVELOPE IS THE OPTIMUM "STRAIGHT GRADE" UNIFORM PROFILE WITHIN THE PROPOSED LIMITS OF WORK. THE UPPER LIMIT OF THE ENVELOPE IS A BEST-FIT LINE BETWEEN IDENTIFIED POINTS OF BEDROCK CONTROL, AS ESTIMATED FROM RECENT SUBSURFACE INVESTIGATIONS. THE CONSTRUCTION WILL ATTEMPT TO FOLLOW THE LOWER LIMIT OF THE ENVELOPE, SUBJECT TO THE CONSTRAINTS SET FORTH BELOW.

2.2. BEDROCK.

A. GENERAL. THE QUALIFICATION OF MATERIAL AS "BEDROCK" WILL BE PERFORMED INITIALLY BY THE PROJECT GEOTECHNICAL ENGINEER. IF THE PROJECT GEOTECHNICAL ENGINEER DETERMINES THAT EXCAVATION TO BEDROCK HAS OCCURRED PRIOR TO REACHING THE LOWEST ELEVATION AT ANY LOCATION WITHIN THE GRADING ENVELOPE, AN INDEPENDENT PROFESSIONAL GEOLOGIST WILL ASSESS AND MAKE THE FINAL DETERMINATION OF THE EXISTENCE AND EXTENT OF ANY SUCH BEDROCK.

B. WHERE BEDROCK IS ENCOUNTERED ABOVE THE LOWER LIMIT OF THE GRADING ENVELOPE, THE PROFILE WILL NOT BE EXCAVATED INTO THE BEDROCK. AN INSPECTION TRENCH WILL BE CONSTRUCTED ACROSS THE CHANNEL, WITHIN THE POTENTIAL CROSS SECTION LIMITS (BETWEEN THE ADJACENT HILL SLOPES), TO ENSURE THAT BEDROCK IS CONTINUOUS. THE CHANNEL ALIGNMENT WILL FOLLOW THE LOW POINT OF THE BEDROCK, TO THE EXTENT THAT THIS IS FEASIBLE WHILE MAINTAINING A GEOMORPHICALLY APPROPRIATE PLANFORM ALIGNMENT, AND WHILE REMAINING WITHIN THE LATERAL LIMITS DESCRIBED BELOW. UPSTREAM OF BEDROCK CONTROL POINTS, THE LOWER LIMIT OF THE PROFILE WILL BE SUBJECT TO THE MINIMUM DESIGN PROFILE GRADIENT, AS SPECIFIED BELOW.

C. MINIMUM DESIGN PROFILE GRADIENT. UPSTREAM OF BEDROCK CONTROLS, THE MINIMUM DESIGN PROFILE GRADE WILL BE SET TO 4%, TO HELP MAINTAIN SEDIMENT TRANSPORT CONTINUITY AND CHANNEL STABILITY.

D. THE CONSTRUCTED PROFILE GRADIENT BETWEEN BEDROCK OUTCROPS WILL NOT EXCEED 12.0%.

E. ALLUVIAL MATERIALS. WHERE THE ORIGINAL "PRE-DISTURBANCE" STREAMBED IS IDENTIFIED BY THE PRESENCE OF SIGNIFICANT ALLUVIAL DEPOSITS, THE DESIGN PROFILE WILL NOT BE CONSTRUCTED BELOW THE ELEVATION OF THESE DEPOSITS, PROVIDED THE SPECIFIED MINIMUM AND MAXIMUM PROFILE GRADE CRITERIA ARE MET. TEMPORARY EXCAVATIONS WILL NOT EXTEND BELOW THE DESIGN PROFILE ANY MORE THAN IS NECESSARY TO CONSTRUCT THE ENGINEERED STREAMBED MATERIAL SHOWN ON THE DESIGN DRAWINGS.

3. CROSS SECTION GEOMETRY

A. ACTIVE CHANNEL. THE LOW FLOW CROSS SECTION GEOMETRY WILL BE INFORMED BY REGIONAL ANALOGS AND REFINED BASED ON THE LOCAL PROFILE GRADIENT WITHIN EACH CONSTRUCTED REACH. CROSS SECTION DETAILS WILL CLOSELY RESEMBLE THE RANGE OF TYPICAL SECTIONS SHOWN ON THE DRAWINGS, EXCEPT WHERE INFLUENCED BY THE PRESENCE OF BEDROCK AS DISCUSSED ABOVE.

B. FLOODPLAIN. THE FLOODPLAIN WIDTHS WILL BE MAXIMIZED WITHIN THE CONSTRAINT OF MAINTAINING THE STABILITY OF THE ADJACENT HILLSIDE AND THE NEED TO ACCOMMODATE ROADS SHOWN ON THE DRAWINGS. THE STABLE DESIGN SLOPE OF THE ADJACENT HILLSIDE WILL BE DETERMINED BY THE GEOTECHNICAL ENGINEER, AND WILL LIKELY VARY BETWEEN 2H:1V AND 1.5H:1V, AS SHOWN ON THE DRAWINGS. EXPOSED BEDROCK MAY ALLOW FOR STEEPER SLOPES, SUBJECT TO APPROVAL OF THE GEOTECHNICAL ENGINEER. WHERE THE FINAL DESIGN PROFILE APPROACHES THE LOWER LIMIT OF THE GRADING ENVELOPE, THE STABILITY OF ADJACENT HILLSIDES WILL DICTATE A NARROWER FLOODPLAIN WIDTH. SLOPE BENCHING MAY BE INCORPORATED TO REDUCE SLOPE LENGTH, CONTROL SURFACE RUNOFF AND HELP PROTECT SLOPES FROM SURFACE EROSION WHILE VEGETATION BECOMES ESTABLISHED.

C. WHERE BEDROCK OUTCROPS CONSTRAIN THE FLOODPLAIN WIDTH, UPSTREAM AND DOWNSTREAM FLOODPLAINS WILL TRANSITION RAPIDLY TO CONFORM TO THOSE RESTRICTIONS AND THEN RETURN TO THE STANDARD FLOODPLAIN WIDTHS AS DESCRIBED ABOVE.

WATERWAYS CONSULTING INC.
509A SWIFT ST.
SANTA CRUZ, CA 95060
PH:(831)421-9291 // FAX:(888)819-6847
WWW.WATWAYS.COM

PRELIMINARY
NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT GROUP

NOTES

PERMANENTE CREEK
RESTORATION PLAN

UPDATED 90% DESIGN

SANTA CLARA COUNTY
CEQA REVIEW SUBMITTAL

DESIGNED BY:	–
DRAWN BY:	B.M.S.
CHECKED BY:	M.W.W.
DATE:	8/26/22
JOB NO.:	13-016

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

ROCKPILE AREA CONTROL POINTS

POINT #	DESCRIPTION	ELEV	NORTHING	EASTING
72	CP SET SPK	716.22	1941334.47	6096793.81
75	CP SET SPK	803.09	1941619.31	6096158.88
76	CP SET RBR	808.85	1941680.82	6095909.82
111	CP SET RBR	806.80	1941671.67	6095921.21
114	CP SET RBR	816.20	1941779.90	6095582.76
115	CP SET RBR	812.88	1941879.05	6095569.80
117	CP SET RBR	819.89	1941892.45	6095529.40
217	CP SET RBR	724.29	1941371.11	6096727.29
404	SPK	806.27	1941662.30	6095969.08
405	RBR	796.09	1941537.79	6096266.02

CONCRETE CHANNEL CONTROL POINTS

POINT #	DESCRIPTION	ELEV	NORTHING	EASTING
10	MAG NAIL	510.38	1943483.74	6101146.44
12	1" IRON PIPE	529.20	1942175.05	6099969.01
17	REBAR	485.24	1943557.06	6100979.06
18	REBAR	490.06	1943435.52	6100870.89
19	REBAR	498.09	1943198.66	6100699.22
20	REBAR	508.54	1942872.53	6100467.68
21	MAG NAIL	521.46	1942467.45	6100151.60
22	SPIKE	551.31	1941760.87	6099823.75
51	MONUMENT	478.22	1943592.65	6101044.38
52	REBAR	483.41	1943590.24	6101025.98
53	REBAR	515.91	1942632.18	6100296.75
54	SPIKE	521.30	1942452.03	6100170.82
193	REBAR	476.72	1943711.46	6100983.49

OLD CRUSHER FOUNDATION CONTROL POINTS

POINT #	DESCRIPTION	ELEV	NORTHING	EASTING
165	CP SET RBR	1063.33	1941953.01	6093263.23

CHANNEL WIDENING AREA CONTROL POINTS

POINT #	DESCRIPTION	ELEV	NORTHING	EASTING
27	REBAR	593.54	1940695.05	6099210.37
28	REBAR	596.51	1940561.90	6099071.25
29	MAG NAIL	598.00	1940385.77	6098868.13
30	REBAR	601.51	1940365.48	6098858.92
31	REBAR	610.23	1940446.61	6098616.89
32	REBAR	613.75	1940462.10	6098526.45
33	REBAR	618.26	1940475.93	6098439.20
34	REBAR	628.65	1940479.92	6098296.99
35	REBAR	632.45	1940501.64	6098230.63
36	MAG NAIL	620.81	1940463.13	6098387.20
37	REBAR	635.48	1940558.97	6098103.67
38	REBAR	641.70	1940495.95	6097949.58
40	MAG NAIL	648.83	1940405.35	6097615.83
41	MAG NAIL	646.63	1940383.67	6097691.16
42	REBAR	656.48	1940451.30	6097514.85
43	REBAR	657.09	1940492.55	6097471.45
44	REBAR	660.96	1940560.15	6097400.04
45	REBAR	668.01	1940655.83	6097298.98
46	SPIKE	680.15	1940841.82	6097231.78
62	SPIKE	569.70	1940615.33	6099288.05
63	SPIKE	570.71	1940570.68	6099267.81
64	REBAR	584.77	1940545.28	6099205.98
65	REBAR	590.89	1940439.65	6099088.09
66	MAG NAIL	591.86	1940396.17	6098999.78
67	MAG NAIL	595.38	1940388.34	6098927.84
68	MAG NAIL	602.87	1940400.72	6098741.75
69	MAG NAIL	606.61	1940410.97	6098663.01
79	SPIKE	646.21	1940316.73	6097727.47
81	SPIKE	694.63	1940223.55	6097775.38
82	REBAR	649.67	1940408.23	6097839.94
83	REBAR	637.23	1940523.90	6098107.56
84	REBAR	621.56	1940440.92	6098417.10
215	REBAR	646.91	1940455.35	6097884.82
218	REBAR	677.67	1940841.54	6097176.51
219	REBAR	680.66	1940900.16	6097145.81
314	REBAR	637.77	1940371.89	6097791.16
400	REBAR	576.85	1940487.04	6099160.53
401	REBAR	607.02	1940404.17	6098660.54
402	REBAR	609.64	1940411.88	6098607.86
403	REBAR	615.06	1940428.64	6098517.03
406	REBAR	629.80	1940471.66	6098007.66
410	REBAR	653.73	1940584.46	6097340.83
411	REBAR	661.24	1940732.49	6097196.50
412	REBAR	664.95	1940814.37	6097160.96
413	REBAR	683.39	1940897.81	6097111.72

MATERIAL REMOVAL AREA CONTROL POINTS

POINT #	DESCRIPTION	ELEV	NORTHING	EASTING
48	CP SET RBR	1261.52	1942178.50	6091840.78
49	CP SET RBR	1227.82	1942114.42	6092223.57
150	CP SET RBR	1248.81	1942121.40	6091732.54
151	CP SET RBR	1209.33	1942037.70	6091938.21
152	CP SET RBR	1193.37	1941973.93	6092019.31
153	CP SET RBR	1206.00	1942064.01	6092164.43
154	CP SET RBR	1203.50	1942039.62	6092197.65
155	CP SET RBR	1174.15	1942015.96	6092308.67
156	CP SET RBR	1156.71	1941993.50	6092485.97
157	CP SET RBR	1146.54	1941979.84	6092548.12
158	CP SET RBR	1107.87	1941764.00	6092719.31
159	CP SET RBR	1096.94	1941783.90	6092867.43
160	CP SET RBR	1090.73	1941829.03	6092915.18
163	CP SET RBR	1071.81	1941856.46	6093112.11
165	CP SET RBR	1063.33	1941953.01	6093263.23
166	CP SET RBR	1069.37	1941972.57	6093285.20
169	CP SET RBR	1247.35	1942132.95	6091720.89
171	CP FD SPK	1248.13	1942159.92	6091675.87
174	CP SET RBR	1257.05	1942125.94	6091344.28
175	CP SET SPK	1256.76	1942089.48	6091244.14

WATERWAYS CONSULTING INC.
509A SWIFT ST.
SANTA CRUZ, CA 95060
PH:(831)421-9291 // FAX:(888)819-6847
WWW.WATWAYS.COM

PRELIMINARY
NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT
GROUP

CONTROL
POINT
TABLES

PERMANENTE CREEK
RESTORATION PLAN

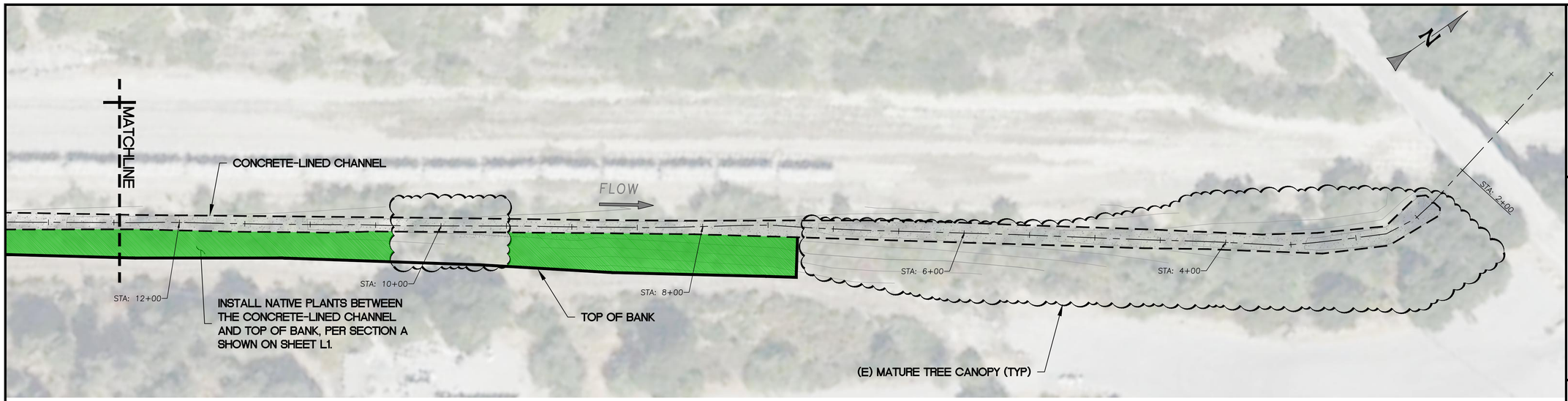
UPDATED 90% DESIGN

SANTA CLARA COUNTY
CEQA REVIEW SUBMITTAL

DESIGNED BY: –
DRAWN BY: B.M.S.
CHECKED BY: M.W.W.
DATE: 8/26/22
JOB NO.: 13-016

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

C41



CONCRETE-LINED CHANNEL SOUTHERN BANK PLANTING PLAN

SCALE: 1" = 40'

SUPPLEMENTAL PLANTING NOTES:

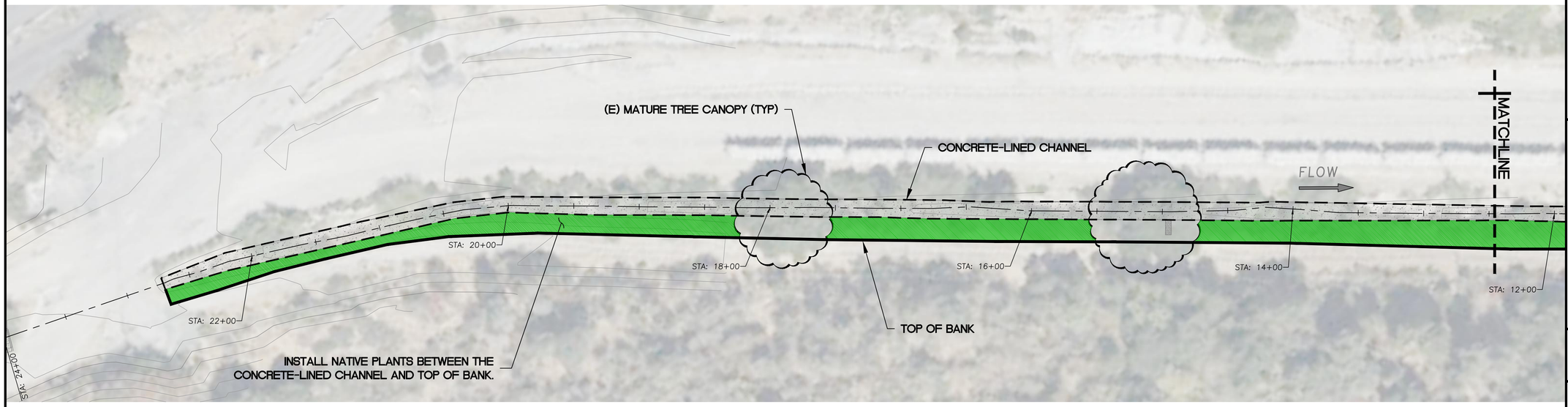
1. PROTECT IN PLACE ALL EXISTING NATIVE TREES AND SHRUBS, INCLUDING EXISTING OAK SEEDLINGS.
2. A QUALIFIED REVEGETATION SPECIALIST SHALL CONFIRM EACH PROPOSED PLANTING LOCATION PRIOR TO EXCAVATION OF PLANTING PITS.
3. PROPOSED PLANT SPECIES CONTAINER SIZE AND SPACING SHALL CONFORM TO TABLE 1. CONCRETE CHANNEL – RIPARIAN PLANTING.
4. CLEAR AND GRUB A THREE-FOOT DIAMETER AREA AT EACH PROPOSED PLANTING LOCATION.
5. PLANTING EXCAVATION SHALL NOT OCCUR WITHIN THE DRIP LINE OF EXISTING SHRUBS OR TREES, WITHIN TEN FEET FROM THE TRUNKS OF EXISTING ESTABLISHED TREES, OR WITHIN FIVE FEET OF EXISTING OAK SEEDLINGS.
6. INSTALL PLANTINGS, BROWSE PROTECTION AND IRRIGATION IN ACCORDANCE WITH THE CONTAINER PLANTING DETAIL ON SHEET L2
7. DEPENDING ON THE CONDITION OF EXISTING SOILS, SOIL EXCAVATED FOR PLANTING MAY REQUIRE AMENDMENT, AS DETERMINED BY THE REVEGETATION SPECIALIST. USE EXCESS SOIL TO FORM A WATERING WELL AROUND THE INSTALLED PLANT.
8. PLACE THREE TO FOUR INCHES OF MULCH AND/OR WEED MATS IN THE CLEARED AND GRUBBED AREA AROUND EACH INSTALLED PLANT OR OAK SEEDLING FOR WEED CONTROL AND MOISTURE RETENTION.

TABLE 1. CONCRETE CHANNEL - RIPARIAN PLANTING

COMMON NAME	SCIENTIFIC NAME	CONTAINER SIZE	ON-CENTER SPACING (FT)	QUANTITY
California Buckeye	*Aesculus Californica*	Treepot 4 (TP4)	15	Container plant quantities will be dependent on the location of existing native species and will be determined at the time of construction.
Coast Live Oak	*Quercus Agrifolia*	Treepot 4 (TP4)	12	
Blue Elderberry	*Sambucus Nigra, SSP. Caerulea*	Treepot 4 (TP4)	10	
Hollyleaf Cherry	*Prunus Ilicifolia*	Deepot 40 (D-40)	10	
Coyote Brush	*Baccharis Pillularis*	Deepot 40 (D-40)	8	
Black Sage	*Salvia Mellifera*	Deepot 60 (D-60)	5	
California Sagebrush	*Artemisia Californica*	Deepot 40 (D-40)	3	

LEGEND

- RIPARIAN PLANTING ZONE (CONCRETE CHANNEL)
- DESIGN ALIGNMENT (STA: 4+00)
- CONCRETE LINED CHANNEL



CONCRETE-LINED CHANNEL SOUTHERN BANK PLANTING PLAN

SCALE: 1" = 40'

WATERWAYS CONSULTING INC.
509A SWIFT ST.
SANTA CRUZ, CA 95060
PH:(831)421-9291 // FAX:(888)819-6847
WWW.WATWAYS.COM

PRELIMINARY

NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT GROUP

CONCRETE CHANNEL REVEGETATION PLAN

PERMANENTE CREEK RESTORATION PLAN

UPDATED 90% DESIGN

SANTA CLARA COUNTY CEQA REVIEW SUBMITTAL

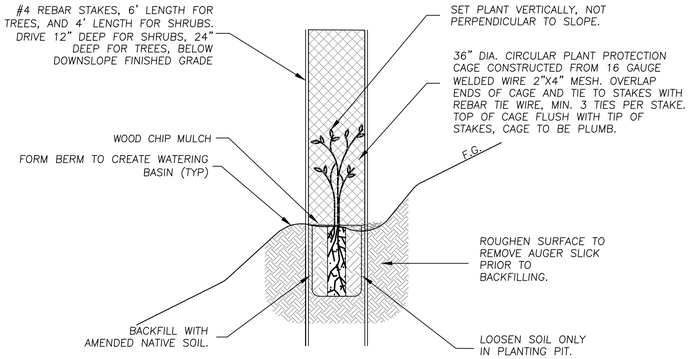
DESIGNED BY:	B.M.Z.
DRAWN BY:	B.M.Z.
CHECKED BY:	M.W.W.
DATE:	8/26/22
JOB NO.:	13-016

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS

0 1"

TREE AND SHRUB REPLACEMENT NOTES:

TREE AND SHRUB REPLACEMENT RATIONS WILL CONFORM TO THE REPLACEMENT RATIOS INCLUDED IN THE LAKE AND STREAMBED ALTERNATION AGREEMENT.



CONTAINER PLANTING DETAIL

SCALE: N.T.S.

SPECIES TO RECEIVE BROWSE PROTECTION CAGES:

COMMON NAME	SCIENTIFIC NAME
CALIFORNIA BUCKEYE	AESCULUS CALIFORNICA
MADRONE	ARBUTUS MENZIESII
CALIFORNIA SAGE	ARTEMISIA CALIFORNICA
HOLLYLEAF CHERRY	PRUNUS ILICIFOLIA
COASTAL LIVE OAK	QUERCUS ARGIFOLIA
BLUE ELDERBERRY	SAMBUCUS NIGRA SSP. CAERULA

NOTE: BROWSE PROTECTION CAGES WILL NOT BE INSTALLED AROUND PLANTINGS IN FLOODPLAIN AREAS DUE TO THE LIKELIHOOD THAT CAGES MAY BE INUNDATED AND DAMAGED BY FLOOD FLOWS.

IRRIGATION NOTES:

ALL CONTAINER PLANTINGS WILL RECEIVE DRIP IRRIGATION. IRRIGATION DETAILS ARE NOT INCLUDED IN THIS DRAWINGS SET AND WILL BE INCLUDED IN THE NEXT DESIGN SUBMITTAL.

TABLE 2a. FLOODPLAIN PLANTING SEED MIX

Floodplain Seeding Area:

Channel Widening and Rockpile Area (acres): 2.53

Material Removal Area (acres): 1.44

COMMON NAME	SCIENTIFIC NAME	PLS LBS / ACRE
California Brome	*Bromus Carinatus*	10.0
Blue Wildrye	*Elymus Glaucus*	8.0
Creeping Wildrye	*Elymus Triticoides*	6.0
Small Fescue	*Festuca Microstachys*	8.0
Meadow Barley	*Hordeum Brachyantherum*	6.0
Blue-Eyed Grass	*Sisyrinchium Bellum*	1.0
Purple Needlegrass	*Stipa Bellum*	5.0
Tomcat Clover	*Trifolium Willdenovii*	5.0
Regreen (sterile wheat grass)	*Triticum aestivum*	40.0
	TOTAL	**89.0**

Seed mix to be applied to the Floodplain Planting Zones at all project sites where rock is not used as a surface treatment

TABLE 2b. UPLAND AND RIPARIAN PLANTING SEED MIX

Upland Seeding Area:

Channel Widening and Rockpile Area (acres): 5.57

Material Removal Area (acres): 2.18

Riparian Seeding Area:

Channel Widening and Rockpile Area (acres): 2.43

Material Removal Area (acres): 1.25

COMMON NAME	SCIENTIFIC NAME	PLS LBS / ACRE
California Sagebrush	*Artemisia Californica*	0.5
California Brome	*Bromus Carinatus*	12.0
Blue Wildrye	*Elymus Glaucus*	10.0
California Poppy	*Eschscolzia Californica*	2.0
Deerweed	*Lotus Scoparius*	3.0
Purple Needlegrass	*Nasella Pulchra*	5.0
Three Weeks Fescue	*Festuca Microstachys*	6.0
Tomcat clover	*Trifolium willdenovii*	5.0
Lupine	*Lupinus Nanus*	4.0
Regreen (sterile wheat grass)	*Triticum aestivum*	40.0
	TOTAL	**87.5**

Seed mix to be applied to the Upland Seedings Zones and the Riparian Planting Zones at all project sites.

TABLE 3. CHANNEL WIDENING/SEDIMENT REMOVAL AREA - FLOODPLAIN PLANTING (TYPE 1)

Area (acres): 1.51

COMMON NAME	SCIENTIFIC NAME	CONTAINER SIZE	ON-CENTER SPACING (FT)	TOTAL QUANTITY
Big Leaf Maple	*Acer Macrophylum*	Treepot 4 (TP4)	25	90
White Alder	*Alnus Rhombifolia*	Treepot 4 (TP4)	20	110
Red/Arroyo Willow (Floodplain)	*Salix Laevigata/lasiolepis*	Live Stake	15	290
Red/Arroyo Willow (Vegetated RSP)	*Salix Laevigata/lasiolepis*	Live Stake	7	60
Red/Arroyo Willow (Sed. Removal Area)	*Salix Laevigata/lasiolepis*	Live Stake	7	90
			Total	**640**

*Spacing is approximate. Quantity will govern.

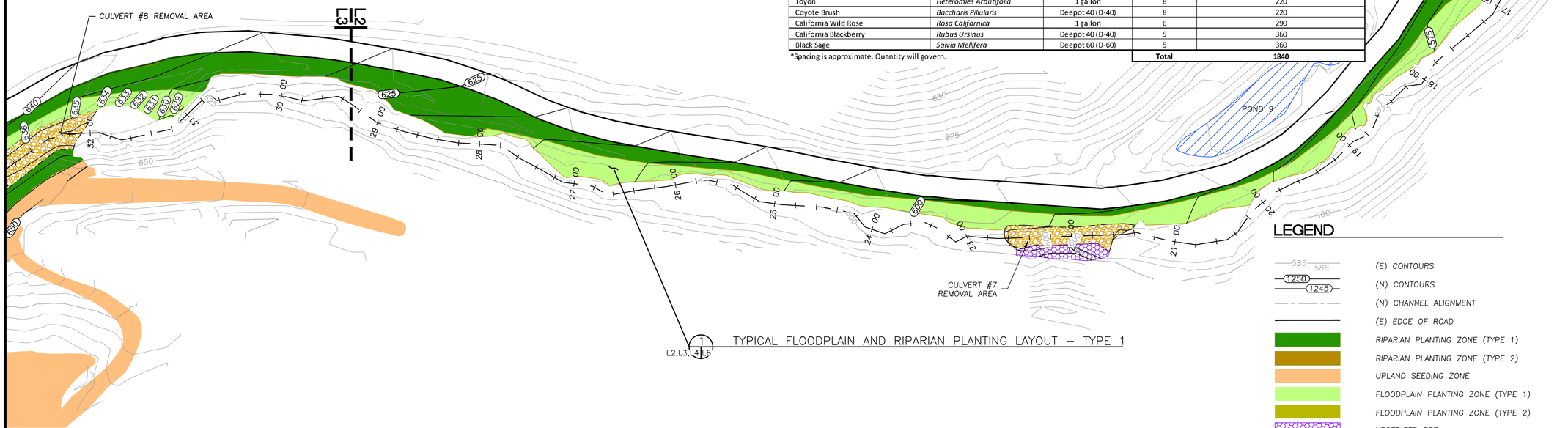
Install Live Willow Stakes at the spacing shown within the vegetated RSP, per Section B, Sheet C11, and Section B, Sheet C18, and within the Engineered Streambed Material at the Sediment Removal Area tributary reach per Detail 1, Sheet C16.

TABLE 4. CHANNEL WIDENING/SEDIMENT REMOVAL AREA - RIPARIAN PLANTING (TYPE 1)

Area (acres): 1.37

COMMON NAME	SCIENTIFIC NAME	CONTAINER SIZE	ON-CENTER SPACING (FT)	TOTAL QUANTITY
California Buckeye	*Aesculus Californica*	Treepot 4 (TP4)	15	110
Coast Live Oak	*Quercus Agrifolia*	Treepot 4 (TP4)	12	130
Blue Elderberry	*Sambucus Nigra, SSP. Caerulea*	Treepot 4 (TP4)	10	150
Toyon	*Heteromles Arbutifolia*	1 gallon	8	220
Coyote Brush	*Baccharis Pillularis*	Deepot 40 (D-40)	8	220
California Wild Rose	*Rosa Californica*	1 gallon	6	290
California Blackberry	*Rubus Ursinus*	Deepot 40 (D-40)	5	360
Black Sage	*Salvia Mellifera*	Deepot 60 (D-60)	5	360
			Total	**1840**

*Spacing is approximate. Quantity will govern.



1 L2,L3,L4,L6 TYPICAL FLOODPLAIN AND RIPARIAN PLANTING LAYOUT – TYPE 1

CHANNEL WIDENING REVEGETATION PLAN

SCALE: 1" = 50'

LEGEND

- (E) CONTOURS
- (N) CONTOURS
- (N) CHANNEL ALIGNMENT
- (E) EDGE OF ROAD
- RIPARIAN PLANTING ZONE (TYPE 1)
- RIPARIAN PLANTING ZONE (TYPE 2)
- UPLAND SEEDING ZONE
- FLOODPLAIN PLANTING ZONE (TYPE 1)
- FLOODPLAIN PLANTING ZONE (TYPE 2)
- VEGETATED RSP
- ENGINEERED STREAM MATERIAL (ESM)

WATERWAYS CONSULTING INC.
509A SWIFT ST.
SANTA CRUZ, CA 95060
PH:(831)421-9291 // FAX:(888)819-6847
WWW.WATWAYS.COM

PRELIMINARY

NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:

LEHIGH HANSON
HEIDELBERG CEMENT GROUP

CHANNEL WIDENING REVEGETATION PLAN (1 OF 2)

PERMANENTE CREEK RESTORATION PLAN

UPDATED 90% DESIGN

SANTA CLARA COUNTY CEQA REVIEW SUBMITTAL

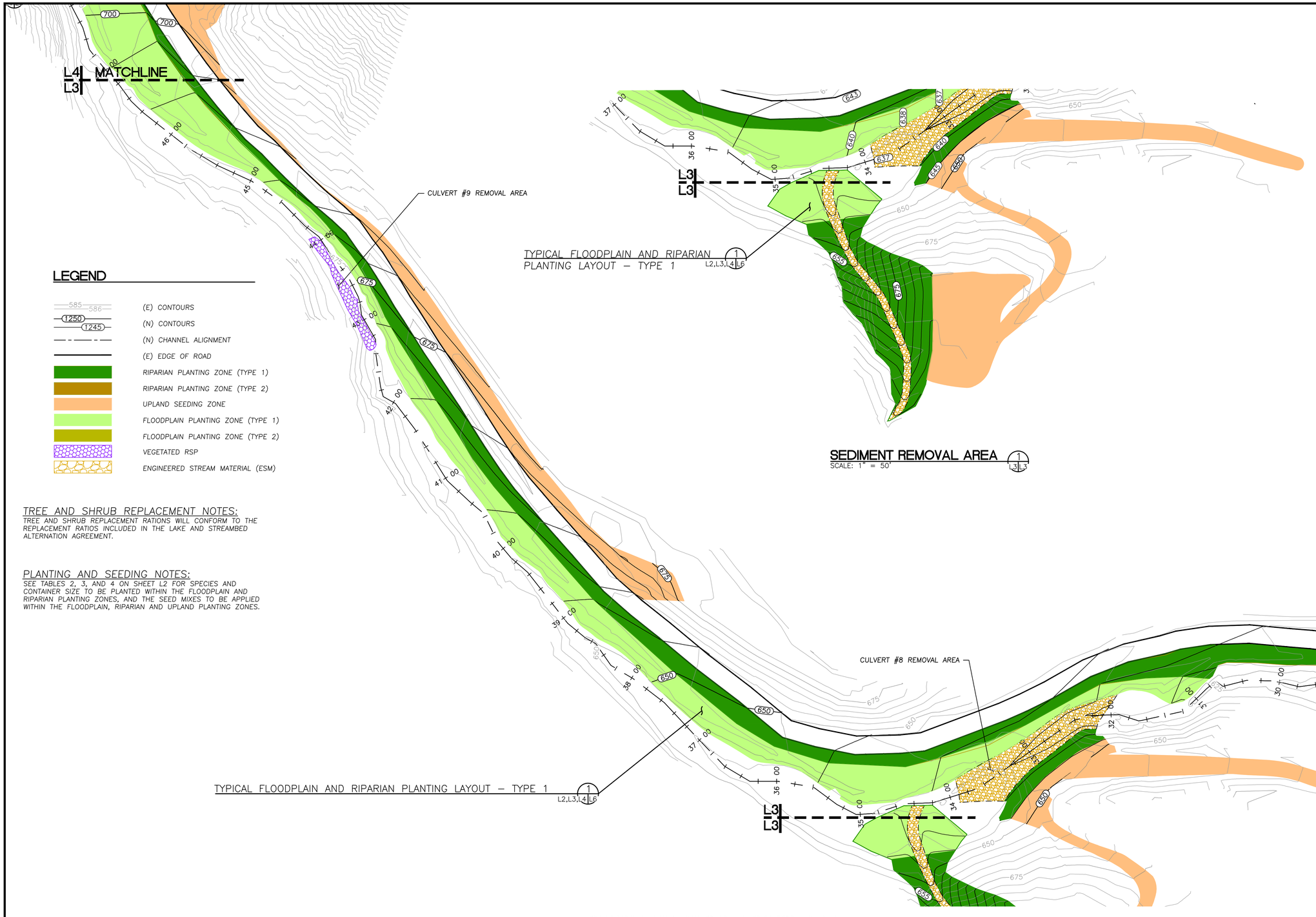
DESIGNED BY: –
DRAWN BY: C.B.H.
CHECKED BY: M.W.W.
DATE: 8/26/22
JOB NO.: 13-016

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS

0 1"

L2

43 OF 47



TYPICAL FLOODPLAIN AND RIPARIAN PLANTING LAYOUT – TYPE 1 (1 / L2,L3,L4,L6)

SEDIMENT REMOVAL AREA (1 / L3)
SCALE: 1" = 50'

TYPICAL FLOODPLAIN AND RIPARIAN PLANTING LAYOUT – TYPE 1 (1 / L2,L3,L4,L6)

LEGEND

- (E) CONTOURS
- (N) CONTOURS
- (N) CHANNEL ALIGNMENT
- (E) EDGE OF ROAD
- RIPARIAN PLANTING ZONE (TYPE 1)
- RIPARIAN PLANTING ZONE (TYPE 2)
- UPLAND SEEDING ZONE
- FLOODPLAIN PLANTING ZONE (TYPE 1)
- FLOODPLAIN PLANTING ZONE (TYPE 2)
- VEGETATED RSP
- ENGINEERED STREAM MATERIAL (ESM)

TREE AND SHRUB REPLACEMENT NOTES:

TREE AND SHRUB REPLACEMENT RATIONS WILL CONFORM TO THE REPLACEMENT RATIOS INCLUDED IN THE LAKE AND STREAMBED ALTERNATION AGREEMENT.

PLANTING AND SEEDING NOTES:

SEE TABLES 2, 3, AND 4 ON SHEET L2 FOR SPECIES AND CONTAINER SIZE TO BE PLANTED WITHIN THE FLOODPLAIN AND RIPARIAN PLANTING ZONES, AND THE SEED MIXES TO BE APPLIED WITHIN THE FLOODPLAIN, RIPARIAN AND UPLAND PLANTING ZONES.

CHANNEL WIDENING REVEGATION PLAN
SCALE: 1" = 50'

WATERWAYS CONSULTING INC.
509A SWIFT ST.
SANTA CRUZ, CA 95060
PH:(831)421-9291 // FAX:(888)819-6847
WWW.WATWAYS.COM

PRELIMINARY
NOT FOR CONSTRUCTION

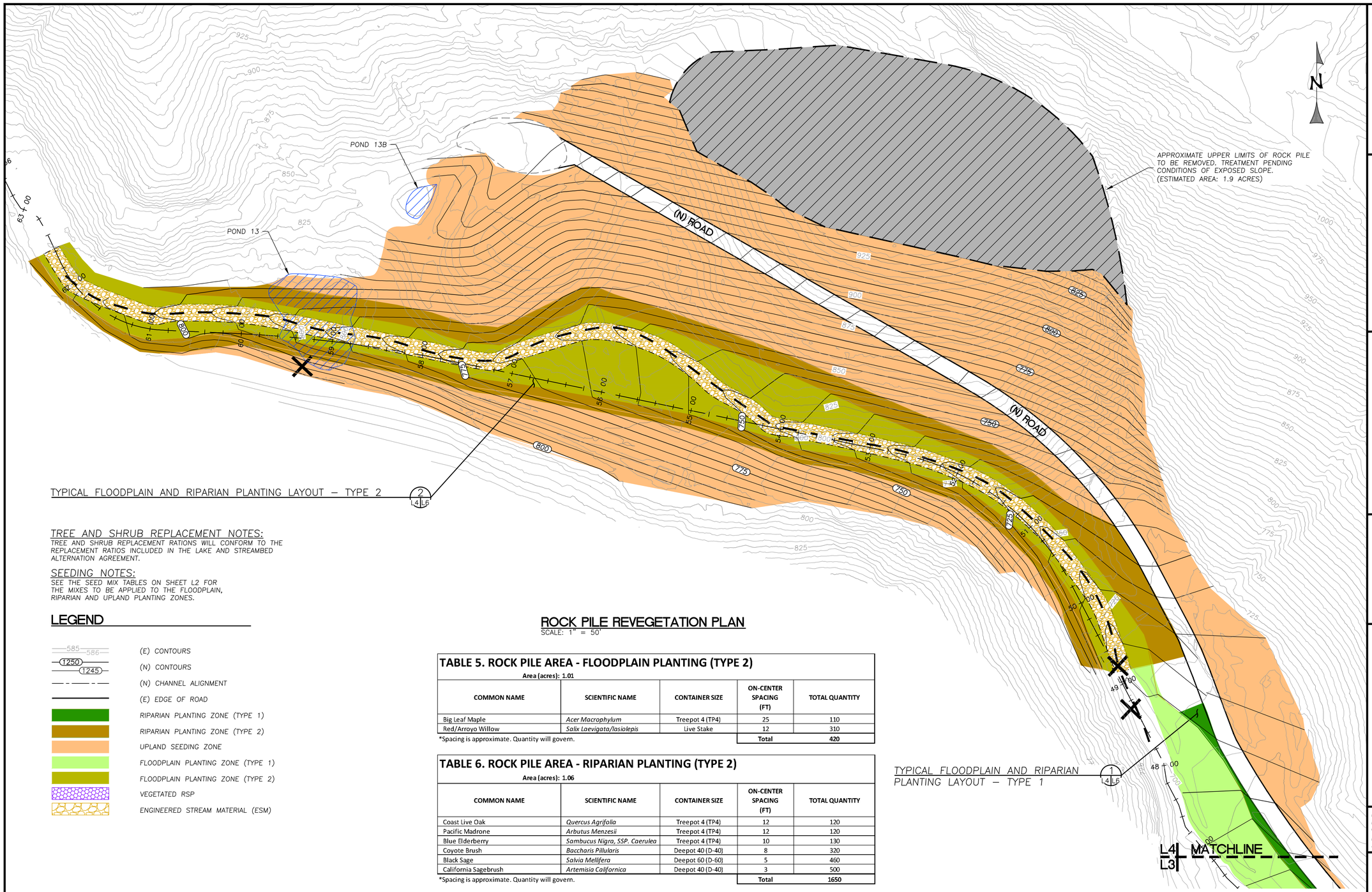
PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT GROUP

CHANNEL WIDENING REVEGETATION PLAN (2 OF 2)

PERMANENTE CREEK RESTORATION PLAN
UPDATED 90% DESIGN
SANTA CLARA COUNTY CEQA REVIEW SUBMITTAL

DESIGNED BY:	–
DRAWN BY:	–
CHECKED BY:	M.W.W.
DATE:	8/26/22
JOB NO.:	13-016

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"



TREE AND SHRUB REPLACEMENT NOTES:

TREE AND SHRUB REPLACEMENT RATIONS WILL CONFORM TO THE REPLACEMENT RATIOS INCLUDED IN THE LAKE AND STREAMBED ALTERNATION AGREEMENT.

SEEDING NOTES:

SEE THE SEED MIX TABLES ON SHEET L2 FOR THE MIXES TO BE APPLIED TO THE FLOODPLAIN, RIPARIAN AND UPLAND PLANTING ZONES.

LEGEND

- (E) CONTOURS
- (N) CONTOURS
- (N) CHANNEL ALIGNMENT
- (E) EDGE OF ROAD
- RIPARIAN PLANTING ZONE (TYPE 1)
- RIPARIAN PLANTING ZONE (TYPE 2)
- UPLAND SEEDING ZONE
- FLOODPLAIN PLANTING ZONE (TYPE 1)
- FLOODPLAIN PLANTING ZONE (TYPE 2)
- VEGETATED RSP
- ENGINEERED STREAM MATERIAL (ESM)

ROCK PILE REVEGETATION PLAN

SCALE: 1" = 50'

TABLE 5. ROCK PILE AREA - FLOODPLAIN PLANTING (TYPE 2)

Area (acres): 1.01

COMMON NAME	SCIENTIFIC NAME	CONTAINER SIZE	ON-CENTER SPACING (FT)	TOTAL QUANTITY
Big Leaf Maple	*Acer Macrophylum*	Treepot 4 (TP4)	25	110
Red/Arroyo Willow	*Salix Laevigata/lasiolepis*	Live Stake	12	310
			Total	420

*Spacing is approximate. Quantity will govern.

TABLE 6. ROCK PILE AREA - RIPARIAN PLANTING (TYPE 2)

Area (acres): 1.06

COMMON NAME	SCIENTIFIC NAME	CONTAINER SIZE	ON-CENTER SPACING (FT)	TOTAL QUANTITY
Coast Live Oak	*Quercus Agrifolia*	Treepot 4 (TP4)	12	120
Pacific Madrone	*Arbutus Menzesii*	Treepot 4 (TP4)	12	120
Blue Elderberry	*Sambucus Nigra, SSP. Caerulea*	Treepot 4 (TP4)	10	130
Coyote Brush	*Baccharis Pillularis*	Deepot 40 (D-40)	8	320
Black Sage	*Salvia Mellifera*	Deepot 60 (D-60)	5	460
California Sagebrush	*Artemisia Californica*	Deepot 40 (D-40)	3	500
			Total	1650

*Spacing is approximate. Quantity will govern.

WATERWAYS CONSULTING INC.
509A SWIFT ST.
SANTA CRUZ, CA 95060
PH:(831)421-9231 // FAX:(888)819-6847
WWW.WATWAYS.COM

PRELIMINARY

NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT GROUP

ROCKPILE AREA REVEGEATION PLAN

PERMANENTE CREEK RESTORATION PLAN

UPDATED 90% DESIGN

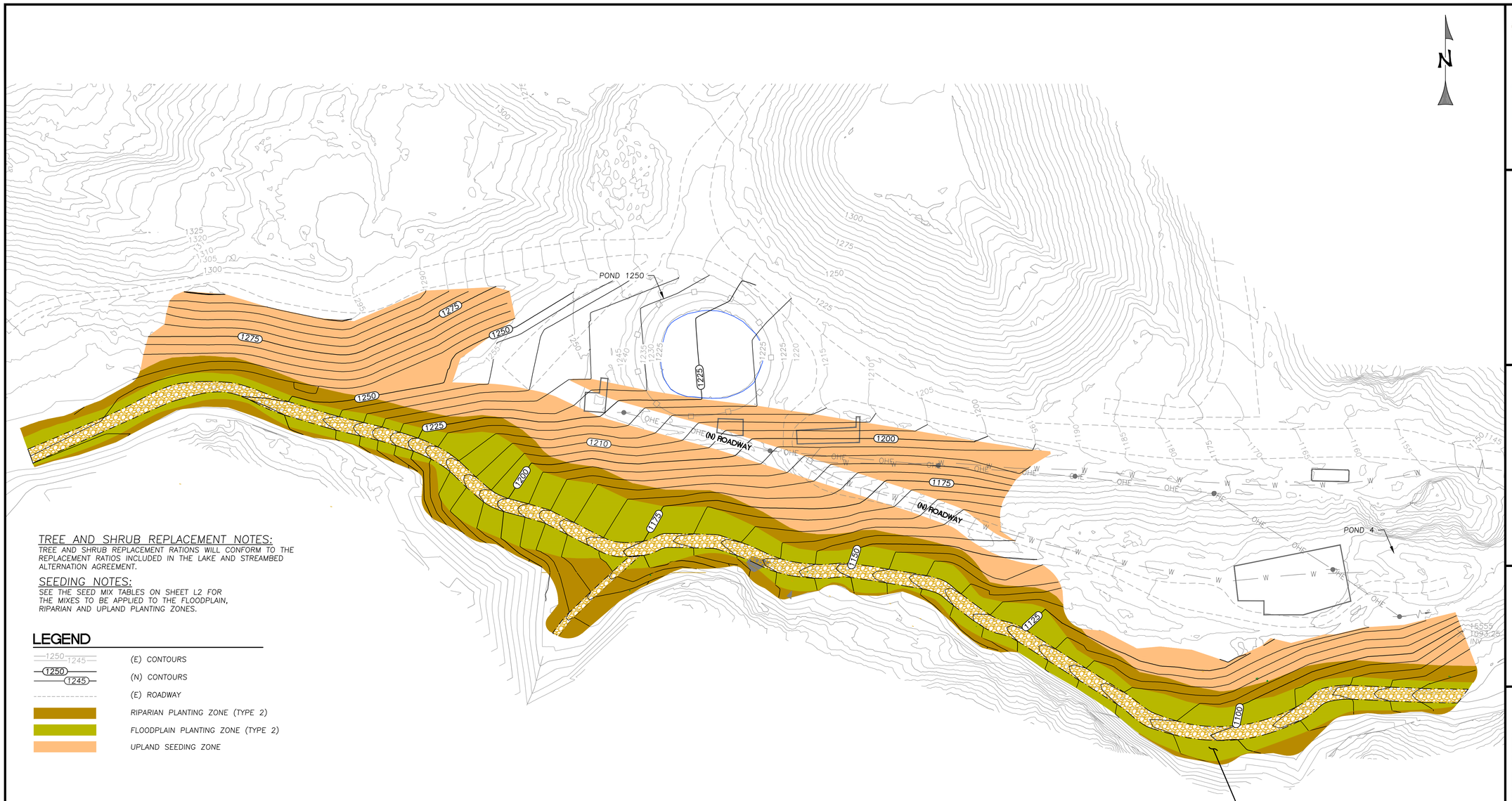
SANTA CLARA COUNTY CEQA REVIEW SUBMITTAL

DESIGNED BY: –
DRAWN BY: –
CHECKED BY: M.W.W.
DATE: 8/26/22
JOB NO.: 13-016

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

L4

45 OF 47



2 TYPICAL FLOODPLAIN AND RIPARIAN PLANTING LAYOUT (TYPE 2)
L5 L6

TREE AND SHRUB REPLACEMENT NOTES:

TREE AND SHRUB REPLACEMENT RATIONS WILL CONFORM TO THE REPLACEMENT RATIOS INCLUDED IN THE LAKE AND STREAMBED ALTERNATION AGREEMENT.

SEEDING NOTES:

SEE THE SEED MIX TABLES ON SHEET L2 FOR THE MIXES TO BE APPLIED TO THE FLOODPLAIN, RIPARIAN AND UPLAND PLANTING ZONES.

LEGEND

- 1250 1245 — (E) CONTOURS
- 1250 1245 — (N) CONTOURS
- (E) ROADWAY
- RIPARIAN PLANTING ZONE (TYPE 2)
- FLOODPLAIN PLANTING ZONE (TYPE 2)
- UPLAND SEEDING ZONE

TABLE 7. MATERIAL REMOVAL AREA - FLOODPLAIN PLANTING (TYPE 2)

Area (acres): 1.44

COMMON NAME	SCIENTIFIC NAME	CONTAINER SIZE	ON-CENTER SPACING (FT)	TOTAL QUANTITY
Big Leaf Maple	*Acer Macrophylum*	Treepot 4 (TP4)	25	150
Red/Arroyo Willow	*Salix Laevigata/lasiolepis*	Live Stake	12	440
Red/Arroyo Willow (Tributary)	*Salix Laevigata/lasiolepis*	Live Stake	7	40
			Total	**590**

*Spacing is approximate. Quantity will govern.

TABLE 8. MATERIAL REMOVAL AREA - RIPARIAN PLANTING (TYPE 2)

Area (acres): 1.25

COMMON NAME	SCIENTIFIC NAME	CONTAINER SIZE	ON-CENTER SPACING (FT)	TOTAL QUANTITY
Coast Live Oak	*Quercus Agrifolia*	Treepot 4 (TP4)	12	140
Pacific Madrone	*Arbutus Menzesii*	Treepot 4 (TP4)	12	140
Blue Elderberry	*Sambucus Nigra, SSP. Caerulea*	Treepot 4 (TP4)	10	150
Coyote Brush	*Baccharis Pillularis*	Deepot 40 (D-40)	8	380
Black Sage	*Salvia Mellifera*	Deepot 60 (D-60)	5	540
California Sagebrush	*Artemisia Californica*	Deepot 40 (D-40)	3	590
			Total	**1940**

*Spacing is approximate. Quantity will govern.

MATERIAL REMOVAL AREA REVEGETATION PLAN

SCALE: 1" = 60'

WATERWAYS CONSULTING INC.
509A SWIFT ST.
SANTA CRUZ, CA 95060
PH:(831)421-9291 // FAX:(888)819-6847
WWW.WATWAYS.COM

PRELIMINARY

NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT
GROUP

MATERIAL REMOVAL AREA REVEGETATION PLAN

PERMANENTE CREEK RESTORATION PLAN

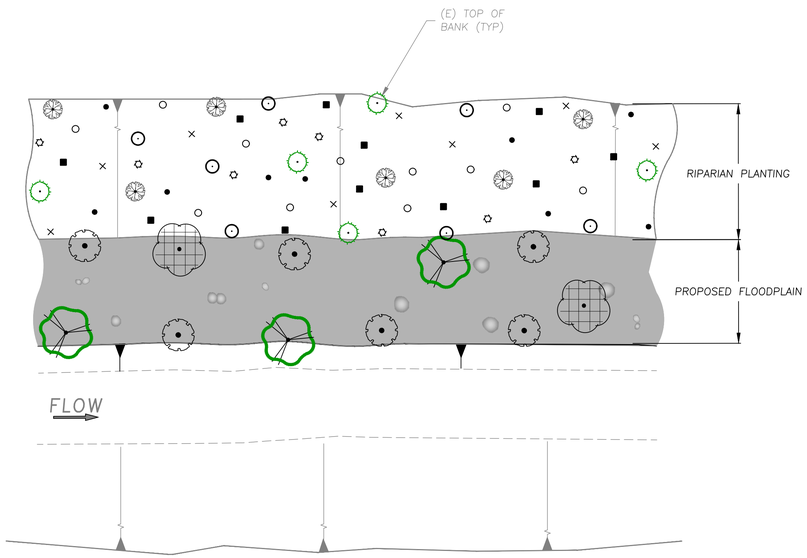
UPDATED 90% DESIGN

SANTA CLARA COUNTY CEQA REVIEW SUBMITTAL

DESIGNED BY: –
DRAWN BY: –
CHECKED BY: M.W.W.
DATE: 8/26/22
JOB NO.: 13-016

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

L5



TYPICAL FLOODPLAIN AND RIPARIAN PLANTING LAYOUT - TYPE 1
SCALE: 1" = 10'

(CHANNEL WIDENING AREA)

1 L2,L3,L4,L6

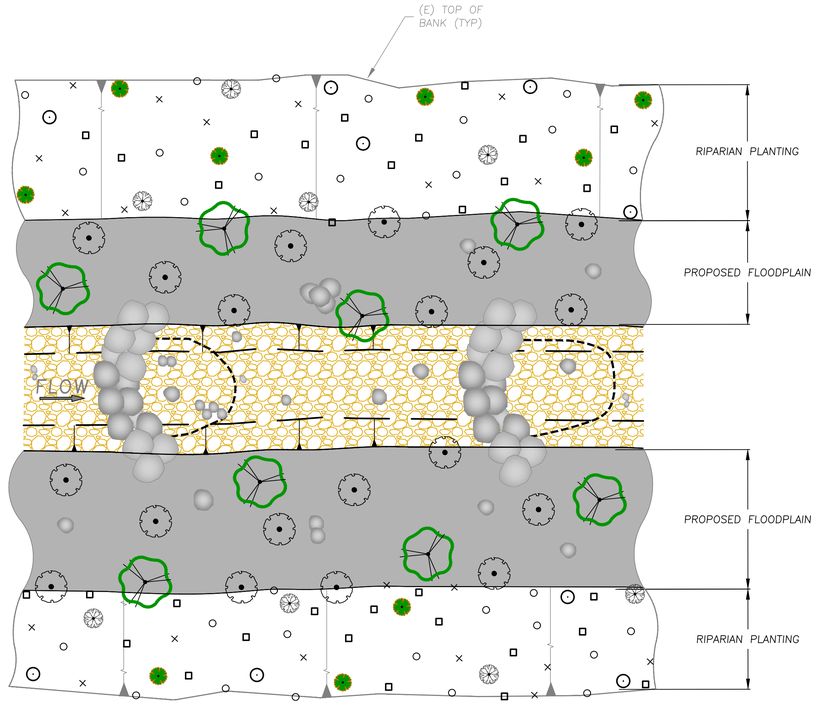
PLANTING LEGEND - TYPE 1

FLOODPLAIN PLANTING

BOTANICAL / COMMON NAME
ACER MACROPHYLLUM/BIG LEAF MAPLE
ALNUS RHOMBIFOLIA/WHITE ALDER
SALIX LAEVIGATA/RED WILLOW

RIPARIAN PLANTING

- AESCULUS CALIFORNICA/CALIFORNIA BUCKEYE
- QUERCUS AGRIFOLIA/COAST LIVE OAK
- SAMBUCUS NIGRA, SSP. CAERULEA/BLUE ELDERBERRY
- HETEROMLES ARBUTIFOLIA/TOYON
- BACCHARIS PILLULARIS/COYOTE BRUSH
- ROSA CALIFORNICA/CALIFORNIA WILD ROSE
- RUBUS URSINUS/CALIFORNIA BLACKBERRY
- SALVIA MELLIFERA/BLACK SAGE



TYPICAL FLOODPLAIN AND RIPARIAN PLANTING LAYOUT - TYPE 2
SCALE: 1" = 10'

(ROCK PILE AND MATERIAL REMOVAL AREAS)

2 L4,L5,L6

PLANTING LEGEND - TYPE 2

FLOODPLAIN PLANTING

BOTANICAL / COMMON NAME
ACER MACROPHYLLUM/BIG LEAF MAPLE
SALIX LAEVIGATA/RED WILLOW

RIPARIAN PLANTING

- QUERCUS AGRIFOLIA/COAST LIVE OAK
- ARBUTUS MENZESII/PACIFIC MADRONE
- SAMBUCUS NIGRA, SSP. CAERULEA/BLUE ELDERBERRY
- BACCHARIS PILLULARIS/COYOTE BRUSH
- SALVIA MELLIFERA/BLACK SAGE
- ARTEMESIA CALIFORNICA/CALIFORNIA SAGEBRUSH

NOTE:
SEE SHEETS L2 TO L5 FOR THE LOCATION OF PLANTING ZONES AND PLANTING/SEEDING TABLES WITH ON CENTER SPACING, CONTAINER SIZE AND THE NUMBER OF EACH SPECIES TO BE INSTALLED.

WATERWAYS CONSULTING INC.
509A SWIFT ST.
SANTA CRUZ, CA 95060
PH:(831)421-9291 // FAX:(888)819-6847
WWW.WATWAYS.COM

PRELIMINARY
NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT GROUP

TYPICAL PLANTING LAYOUTS

PERMANENTE CREEK RESTORATION PLAN
UPDATED 90% DESIGN
SANTA CLARA COUNTY CEQA REVIEW SUBMITTAL

DESIGNED BY:	–
DRAWN BY:	–
CHECKED BY:	M.W.W.
DATE:	8/26/22
JOB NO.:	13-016

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

APPENDIX A

Fish Passage Design Flow Calculations

Project: Permanente Quarry
Project #: 13-016
Date: 8/29/2017
Calculated by: M.L.B/B.R.S.
Checked by: B.M.Z.

Exceedence Probability Values for Mean Daily Flows at USGS Gages Near Cupertino

Percent Exceedence	Annual Exceedance Discharge (cfs)									
	Gage #11166575		Gage #11166578		Gage #11169500		Gage #11164500		Gage #11166000	
	Permanente Creek		West Fork Permanente Creek		Saratoga Creek		San Francisquito Creek		Matadero Creek	
	Real Flows (cfs)	Normalized Flows (cfs/sq.mi.)	Real Flows (cfs)	Normalized Flows (cfs/sq.mi.)	Real Flows (cfs)	Normalized Flows (cfs/sq.mi.)	Real Flows (cfs)	Normalized Flows (cfs/sq.mi.)	Real Flows (cfs)	Normalized Flows (cfs/sq.mi.)
95	0.00	0.00	0.00	0.00	0.36	0.04	0.15	0.00	0.00	0.00
90	0.00	0.00	0.00	0.00	0.49	0.05	0.29	0.01	0.00	0.00
10	4.00	1.04	0.82	0.27	18.00	1.95	45.00	1.20	3.50	0.48
5	7.30	1.89	3.49	1.17	38.80	4.21	112.75	3.01	9.90	1.36

	Gage #11166575	Gage #11166578	Gage #11169500	Gage #11164500	Gage #11164500
Drainage Area (sq.mi.)	3.86	2.98	9.22	37.4	7.26

Site Name	Location		Drainage Area (mi^2)	Record Length (yrs)	Normalized Exceedance Flows			
					95% (cfs/mi^2)	90% (cfs/mi^2)	10% (cfs/mi^2)	5% (cfs/mi^2)
PERMANENTE C NR MONTE VISTA CA - 11166575	37°20'00"	122°05'13"	3.86	3	0.00	0.00	1.04	1.89
WF PERMANENTE C NR MONTE VISTA CA - 11166578	37°19'59"	122°05'58"	2.98	3	0.00	0.00	0.27	1.17
SARATOGA C A SARATOGA CA - 11169500 [1]	37°15'16"	122°02'18"	9.22	20	0.04	0.05	1.95	4.21
SAN FRANCISQUITO C A STANFORD UNIVERSITY CA - 11164500 [2]	37°25'24"	122°11'18"	37.4	20	0.00	0.01	1.20	3.01
MATADERO CREEK A PALO ALTO CA 11166000 [3]	37°25'18"	122°08'04"	7.26	65	0.00	0.00	0.48	1.36
				Average =	0.01	0.01	0.99	2.33

[1] Water is diverted 0.7 miles upstream of gage for municipal use by San Jose Water Works

[2] Flow Slightly regulated by Searsville Lake. Diversions upstream from gage to Los Trancos and Lagunita Canal for irrigation on Stanford University

[3] No know regulation or diversion upstream of site

Note: Use the Matadero Creek gage to calculate fish passage design flows because it has an extensive period of record (65 years) and is unregulated. The CDFW, California Salmonid Stream Habitat Restoration Manual requires a gage to have at least 5 years of recorded daily average flows, and preferably more than 10 years for use in calulcating fish passage design flows.

Legend - Fish Passage Design Flows	
Juvenile Salmonid Fish Passage - Low	
Adult Non-Anadromous Salmonid Fish Passage - Low	
Juvenile Salmonid Fish Passage - High	
Adult Non-Anadramous Salmonid Fish Passage - High	

Permanente Quarry Watershed Fish Passage Design Flows				
Drainage Area (mi^2) =		3.50		
Juvenile Low	Adult Non-Anadramous Low	Juvenile High	Adult Non-Adadromous High	
95% (cfs)	90% (cfs)	10% (cfs)	5% (cfs)	
0.00	0.00	1.69	4.77	Using Matadero Creek Gage
0.00	0.00	2.09	5.16	Average of 3 unregulated gages
0.03	0.04	3.46	8.15	Average of all 5 gages

Location: Pond 14 Bypass Channel through the Concrete Channel

Permanente Quarry Watershed Fish Passage Design Flows			
Drainage Area (mi^2) =		3.01	
Juvenile Low	Adult Non-Anadromous Low	Juvenile High	Adult Non-Anadromous High
95% (cfs)	90% (cfs)	10% (cfs)	5% (cfs)
0.00	0.00	1.45	4.10

Location: Culverts #2 - #7

Permanente Quarry Watershed Fish Passage Design Flows			
Drainage Area (mi^2) =		2.70	
Juvenile Low	Adult Non-Anadromous Low	Juvenile High	Adult Non-Anadromous High
95% (cfs)	90% (cfs)	10% (cfs)	5% (cfs)
0.00	0.00	1.30	3.68

Location: Culvert #8 - Pond 13

Permanente Quarry Watershed Fish Passage Design Flows			
Drainage Area (mi^2) =		2.02	
Juvenile Low	Adult Non-Anadromous Low	Juvenile High	Adult Non-Anadromous High
95% (cfs)	90% (cfs)	10% (cfs)	5% (cfs)
0.00	0.00	0.97	2.75

Location: Materials Removal Area

APPENDIX B

Permanente Creek Restoration – Regional Hydraulic Geometry and Analog Channel Assessment Technical Memorandum

TECHNICAL MEMORANDUM - REVISED for 90% DESIGN

Prepared by:	Waterways Consulting, Inc.
Date:	October 30, 2018
Re:	Permanente Creek Restoration – Regional Hydraulic Geometry and Analogue Channel Assessment

Introduction

Waterways Consulting, Inc. (Waterways) is developing engineering drawings to restore portions of Permanente Creek that flow through the Permanente Quarry (Quarry) property and have been impacted by past mining activities. The proposed approach at two locations (the Rock Pile Area and Material Removal Area[1]) focuses on restoring the channel form to an approximation of the pre-mining channel geometry and providing suitable aquatic habitat for local species, including resident rainbow trout. The Quarry is situated on lands owned by Lehigh Hanson Heidelberg Cement Group on the east side of the Santa Cruz Mountains to the west of Cupertino. Quarry operations over the past century have resulted in significant channelization, the installation of numerous culverts and sedimentation basins, and considerable sediment inputs to Permanente Creek. The altered channel form and high sediment loads resulted in the degradation of the instream aquatic habitat.

The proposed restoration will remove overburden sediment and several culverts, rebuild the affected channel reaches, and restore impacted riparian and aquatic habitats. Restoring Permanente Creek at the Rock Pile and Material Removal Areas requires a complete reconstruction of the streambed. Consequently, there is a need to estimate the appropriate channel morphology to support the restoration design, including active channel widths, depths and pool geometries and spacing.

Regional curves, relating channel dimensions to drainage area, exist for the San Francisco Bay region (Dunne and Leopold 1978) (Figure 1). However, these curves are regional in nature, incorporating data from a range of landscape settings and channel morphologies. For example, channel geometries of the low gradient bottomlands of the Santa Clara Valley will vary from bedrock-controlled streams in the Santa Cruz Mountains that are higher gradient and more influenced by hillslope processes. Given that much of the proposed restoration activities are in higher gradient, confined reaches of Permanente Creek, the appropriateness of the regional curves can be improved by focusing the data on sites with a similar geomorphic setting. Focusing the dataset on sites in the Santa Cruz Mountains could greatly improve the use of the hydraulic geometry curves to constrain expected channel morphologies in the impacted reaches of Permanente Creek. Furthermore, field-based measurements of channel geometry within less impacted reaches of Permanente Creek and in adjacent watersheds that exhibit similar characteristics to Permanente Creek could both provide a test for and improve the quality of the developed relationships.

[1] Although the analogue study was developed to support design efforts for the Rockpile and Material Removal Areas of the Permanente Restoration Project, the results are applicable to other locations within the project area including Culverts #7 and #8 within the Channel Widening Area.

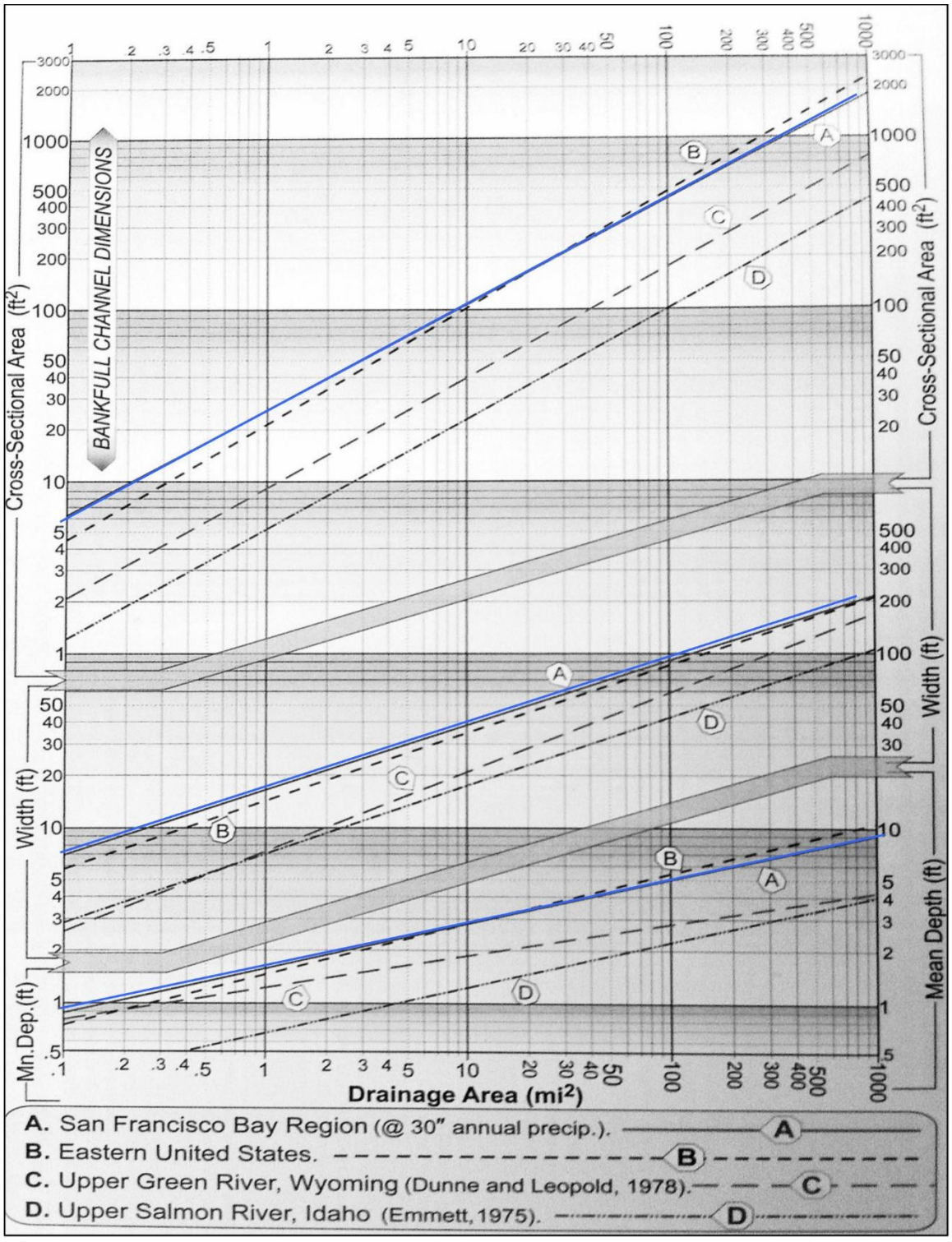


Figure 1. Regional hydraulic geometry curves produced by Dunne and Leopold (1978) relating drainage area to bankfull depth, width and cross-sectional area. The blue lines highlight the regional curves for the San Francisco Bay Area.

To create more site-specific curves, Waterways compiled data for the Santa Cruz Mountain sites that were included in the Dunne and Leopold (1978) curves for the San Francisco Bay region, surveyed two analogue stream channels close to the project area that were previously identified as having similar watershed and geomorphic characteristics as Permanente Creek (URS 2011)[2], and surveyed two segments of Reach 20 on Permanente Creek in what was considered a less impacted reach. These data were used to define reach-specific channel dimensions for the restoration effort. In addition, a longitudinal profile surveyed along portions of Permanente Creek where the channel morphology was determined to be more representative of natural conditions, was used to identify an appropriate size and spacing for pools to support the engineering design. This memorandum summarizes the findings of this work.

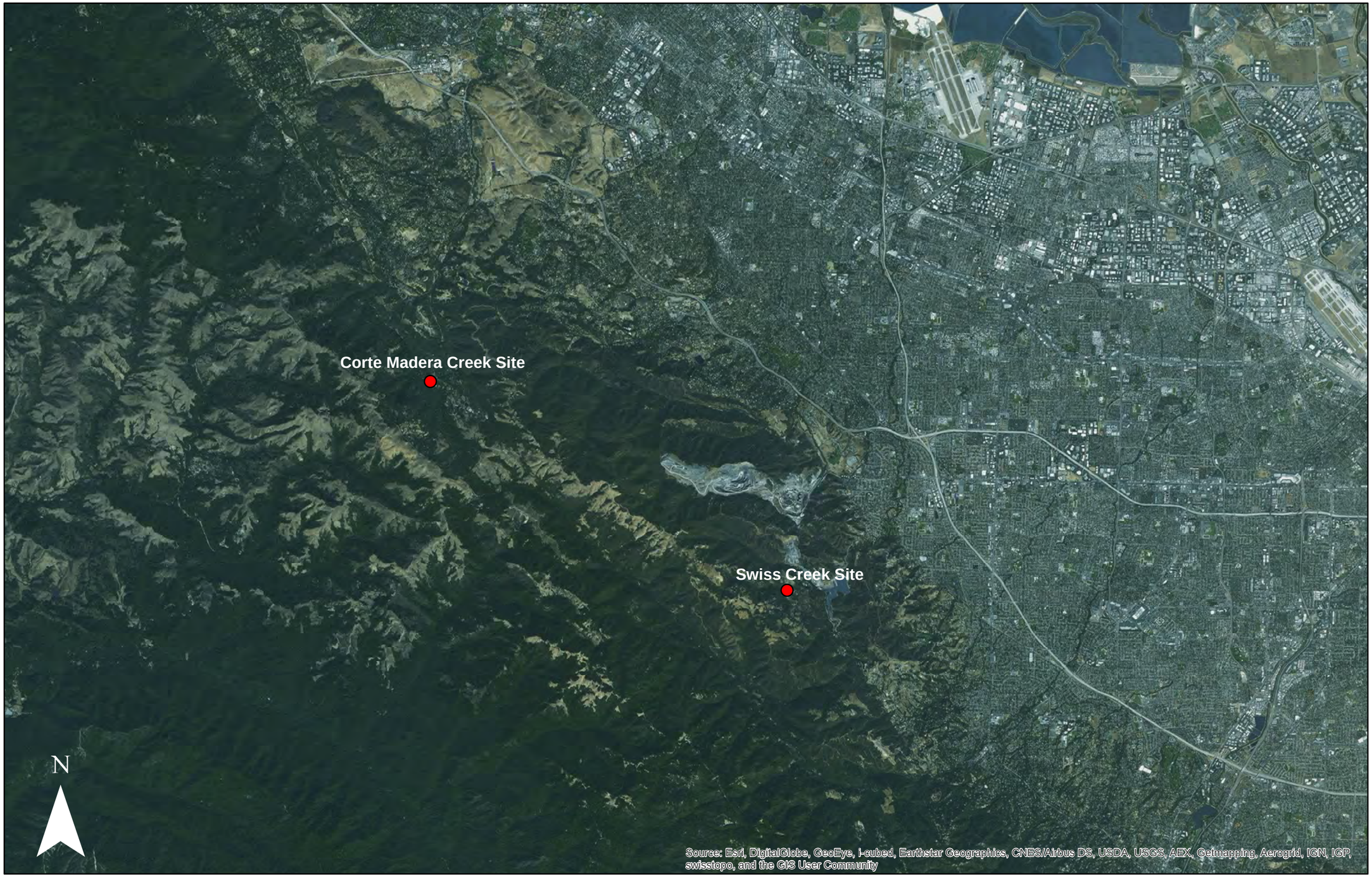
Study Area

Santa Cruz Mountains

The Santa Cruz Mountains have a complex geologic history, resulting in areas dominated by sandstone, limestone, igneous rocks (e.g., basalt), or metamorphic rocks (e.g., serpentine). The variable geologies result in different rates of erosion and the presence of different types of channel-forming sediment among streams that can be spatially close to each other. For example, Permanente Creek has abundant limestone that forms calcium carbonate precipitates that can bind rocks along the channel bed and banks. On the other hand, Stevens Creek is approximately one and one-half miles southeast of Permanente Creek and does not have limestone, and thus does not exhibit calcium carbonate precipitates.

Santa Cruz Mountain streams tend to be small headwater channels at the higher elevations and larger, alluvial streams at the lower elevations. The higher and mid-elevation streams generally flow through narrow valleys with steep hillslopes that restrict lateral channel movement. The steep hillslopes are susceptible to landslides and debris flows, especially following wildfire events. Entire reaches can be transformed during a debris flow and associated mudflow event. Debris flows can result in mobilization and deposition of sediment and debris across an entire valley bottom, leaving an aggraded valley consisting of an unsorted mix of materials. Subsequent high flows following a debris flow event reworks the aggraded material, with the active channel incising into the relatively uniform post-debris flow floodplain surface. Large roughness elements, including boulders and logs, become exposed as the channel incises into the debris flow surface, influencing the planform of the channel and providing local grade control for both the channel and floodplain. In higher gradient reaches, pools and riffles form in response to randomly spaced roughness elements. Along Permanente creek, debris flows prior to mining operations likely provided large wood and boulders that were incorporated into steep step-pool reaches and lower gradient riffle-pool reaches.

[2] The URS Plan was prepared to comply with the July 27, 1999 Cleanup and Abatement Order – 99-018 issued by the San Francisco Bay Regional Water Quality Control Board by preparation of a report that documented a field reconnaissance of Permanente Creek throughout the quarry facility identifying areas requiring stabilization, prioritizing stabilization activities at candidate sites, and preparing an implementation schedule.



Map identifying the location of the surveyed reference reaches for Permanente Creek.

FIGURE

2

WATERWAYS CONSULTING INC.
509A SWIFT ST.
SANTA CRUZ, CA 95060
PH:(831)421-9291 / FAX:(888)819-6847
WWW.WATWAYS.COM

Field Sites

Waterways reviewed the URS Plan and studied published literature on the Santa Cruz Mountains to determine suitable reference reaches for Permanente Creek. We determined that a reach along Swiss Creek and a reach along Corte Madera Creek were the most appropriate reference reaches for Permanente Creek (Figure 2 and Table 1). The URS Plan described Corte Madera Creek and Swiss Creek as similar in drainage area, slope, and valley shape to Permanente Creek. Both creeks are in the Santa Cruz Mountains, relatively close to Cupertino, with precipitation regimes similar to the Permanente Creek watershed. Corte Madera Creek flows west and Swiss Creek flows east through confined, steep stream valleys, constrained on both sides by steep hillslopes prone to mass wasting and debris flow events. Both reference reaches are bedrock-controlled with a step-pool channel pattern formed by large boulders and other recently delivered colluvial deposits. Swiss Creek exhibited calcium carbonate precipitates within the active channel, similar to the calcium carbonate formations identified in Permanente Creek. In addition to the reference reaches in adjacent watersheds, a less impacted reach (Reach 20) within Permanente Creek was chosen to further support development of regional hydraulic geometries in support of the engineering design effort.

Table 1. Basin Characteristics for the Field Sites and Permanente Creek.

	Swiss Creek	Corte Madera Creek	Permanente Creek
Average annual precipitation (in)	33.8	38.6	34.2
Mean basin elevation (ft)	1,842	1,917	1,957
Dominant geology	limestone, sandstone	sandstone, shale	limestone, sandstone
Dominant hillslope process	landslide/debris flow	landslide/debris flow	landslide/debris flow
Average channel slope (%)	10.72	8.39	3.4 - 13.85
Drainage area (sq. miles)	0.8	1.4	2.7

Analysis Approach

To develop the regional hydraulic geometry relationships, information from the USGS streamflow gage database was compiled for streams in the Santa Cruz Mountains. The focus of this data mining effort was the 1.5-year[3] recurrence discharge because it approximates the channel forming, or bankfull, discharge (Dunne and Leopold, 1978). To evaluate the performance of the curve and provide data for smaller watersheds, which was missing from the USGS dataset, we collected field data from the two adjacent watersheds and within Reach 20 of Permanente Creek with a specific focus on measuring channel geometries at bankfull indicators that were identified in the field.

Hydraulic Geometry using existing USGS gage data

Waterways identified 33 USGS stream gages in the Santa Cruz Mountains, but only 14 of the 33 had sufficient peak flow records to be used in the hydraulic geometry analysis (Table 2). Ideally the gage sites would be limited to the eastern Santa Cruz Mountains near Cupertino and Santa Clara. However, since there are a limited number of gages with sufficient data, the 14 gages Waterways assessed are

[3] Previous iterations of this study focused efforts on the 2-year event. Results of that effort identified disparities between the gage-based analysis and the field-based analysis with the field-based analysis consistently under predicted bankfull widths and depths. This suggested that field-based bankfull indicators occurred at a discharge approximating the 1.5-year event rather than the 2-year event. These results, combined with comments from the reviewers prompted us to redo the analysis with a focus on the 1.5-year event rather than the 2-year event.

Table 2. USGS gage sites used to develop regional hydraulic geometry curves.

Site Name	Location	Period of Record	Drainage Area (sq. miles)	1.5-Year Flood Discharge (Bankfull) (cfs)	Estimated Bankfull Width (feet)	Estimated Bankfull Cross Sectional Area (sq. feet)	Estimated Bankfull Depth (feet)
Llagas Cr above Chesbro Reservoir	37.1483, -121.7672	1971-1982, 2004-2010	9.6	390	25.0	132.5	5.3
Aptos Creek near Aptos	37.0020, -121.9050	1972-1983	10.2	185	29.3	68.7	2.3
San Lorenzo River near Boulder Creek	37.2067, -122.1439	1969-1992, 1997	6.2	105	24.7	32.9	1.3
Bear Creek at Boulder Creek	37.1278, -122.1158	1978-1992, 1997	16.0	540	33.8	122.5	3.6
Boulder Creek at Boulder Creek	37.1267, -122.1217	1977-1992, 1997	11.3	680	47.4	305.2	6.4
Zayante Creek at Zayante	37.0861, -122.0458	1958-1992, 1997	11.1	480	28.0	103.0	3.7
San Lorenzo River at Big Trees	37.0444, -122.0714	1937-2017	106.0	3700	87.5	682.0	7.8
Carbonera Creek at Scotts Valley	37.0506, -122.0125	1985-2007	3.6	505	26.5	117.4	4.4
Scott Creek above Little Creek	37.0642, -122.2283	1937-1941, 1959-1973, 1982	25.1	600	43.5	145.0	3.3
Pescadero Creek near Pescadero	37.2608, -122.3278	1952-2017	45.9	1350	53.0	291.5	5.5
San Gregorio Creek at San Gregorio	37.3258, -122.3856	1955, 1970-2017	50.9	1900	61.5	402.5	6.5
Pilarcitos Creek at Half Moon Bay	37.4666, -122.4331	1967-2017	27.8	450	33.0	139.0	4.2
Redwood Creek at Redwood City	37.4494, -122.2325	1960-1997	1.8	170	13.0	41.5	3.2
San Franciscquito Creek at Stanford University	37.4233, -122.1883	1931-1941, 1951-2017	37.4	1000	45.5	198.5	4.4
Saratoga Creek at Saratoga	37.2544, -122.0383	1934-2017	9.2	255	25.6	40.2	1.6

located throughout the eastern and western Santa Cruz Mountains. Despite the slightly wider than ideal geographic range, our gage analysis improves upon the current regional analyses by focusing on a smaller area and limiting gage sites to the Santa Cruz Mountains.

Waterways compiled the existing information available at each of the selected gaging sites, including drainage area, discharge, field measurements of channel width and cross-sectional area, and local channel slope near the gage. We imported the discharge data into HEC-SSP (U.S. Army Corps of Engineers 2010) and developed flood frequency curves (USGS, Bulletin 17b, 1982) for each gage site to estimate the 1.5-year recurrence interval discharge. We then reviewed measurements of channel width and cross-sectional area at each gage site to find measurements that were taken during a high flow event that approximated the 1.5-year recurrence interval discharge. Four of the gaging sites did not have channel width and cross-sectional area data recorded during a 1.5-year event, so we extrapolated based on the available data. We then estimated bankfull depth at each gage site by dividing channel

cross-sectional area by channel width. Banfull width, bankfull depth, and the 1.5-year flood discharge were plotted separately against drainage area. One outlier was identified and removed from the study.

Analogue Site Assessment

Waterways surveyed a 200-foot reach of Corte Madera Creek, located downstream of the Alpine Road Trail culvert, a 171-foot reach of Swiss Creek, located approximately 500 feet upstream from the Peacock Court bridge, and two segments within Reach 20 of Permanente Creek totaling over 300 feet of channel. We chose reach locations that were beyond the influence of instream structures (e.g., culverts, bridges) and were representative of conditions within the reach. We used an auto-level to survey four channel cross section profiles at Corte Madera Creek, three channel cross section profiles at Swiss Creek, two sets of three channel cross-section profiles at Permanente Creek and a longitudinal profile at all four sites. Each channel cross section profile included the expanse of the valley floor and the identification of significant geomorphic features using field indicators, such as bankfull. In most cases, the field indicator used to estimate the bankfull width and depth was the base of mature trees.

Using the survey data, Waterways calculated the bankfull channel width and plotted each cross section to calculate their cross-sectional areas. We then divided each cross-sectional area by the surveyed bankfull width to determine average bankfull depth. We estimated drainage area for each field site using StreamStats (USGS 2012) and calculated channel slopes using the surveyed longitudinal profiles. Channel widths and hydraulic depths were determined for each cross-section and then averaged for each reach, or reach segment, to obtain a single channel width and depth for each creek at the estimated bankfull discharge. Two separate segments were surveyed in Reach 20 of Permanente Creek to identify differences in channel geometry based on differences in local channel slope with one segment having a local channel slope of 4.6% and the other a local channel slope of 8.2%.

Hydraulic Geometry Analysis

Waterway combined the USGS gage site data with the field survey data to determine trends in channel geometry as a function of drainage area. We developed relationships between drainage area and bankfull width, bankfull depth, and the 1.5-year recurrence interval discharge. Trend lines were fit to the data to provide a predictive tool to estimate these parameters at specific restoration sites, most specifically the Rock Pile and Material Removal Areas (Figures 3, 4, and 5). Using the equation for each trend line, we solved for the predicted channel width and depth for specific restoration areas within Permanente Creek based on a drainage area of 2.7 square miles (Culverts 7 and 8), 2.54 square miles (Rock Pile), and 2.02 square miles (Material Removal Area). Table 3 summarizes the results of this analysis.

Table 3. Channel Dimensions Calculated Using Hydraulic Geometry Relationships

Project Site	Drainage Area (mi^2)	Predicted Bankfull Width (ft)	Predicted Bankfull Depth (ft)	Cross Sectional Area (ft^2)
Culvert 7	2.70	17.9	2.3	31
Culvert 8	2.70	17.9	2.3	31
Rock Pile	2.54	17.5	2.3	29
Material Removal Area	2.02	16.0	2.1	25

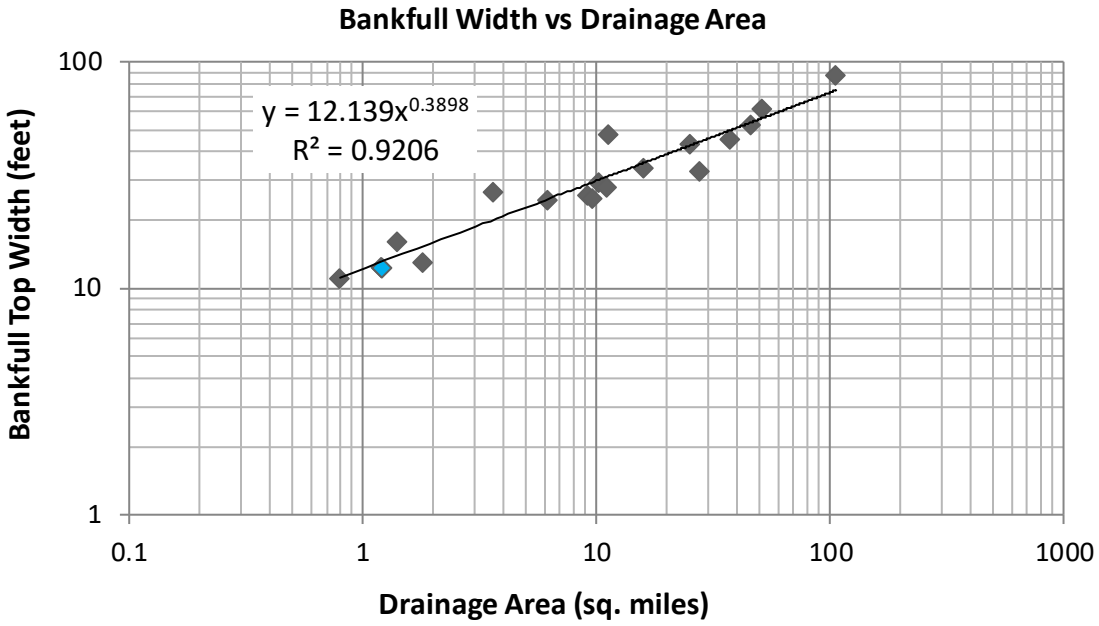


Figure 3. Bankfull Top Width as a Function of Drainage Area for the Santa Cruz Mountains. The blue marker represents the sites on Permanente Creek in Reach 20.

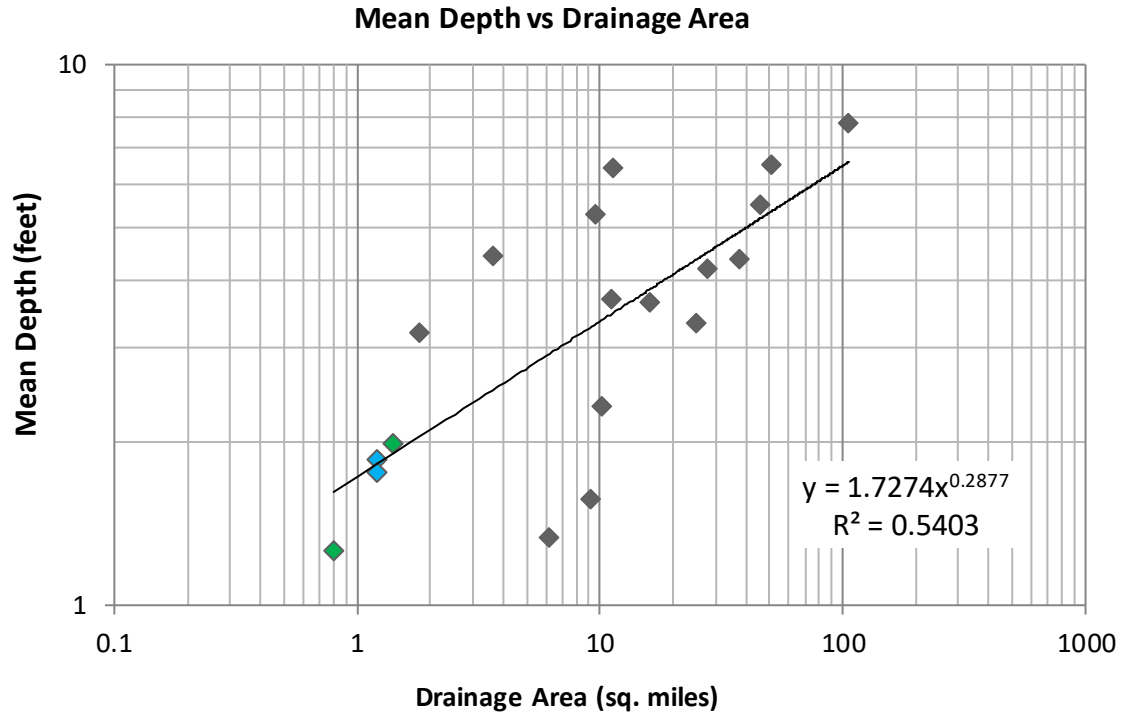


Figure 4. Bankfull Depth as a Function of Drainage Area for the Santa Cruz Mountains. The green data points are Swiss and Corte Madera Creeks. The blue data points are the sites on Permanente Creek.

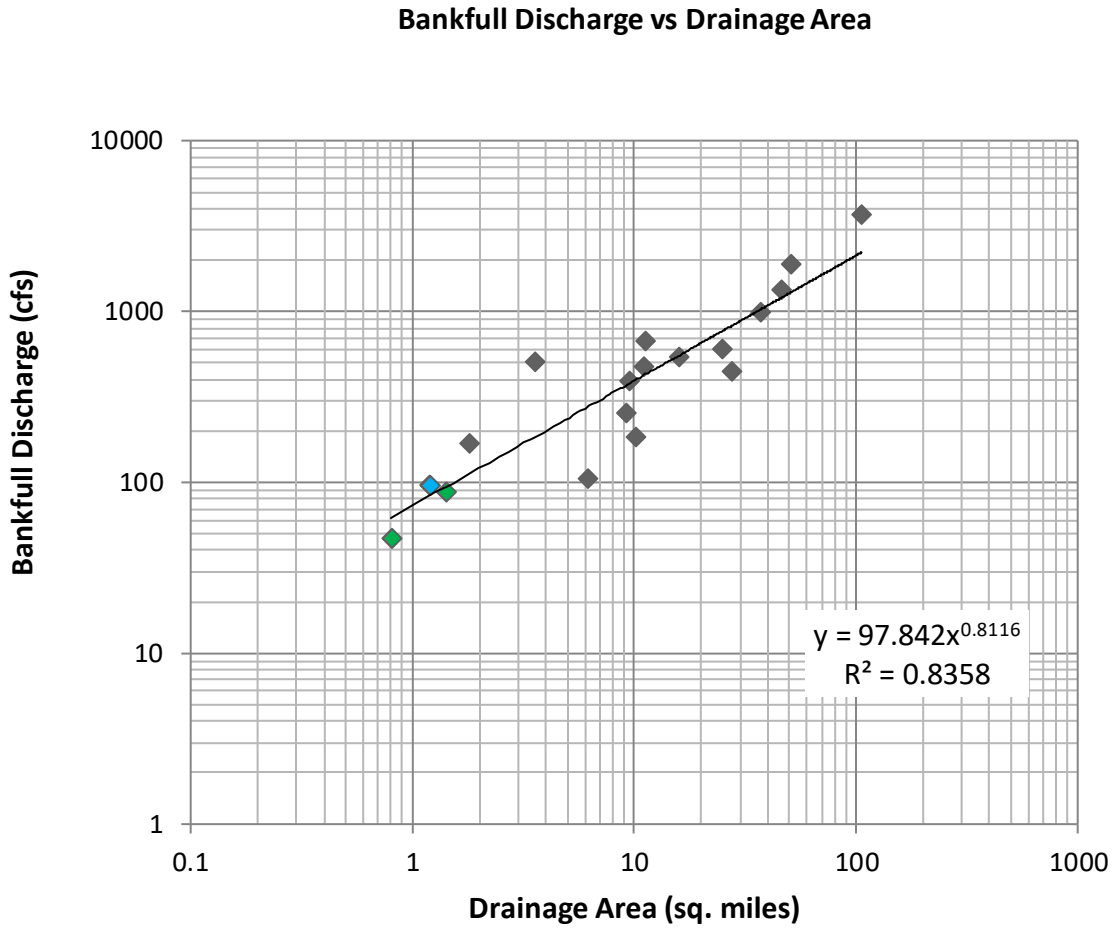


Figure 5. Bankfull Discharge as a Function of Drainage Area for the Santa Cruz Mountains. The green data points are Swiss and Corte Madera Creeks. The blue data points are the sites on Permanente Creek.

Pool Geometry

An important design parameter for reach-scale restoration of Permanente Creek is pool length and pool spacing. Despite the legacy of impacts to Permanente Creek, it was determined that several reaches (R14-R16 and R20-R21) continued to exhibit naturally formed pool and riffle geometries that encompass a range of channel slopes. These conditions provided an opportunity to measure pool and riffle geometries, locally, to support the design effort, rather than measuring those parameters in other adjacent watersheds which may lack specific characteristics found in Permanente Creek such as the prevalence of calcium carbonate precipitates. Given the inherent variability in pool geometries associated with the debris flow morphology of the channel, it was important to collect data along entire reaches and summarize the information to convey averages and ranges of natural conditions. To convey the range of natural variability, longitudinal profile data was collected along the entire length of the identified reaches within Permanente Creek to calculate pool length and spacing in relation to reach-

scale channel gradients (Table 4). These data were then used to calculate pool statistics for each site-specific restoration area.

Table 4. Statistics on Pool Length, Depth and Spacing (in feet) By Reach of Permanente Creek.

Reach #	Reach Avg Slope	Avg Pool Length (ft)	Median Pool Length (ft)	St. Dev Pool Length (ft)	Avg Pool Depth (ft)	Median Pool Depth (ft)	St. Dev Pool Depth (ft)	Avg Pool Spacing (ft)	Median Pool Spacing (ft)	St. Dev Pool Spacing (ft)
21	5.1%	13.6	11.6	6.3	0.6	0.6	0.3	211	150	212
20	5.2%	11.4	11.0	4.1	0.9	1.0	0.4	106	92	57
16	7.1%	15.4	14.4	6.1	0.8	0.8	0.4	76	65	69
15	11.6%	10.5	9.4	2.5	0.7	0.7	0.4	58	39	50
14	6.4%	8.8	8.0	3.8	0.6	0.6	0.3	31	19	27
	4-8% Reaches	**12.0**	**10.3**	**5.7**	**0.7**	**0.7**	**0.4**	**94**	**55**	**124**
	8-12% Reaches	**10.5**	**9.4**	**2.5**	**0.7**	**0.7**	**0.4**	**58**	**31**	**50**

Results/Discussion

Dunne and Leopold's (1978) regional curves provide a predictive tool to estimate bankfull channel dimensions for Permanente Creek. Use of the Dunne and Leopold regional curves for the entire Bay Area estimated a bankfull width for the Permanente project area of approximately 17 to 25 feet and a bankfull depth of approximately 1.5 to 2.0 feet. Because these curves are regional and include a significant number of gage locations that are in a geomorphic setting that are different from the project area, regional curves that are more specific to the Permanente Creek project area were developed. Utilizing the more focused data set, which includes the USGS sites within the Santa Cruz Mountains and the field-based assessments sites on Permanente, Corte Madera and Swiss Creek, the curves predicted a bankfull width of 17.9 feet for Culverts 7 and 8, 17.5 feet for the Rock Pile Area, and 16.0 feet for the Material Removal Area and a bankfull depth of approximately 2.3 feet for Culverts 7 and 8, 2.3 feet for the Rock Pile Area and 2.1 feet for the Material Removal Area prior to mining-related impacts (Table 3). As expected, the Dunne and Leopold (1978) curves describe a wider and flatter channel, most likely due to the inclusion of lower gradient, unconfined, alluvial channels in the analysis. Table 5 includes ranges of bankfull channel dimensions for the areas where the channel will be reconstructed to provide for some variability and flexibility during construction since large non-uniform materials will be used in channel construction.

Measured channel slopes for Corte Madera and Swiss Creek, 8.4% and 10.7% respectively, are in the range of the design slopes at the Rock Pile and Material Removal Areas along Permanente Creek. Field observations of a step-pool channel morphology at these channel gradients suggest that Permanente Creek likely had a step-pool channel pattern in the steeper reaches prior to mining. This is supported by

the observed conditions in the reaches of Permanente Creek that were identified as having pool and riffle geometry that were representative of natural conditions.

The pool analysis, utilizing the surveyed longitudinal profiles along the more intact reaches of Permanente Creek, suggest that there is an inverse relationship between pool length and spacing relative to channel gradient (Table 4). Furthermore, lower gradient reaches exhibit higher overall pool length and spacing variability than higher gradient reaches. This supports the idea that higher gradient reaches (>8% channel slope) are more characterized by a step-pool morphology, whereas lower gradient reaches (4% to 8% channel slope) exhibit more of a pool-riffle morphology. Pool depth was fairly consistent across all of the evaluated reaches with pools ranging between 0.5 and 2 feet, independent of channel slope. This is likely due to the fact that pool depth may be more a function of the presence of localized roughness elements, and the fact that there are limited opportunities to scour deeper pools due to the composition of the bed material and associated natural armoring.

Table 5. Proposed Channel Dimensions for Constructed Reaches

Project Site	Design Slope (%)	Design Slope Range (%)	Proposed Bankfull Width Min (ft)	Proposed Bankfull Width Max (ft)	Proposed Bankfull Depth Min (ft)	Proposed Bankfull Depth Max (ft)	Cross Sectional Area Min (ft^2)	Cross Sectional Area Max (ft^2)
Culvert 7	4.3%	4%-8%	16.5	20.5	2.1	2.5	28.2	34.2
Culvert 8	2.7%	<4%	18.0	22.0	1.9	2.3	28.2	34.2
Rock Pile Area	Varies	<4%	17.5	21.5	1.8	2.2	26.9	32.9
		4%-8%	16.0	20.0	2.0	2.4		
		>8%	15.5	18.5	2.4	2.8		
Material Removal Area	Varies	<4%	16.0	20.0	1.7	2.1	22.5	28.5
		4%-8%	14.5	18.5	1.9	2.3		
		>8%	14.0	17.0	2.3	2.7		

References

Dunne, T. and Leopold, L.B. 1978. Water in Environmental Planning. W.H. Freeman and Company, New York, pp. 615-618.

URS Corporation. 2011. Permanente Creek Long-Term Restoration Plan. *Prepared for Lehigh Southwest Cement Company, March 11, 2011.*

US Army Corps of Engineers. 2010. HEC-SSP Statistical Software Package, Version 2.0. U.S. Army Corps of Engineers Hydrologic Engineering Center, http://www.hec.usace.army.mil/software/hec-ssp/.

U.S. Geological Survey. 2012. The StreamStats program for California, online at http://water.usgs.gov/osw/streamstats/california.html

U.S. Geological Survey. 1982. Bulletin 17B, Guidelines for Determining Flood Flow Frequency. Interagency Advisory Committee on Water Data, Hydrology Subcommittee. Reston, Virginia. http://water.usgs.gov/osw/bulletin17b/dl_flow.pdf

APPENDIX C

Seismic Refraction Survey (Bedrock Analysis)

NORCAL GEOPHYSICAL CONSULTANTS, INC.

May 22, 2014

Golder Associates, Inc.
425 Lakeside Drive
Sunnyvale, CA 94085

Subject: Seismic Refraction Survey
Sites 4 and 11
Permanente Quarry
Cupertino, California

NORCAL Job #14-245.15B

Attention: George Wegmann,

This report presents the findings of seismic surveys performed by NORCAL Geophysical Consultants, Inc. for Golder Associates, Inc. at Permanente Quarry in Cupertino, California. The surveys were performed during the period March 4 through 11th, 2014 by NORCAL Professional Geophysicist William J. Henrich, PGp 893. Geologist Jeff Linder and Field Technician Dave Walter of Golder Associates, Inc. provided field assistance throughout the duration of the survey.

1.0 SITE DESCRIPTION AND PURPOSE

The seismic surveys were conducted at two locations referred to as Area 11 and Area 4, as shown on Plates 1A and 1B, respectively. Both areas encompass sections of Permanente Creek which drains in a general west to east direction. The area north of the creek has been subjected to accumulations of overburden materials related to quarrying operations. Particle sizes of the mine wastes ranged from sand and gravel size up to boulders that, on the surface, were several feet across. The local bedrock consisted of greywacke (sandstone), greenstone and limestone belonging to the Franciscan Complex.

The purpose of the seismic survey was to determine the thickness of alluvium and alluvium-rock fills at accessible select areas within the stream channel, along parallel haul roads and areas north of the stream channel. This data will be used by others to assess volumes of unconsolidated materials needed to be removed for restoration to the original stream channel grade and configuration as part of a reclamation plan for the quarry.

2.0 METHODOLOGY

We collected seismic data using two methods known as seismic refraction (SR) and multi-channel analysis of surface waves (MASW). The SR method was used to determine the compressional (P-) wave velocity of subsurface materials. The P-wave velocity (Vp) of fill, sediments, and rock are dependent on physical properties such as compaction, density, hardness, and induration. However, other factors such as bedding, fracturing, and saturation also affect Vp.

Typically, low Vp is indicative of loose, dry soils, poorly compacted fill material, poorly to semi-consolidated sediments, or alternatively, deeply weathered and/or highly fractured rock. Moderate Vp usually indicates dense and highly compacted or saturated sedimentary deposits or fill, and/or moderately weathered and fractured sedimentary rock. High Vp typically represent un-weathered sedimentary (i.e., sandstone, conglomerate, meta-sandstone or basalt) bedrock. A more detailed description of the SR methodology is provided in Appendix A.

The MASW method was used to determine both the P-wave and the shear (S-) wave velocity of subsurface materials in areas where limited access precluded the use of the SR method. S-waves typically propagate through earth materials at roughly one-half the velocity of P-waves. However, S-wave velocities are more directly related to the strength of fill, sediments, and rock than P-waves. Furthermore, unlike Vp, S-wave velocity (Vs) is not affected by saturation. Typically, low Vs is indicative of loose, dry soils, poorly compacted fill material, poorly to semi-consolidated sediments, or alternatively, deeply weathered and/or highly fractured rock. Moderate Vs usually indicates dense and highly compacted sedimentary deposits or fill, and/or moderately weathered and fractured sedimentary rock. High Vs typically represent un-weathered sedimentary (i.e., sandstone, conglomerate, meta-sandstone or basalt) bedrock. A more detailed description of the MASW method is provided in Appendix B.

3.0 DATA ACQUISITION

SR surveys were conducted in two locations referred to as the Rock Pile Area (Area 11) and the Material Removal Area (Area 4). The SR surveys were conducted according to the procedures described in Appendix A. MASW soundings were conducted in Area 11 according to the procedures described in Appendix B. The salient features of the data acquisition procedures used in each area are described in the following sections.

3.1 AREA 11

In Area 11 we collected SR data from 8-lines ranging in length from 75- to 250-ft. The locations of these lines, labeled Line 1 through Line 8, are shown on Plate 1A. We also conducted two MASW soundings. The locations of the soundings, labeled MASW-9 and MASW-10 are also shown on Plate 1A. Where possible, the SR lines and MASW soundings were located within the stream channel. However, there were some areas where the lines had to be placed on adjacent compacted gravel roads because of the presence of dense vegetation, concrete linings or steel culverts within the channel.

3.2 AREA 4

In Area 4, we acquired SR data from 13-lines ranging in length from 125- to 250-ft. The locations and orientations of the SR lines are shown on Plate 1B. The SR lines were positioned within the stream channel and on the northern portions (hill slopes, access roads and parking area) of the site.

4.0 DATA PROCESSING

4.1 SEISMIC REFRACTION (SR)

The refraction data were processed as described in Appendix A. Elevation data were provided by Waterways Consultants, Inc. at each shot point location within every seismic line. These elevation data were incorporated into the final processed seismic models. Further information regarding specific data input and sample compilations can be found in Appendix A.

4.2 MULTI-CHANNEL ANALYSIS OF SURFACE WAVES (MASW)

The MASW data were processed according to the procedures described in Appendix B.

5.0 RESULTS

The results of the seismic refraction survey are illustrated by the seismic velocity cross-sections (profiles) shown on Plates 2 through 8. On each profile the vertical axis represents elevation above mean sea level (MSL) and the horizontal axis represents draped survey distance (Station) along each line. Color shaded areas represent the lateral and vertical extent of the seismic layers comprising each profile. Modelled layer depths (thicknesses) as described in the Appendix A were determined beneath each geophone. These data were interpolated/extrapolated beneath each shot point. The relationship between color and seismic velocity is indicated by the color scales plotted to the right of each seismic refraction profile. In order to indicate how velocity varies from line to line within each survey area, the same scale was used for every profile. The results obtained in each area are described in the following sections. Specific results are presented for areas where two or more seismic refraction profiles either cross each other or are in a local proximity. It was useful to group seismic lines in this manner because of common characteristics involving of topography, location or surface conditions.

5 .1 AREA 11

5.1.1 Lines 1 and 2 (Plate 2)

Lines 1 and 2 were located within the stream channel, just west of a retention pond, as shown on Plate 1A. During the survey, water from remote pumping was actively being discharged to the stream channel above the seismic lines. The profile for Line 1 indicates velocities (Vp) ranging from 1200- to 7200-ft/sec. Our interpretation of the data resolves this range into two seismic layers labeled V1 and V2 in order of increasing depth and velocity. We interpret V1as representing unconsolidated stream deposits and V2 as representing bedrock. The depth to rock ranged from 18- to 25-ft. The Profile for Line 2 indicates velocities (Vp) ranging from 1150- to 2550-ft/sec. Our interpretation of the data resolves this range into two seismic layers labeled V1 and V2 in order of increasing depth and velocity. Given the low velocities of these layers, we interpret both as representing unconsolidated stream deposits. The difference in velocity between the two layers is related to their relative degree of compaction. V2 has a higher velocity than V1 because it is more highly compacted, probably because of the overbearing weight of V1. Line 2 did not detect bedrock because it was a relatively short line length which limited the depth of exploration.

5.1.2 Line 3 – 6, MASW Soundings 9 and 10 (Plate 3)

Lines 3 through 5 were located on access roads that parallel the stream channel, as shown on Plate 1A. Line 6 was situated in open, gravel packed area that ranged from 40 to 60-ft north of a subsurface diversion channel. The profiles for Lines 3-6 indicate velocities (Vp) ranging from 2300- to 7800-ft/sec. Our interpretation of the data resolves this range into two seismic layers designated as V1 and V2 in order of increasing depth and velocity. We interpret V1 as representing unconsolidated materials, e.g. road fill and/or alluvium. Given the high velocity range of V2 (6850- to7800-ft/sec) we interpret it as representing bedrock. The depths to bedrock ranged from 8- to 35-ft bgs.

MASW Soundings 9 and 10 were located north of Seismic Refraction Line 3, as shown on Plate 1A. The MASW soundings were acquired for the purpose of assessing possible near surface high velocity layers and providing depth to bedrock information further north of the stream channel. The 1D MASW Velocity Models (9 and 10) shown at the top of Plate 3 indicate a near surface high velocity layer (Vs=1500- to 2000-ft/sec) that is 8- to 16-ft thick. We interpret this high velocity layer as representing compacted (by very heavy vehicle loads) road fill. The materials underlying the compacted fill have lower velocities (Vs=500- to1000-fps) and thus constitute a velocity inversion. This velocity inversion, which is typically about 8- to 9-ft thick, is characteristic of alluvium. It is underlain, at depths of 17- to 26-ft bgs by velocities (Vs) of about 1800-ft/sec. We interpret these velocities as being indicative of consolidated bedrock. The bedrock depth indicated by the MASW-9 model (about 17-ft) is more shallow than the depth

indicated by the Line 3 profile (23-ft) at its point of closest approach. Conversely, the bedrock depth indicated by the MASW-10 model (26-ft) is significantly greater than the 5- to 10-ft depth indicated by the Line 3 and Line 4 profiles at their points of closest approach to MASW-10. These factors highlight the erratic nature of the bedrock surface and can be, in part, attributed to the fact that MASW-9 and MASW-10 are 25-ft north of Lines 3 and 4.

Additionally, the MASW soundings were undertaken to provide a constraint on the seismic refraction results in the general area (Seismic Refraction Lines 3 and 4) as the MASW techniques can accommodate shallow velocity inversions in processing. The MASW bedrock depths (17- to 26-ft bgs) derived from MASW analysis thus formed an approximate magnitude range of values. Our seismic refraction results indicated that bedrock depths ranged from 5- to 35-ft bgs which is in the same order of magnitude as the MASW estimate of depths to bedrock in the general area.

5.1.3 Lines 7, 8 and 11(Plate 4)

Lines 7, 8 and 11 trend northward, away from the stream channel, as shown on Plate 1A. Lines 7 and 8 cross an uphill section of accumulated mine waste and packed surficial gravel. The local topography was highly variable and steep. Line 11 crosses a gently sloping, open, gravel packed area from the edge of a metal culvert up to point 50-ft distant from the rock discharge pile (Rock Pile). The profiles for Lines 7, 8 and 11indicate velocities ranging from 1850- to 5700-ft/sec. Our interpretation of the data resolves this range into two seismic layers designated as V1 and V2, in order of increasing depth and velocity. Because of its relatively low velocity and highly variable thickness, we interpret V1 as representing mine wastes and/or alluvium. We interpret V2 as representing bedrock. Beneath Lines 7 and 8, the depth to rock ranges from less than 10- to over 50-ft. The Time-Distance plot for Line 11 indicated a relatively high velocity V1 layer associated with the road bed. No characteristic higher V2 bedrock velocity layer was detected. Therefore, no modeling results are presented for this line.

5.2 AREA 4

5.2.1 Lines 12, 13, 14 and 15 (Plate 5)

Lines 12, 13 and 14 were situated within a relative wide section of the stream channel, as shown on Plate 1B. Line 15 was located along a man-made bench that parallels the stream channel, about 20-ft upslope from the channel. The profiles for the four lines indicate velocities (Vp) ranging from about 900- to 3550-ft/sec. Our interpretation of the refraction data resolves this velocity range into three layers labeled V1 through V3 in order of increasing depth and velocity. We interpret the V1 and V2 layers as representing unconsolidated stream deposits and V3 as representing weathered bedrock. The depth to rock (V2/V3 interface) ranges from 7- to 23-ft bgs.

The relatively low velocity of V3 (2800- to 3450-ft/sec) suggests that it comprises a very weak rock like a meta-shale. The profile for Line 15 indicates that bedrock deepens to the east (downstream), reaching a maximum depth of 36-ft-bgs at the east end of the line. This puts it at an elevation of 1190-1192-ft MSL, which corresponds to the bedrock elevations at the west end of Line 12 and the east end of Line 13.

5.2.2. Lines 16 and 17 (Plate 6)

Lines 16 and 17 were situated on top of a gravel packed, level parking area, as shown on Plate 1B. The profiles for both lines indicate velocities (Vp) ranging from 1150- to 6200-ft/sec. Our interpretation of the Line 16 and Line 17 data resolves this range into two seismic layers labeled V1 and V2 in order of increasing depth and velocity. We interpret V1 as representing fill and alluvium and V2 as representing bedrock. The depth to rock ranges from17- to 23-ft bgs.

5.2.3 Lines 18, 19, 20 and 21 (Plate 7)

Lines 18 through 20 were located within the active stream channel, as shown on Plate 1B. However, there was no water in the channel at the time the survey was conducted. Line 21 extended north and upslope from the west end of Line 19. The profiles for these lines indicate velocities (Vp) ranging from 1100- to 4150-ft/sec. Our interpretation of the data resolves this range into three layers labeled V1 through V3 in order of increasing depth and velocity. V2 is absent beneath Line 18 and V3 is absent beneath Line 19. We interpret the combined V1 and V2 layers, with velocities ranging from 1050- to 2650-ft/sec, as representing unconsolidated stream and slope deposits. However, below Lines 19 and 20, the V2 layer could represent decomposed bedrock or dense gravel deposits. In addition, our field observations indicate that, beneath Line 21, V2 could represent mining waste that contains a high percentage of boulder size fill. We interpret theV3 layer as representing bedrock with velocities, where defined, ranging from 3400- to 4150-ft/sec. The depth to rock ranges from about 8- to 32-ft.

5.2.4 Lines 22, 23 and 24 (Plate 8)

Line 22 and Line 23 were located on an access road, as shown on Plate 1B. This road leads to Pond 4 (not shown). Line 24 extended southeast and down slope, from the access road towards the stream channel. The profiles for the three lines indicate velocities (Vp) ranging from 1200- to 6700-ft/sec. Our interpretation of the data resolves the velocity range into two layers labeled V1 and V2 in order of increasing depth and velocity. We interpret V1 as representing unconsolidated stream deposits. We interpret V2 as representing bedrock. Beneath Lines 22 and 23, the computed depths to bedrock ranged from 18- to 30-ft bgs. Beneath Line 24, the depths to bedrock decrease in the down slope direction; ranging from 18-ft bgs near the access road to only 8-ft bgs at the southeast edge of the profile.

6.0 STANDARD CARE

The scope of NORCAL's services for this project consisted of using geophysical methods to characterize the subsurface. The accuracy of our findings is subject to specific site conditions and limitations inherent to the techniques used. We performed our services in a manner consistent with the standard of care ordinarily exercised by members of the profession currently employing similar methods. No warranty, with respect to the performance of services or products delivered under this agreement, expressed or implied, is made by NORCAL.

We appreciate having the opportunity to provide you with this information.

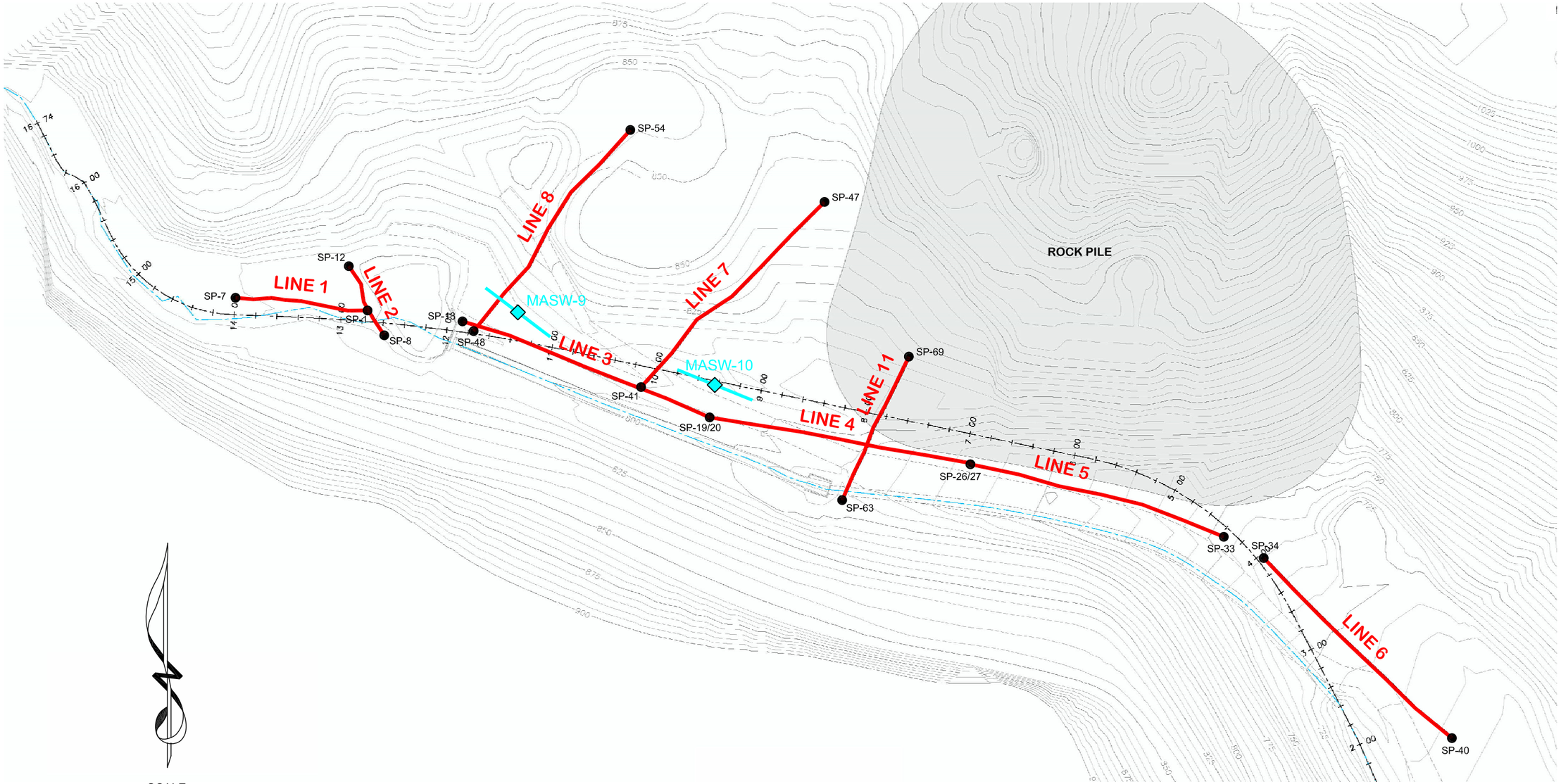
Respectfully,

NORCAL Geophysical Consultants, Inc.

William J Henrich
Professional Geophysicist PGp 893

WEB/tlt

Enclosures: Plates 1A, 1B and 2 through 8
Appendix A - Seismic Refraction (SR)
Appendix B – Multi-channel Analysis of Surface Waves (MASW)



SCALE

0 50 100 200

(1 inch = 100 feet)

LEGEND

	SEISMIC REFRACTION LINE
SP-1	SHOT POINT LOCATION
	CENTER POINT OF MASW LINE

NOTE: BASE MAP PROVIDED BY WATERWAYS CONSULTING, INC.

NORCAL

SITE LOCATION MAP
PERMANENTE QUARRY AREA 11
SEISMIC REFRACTION SURVEY

LOCATION: CUPERTINO, CALIFORNIA

CLIENT: GOLDER ASSOCIATES, INC.

JOB #: 14-245.15B

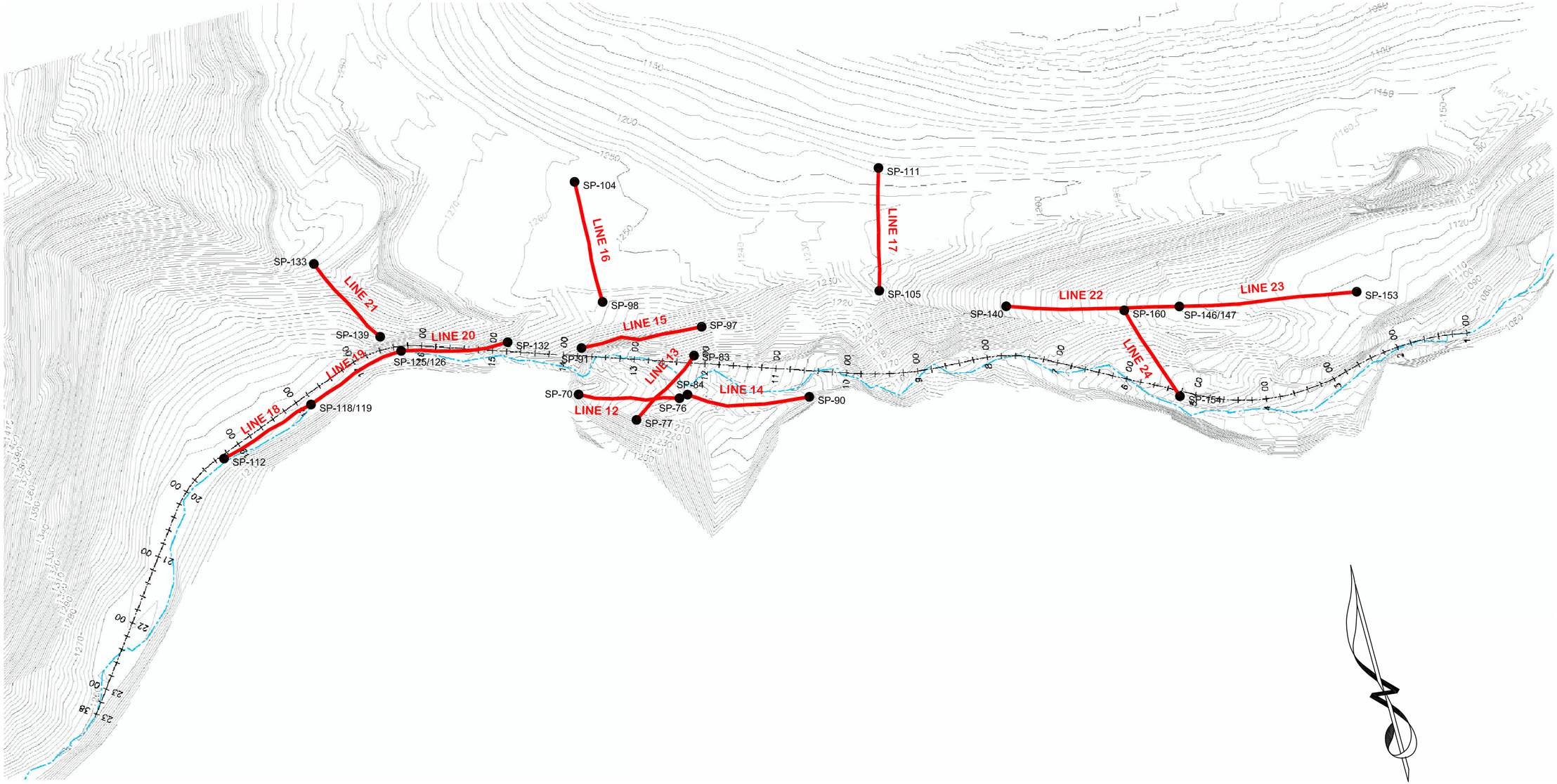
NORCAL GEOPHYSICAL CONSULTANTS INC.

DATE: MAY 2014

DRAWN BY: G.RANDALL

APPROVED BY: WJH

PLATE 1A



SCALE

0 150 300

(1 inch = 150 feet)

LEGEND

———	SEISMIC REFRACTION LINE
● SP-1	SHOT POINT LOCATION

NOTE: BASE MAP PROVIDED BY WATERWAYS CONSULTING, INC.

NORCAL

SITE LOCATION MAP
PERMANENTE QUARRY AREA 4
SEISMIC REFRACTION SURVEY

LOCATION: CUPERTINO, CALIFORNIA

CLIENT: GOLDER ASSOCIATES, INC.

JOB #: 14-245.15B

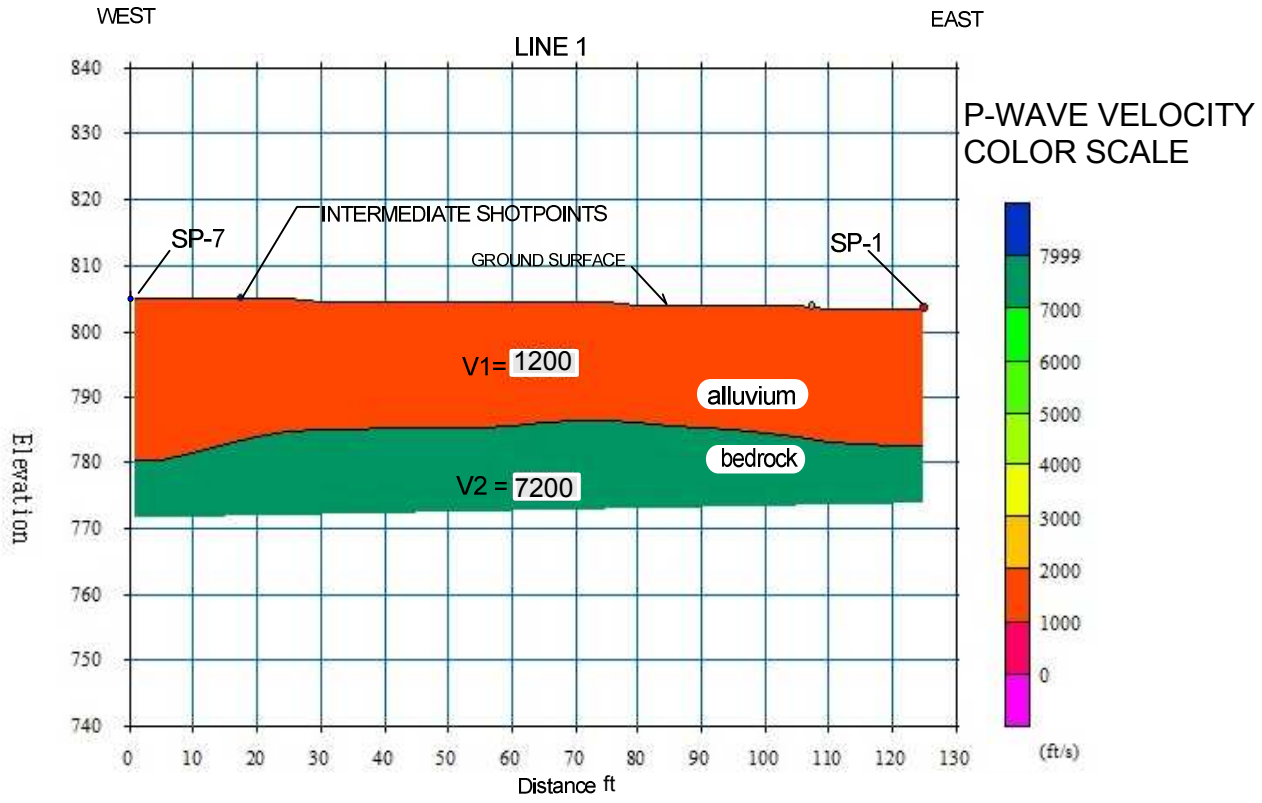
NORCAL GEOPHYSICAL CONSULTANTS INC.

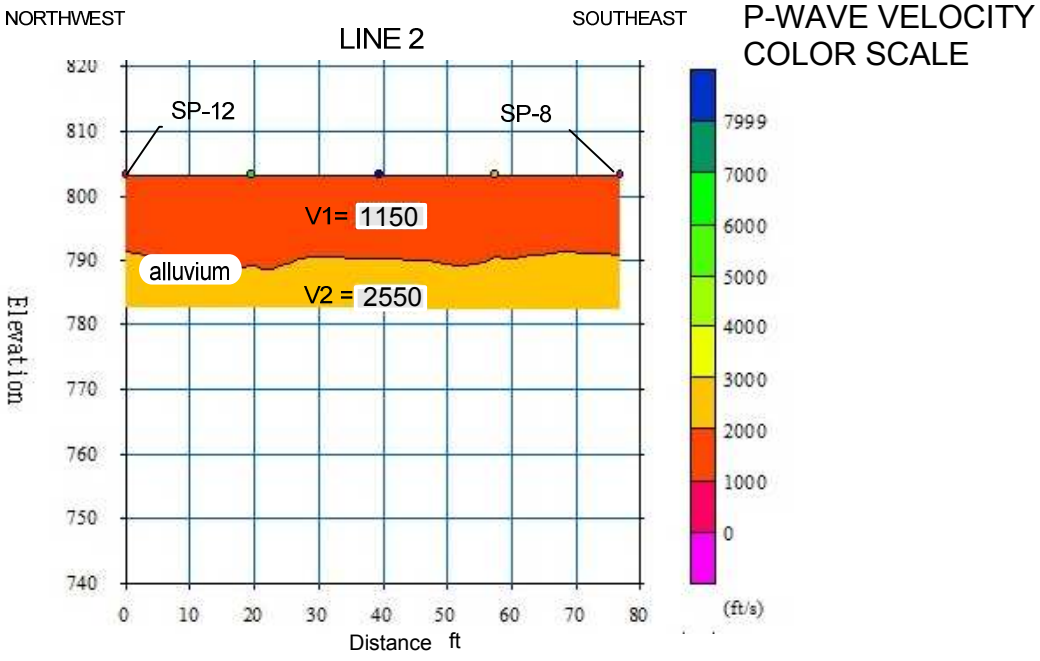
DATE: MAY 2014

DRAWN BY: G.RANDALL

APPROVED BY: WJH

PLATE 1B





EXPLANATION

V2 = 7200 Velocity Layer in ft/sec

Horizontal/Vertical Scale 1' = 30 feet

NORCAL

SEISMIC REFRACTION PROFILES LINES 1 AND 2

LOCATION: PERMANENTE QUARRY, CUPERTINO, CA

CLIENT: GOLDER ASSOCIATES, INC.

JOB #: 14-245.15B

NORCAL GEOPHYSICAL CONSULTANTS INC.

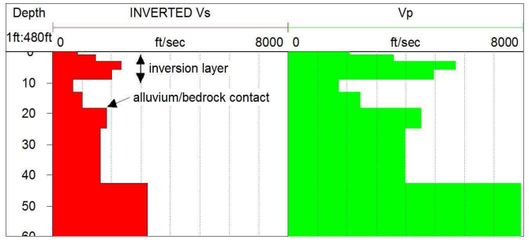
DATE: APRIL, 2014

DRAWN BY: W HENRICH

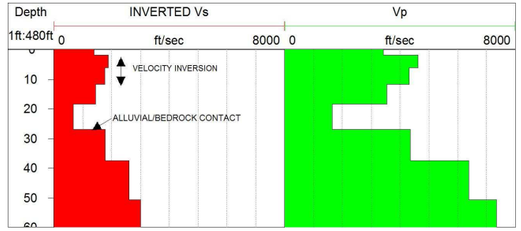
APPROVED BY: WJH

PLATE 2

MASW VELOCITY PROFILE 9

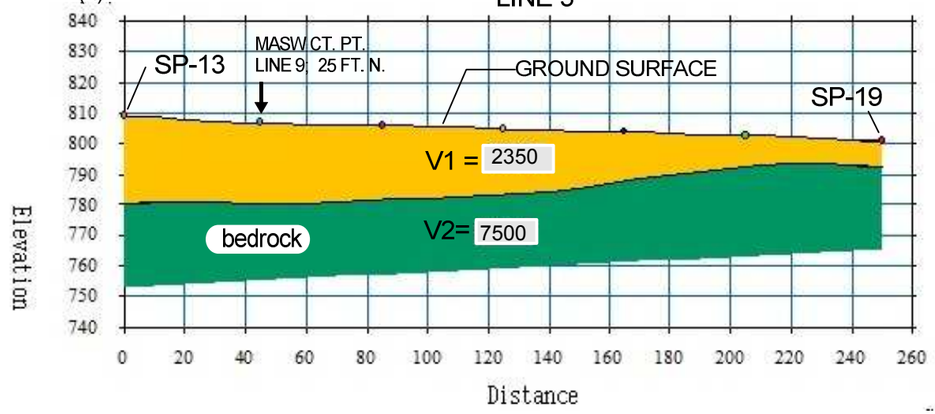


MASW VELOCITY PROFILE 10



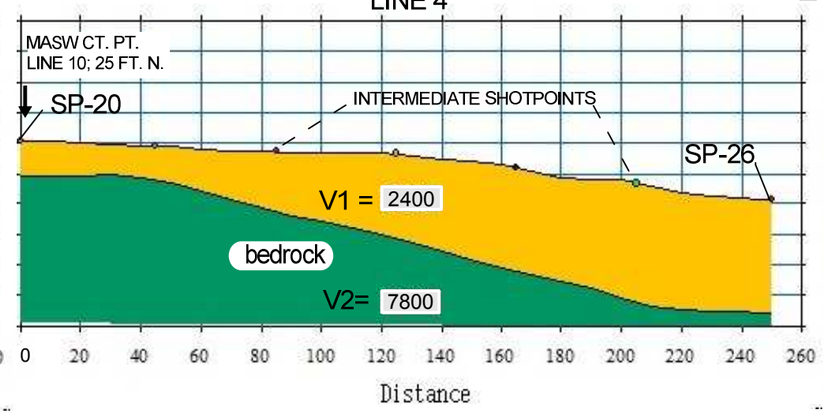
WEST

LINE 3

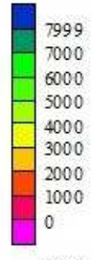


LINE 4

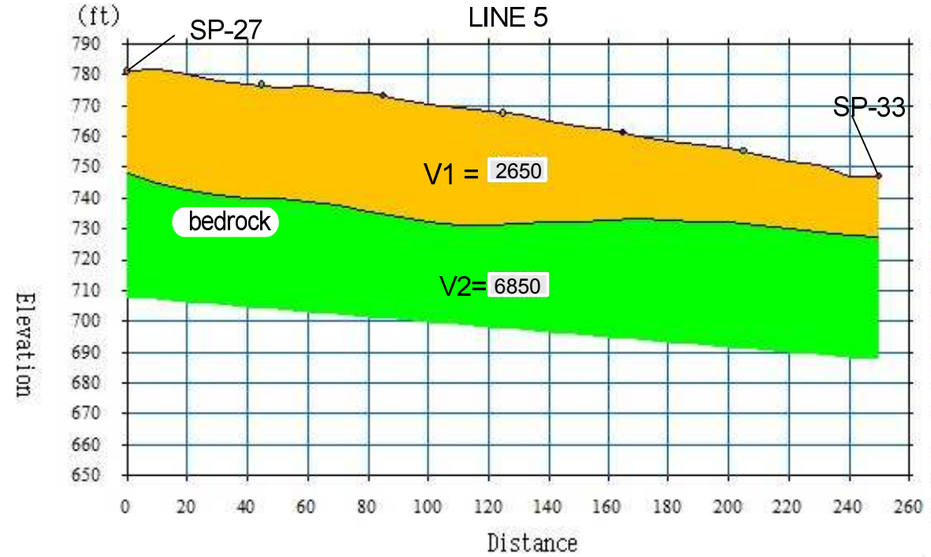
EAST



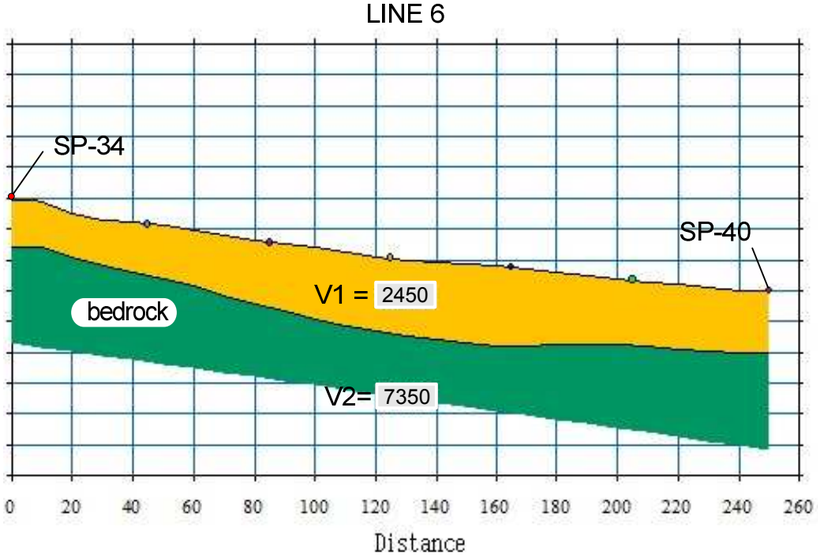
P-WAVE VELOCITY
COLOR SCALE



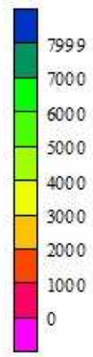
LINE 5



LINE 6



P-WAVE VELOCITY
COLOR SCALE



EXPLANATION

V2 = 7200 Velocity Layer in ft/sec

HORIZONTAL/VERTICAL SCALE: 1" APPROX. EQUALS 50 FEET

NORCAL

SEISIMC REFRACTION PROFILES
LINES 3, 4, 5 AND 6;
MASW PROFILES 9 AND 10

LOCATION: PERMANENTE QUARRY, CUPERTINO, CA

CLIENT: GOLDER ASSOCIATES, INC

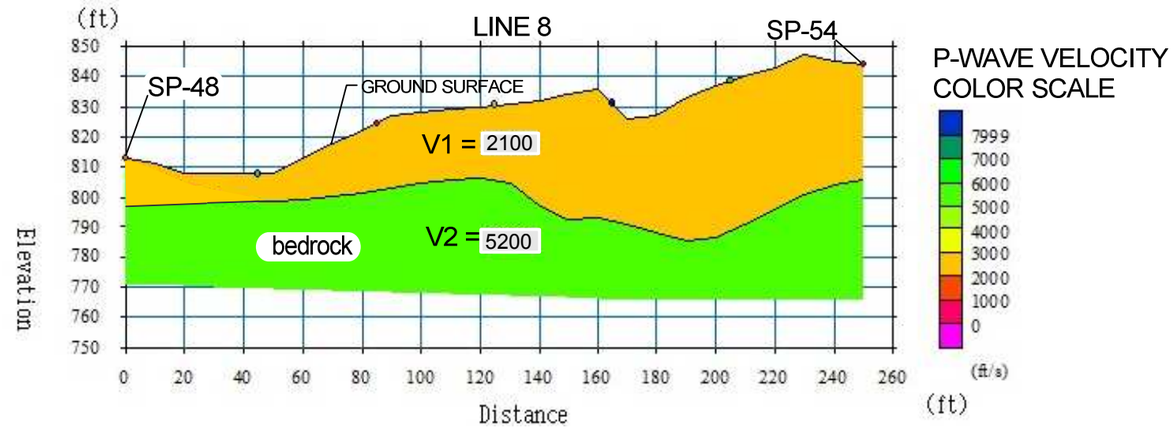
JOB #: 14-245.15B | NORCAL GEOPHYSICAL CONSULTANTS INC.

DATE: APRIL, 2014 | DRAWN BY: W. HENRICH | APPROVED BY: WJH

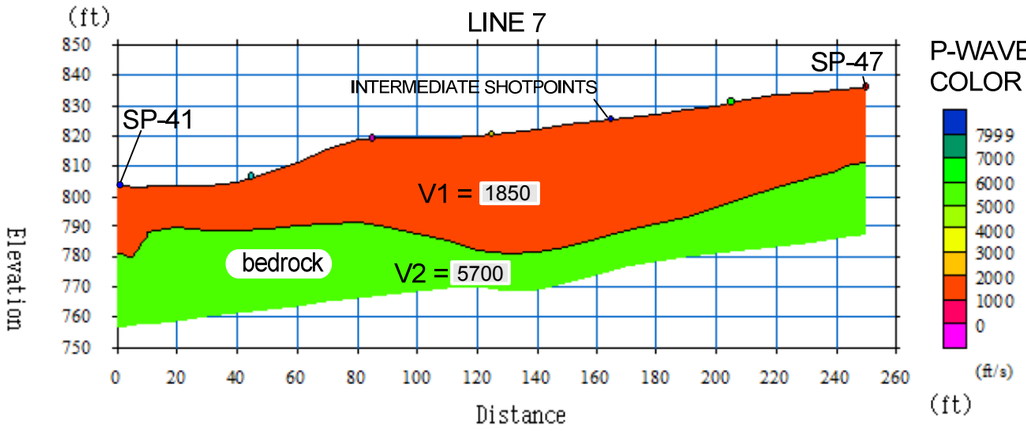
PLATE 3

SOUTHWEST

NORTHEAST

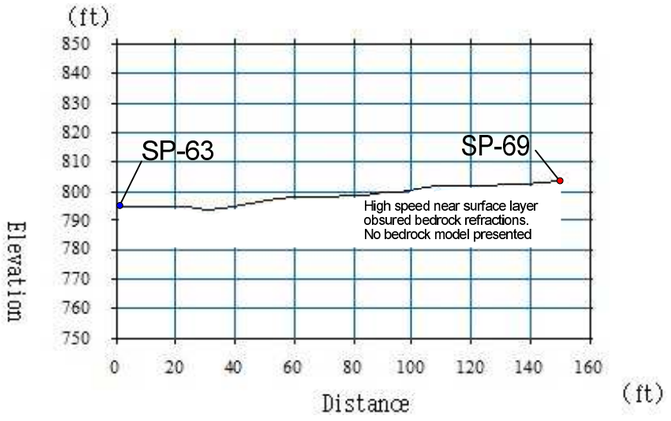


P-WAVE VELOCITY COLOR SCALE



P-WAVE VELOCITY COLOR SCALE

LINE 11



EXPLANATION

V2 = 7200 Velocity Layer in ft/sec

HORIZONTAL/VERTICAL SCALE: ONE INCH APPROX. EQUAL 50 FEET

NORCAL

SEISIMC REFRACTION PROFILES
LINES 7, 8, AND 11

LOCATION: PERMANENTE QUARRY, CUPERTINO, CA

CLIENT: GOLDER ASSOCIATES, INC

JOB #: 14-245.15B

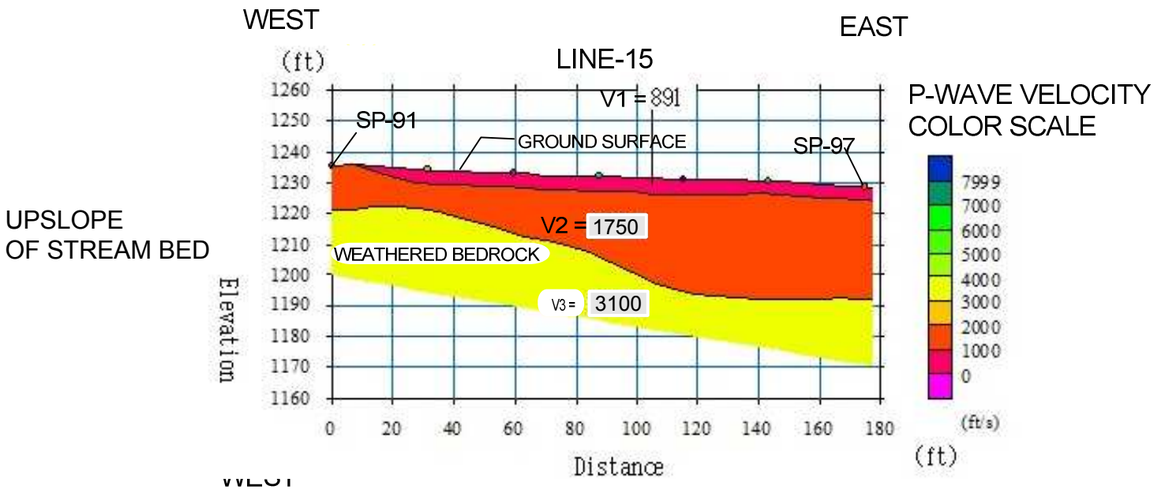
NORCAL GEOPHYSICAL CONSULTANTS INC.

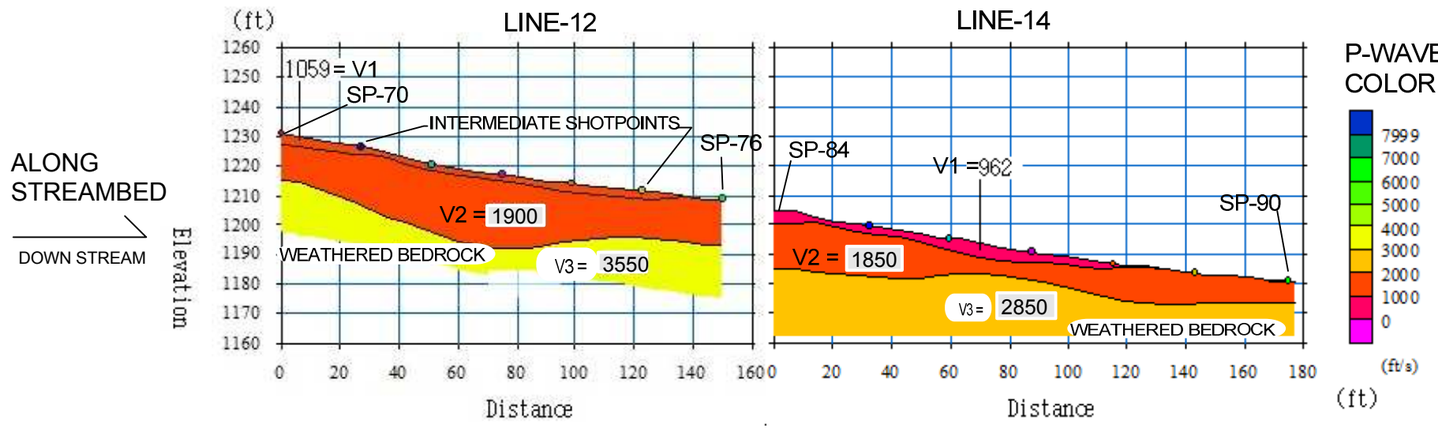
DATE: APRIL, 2014

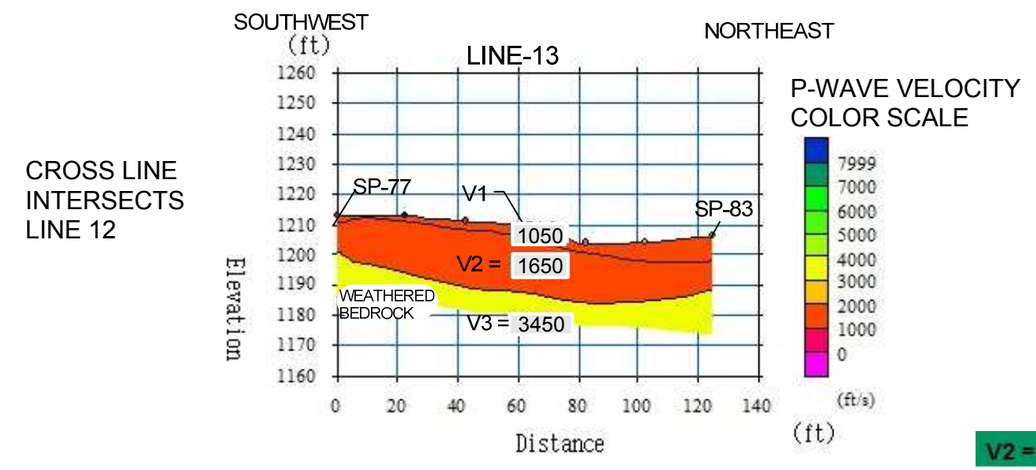
DRAWN BY: W. HENRICH

APPROVED BY: WJH

PLATE 4







EXPLANATION

V2 = 7200 Velocity Layer in ft/sec

HORIZONTAL/VERTICAL SCALE: ONE INCH APPROX. EQUAL TO 50 FEET

NORCAL

SEISIMC REFRACTION PROFILES
LINES 12, 13, 14, AND 15

LOCATION: PERMANENTE QUARRY, CUPERTINO, CA

CLIENT: GOLDER ASSOCIATES, INC

JOB #: 14-245.15B

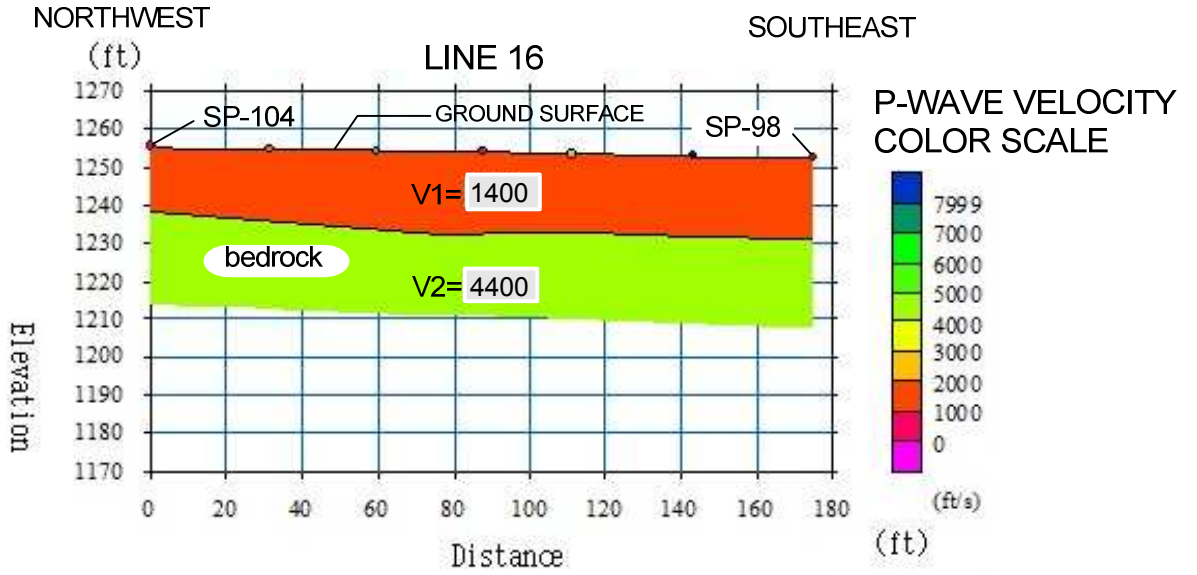
NORCAL GEOPHYSICAL CONSULTANTS INC.

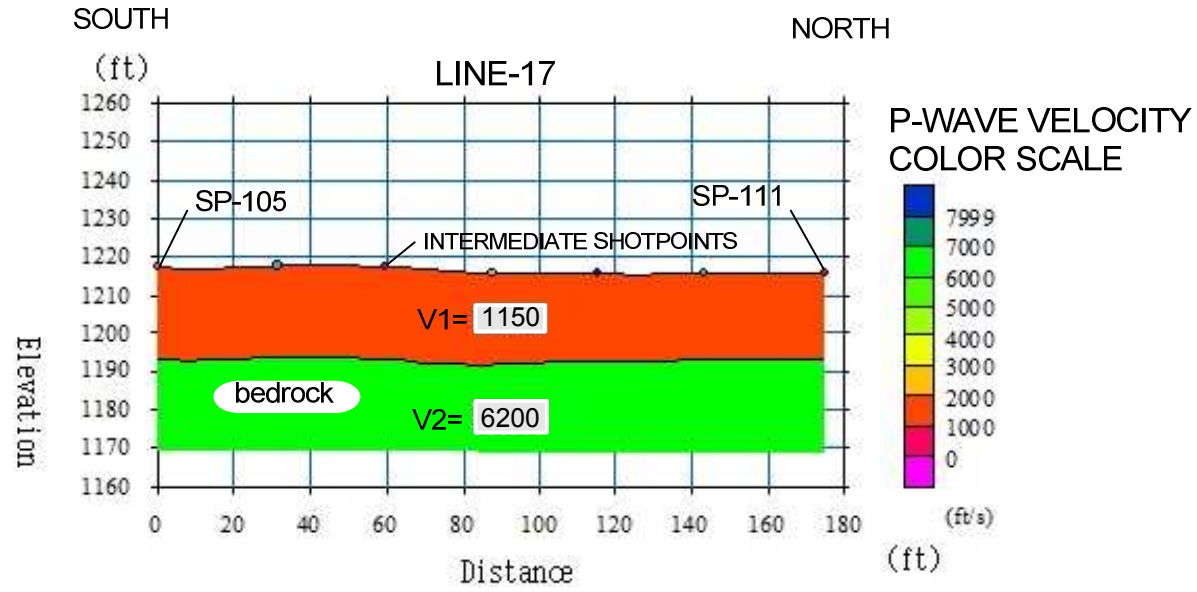
DATE: APRIL, 2014

DRAWN BY: W. HENRICH

APPROVED BY: WJH

PLATE
5





EXPLANATION

V2 = 7200 Velocity Layer in ft/sec

HORIZONTAL/VERTICAL SCALE: ONE INCH APPROX. EQUAL TO 50 FEET

NORCAL

SEISMIC REFRACTION
PROFILES LINES 16 AND 17

LOCATION: PERMANENTE QUARRY, CUPERTINO, CA

CLIENT: GOLDER ASSOCIATES, INC.

JOB #: 14-245.15B

NORCAL GEOPHYSICAL CONSULTANTS INC.

DATE: APRIL, 2014

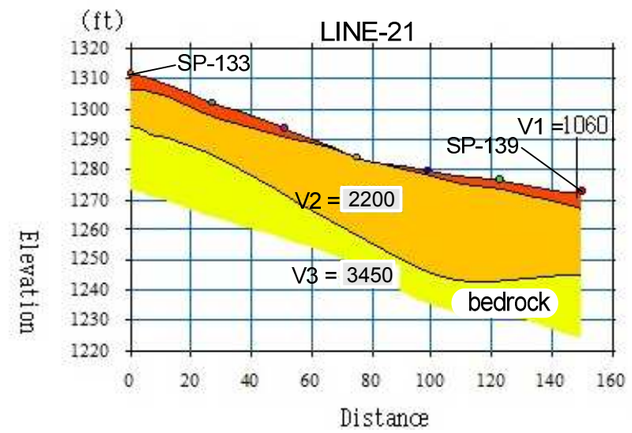
DRAWN BY: W HENRICH

APPROVED BY: WJH

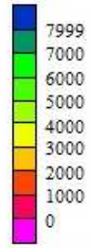
PLATE 6

NORTHWEST

SOUTHEAST



P-WAVE VELOCITY COLOR SCALE

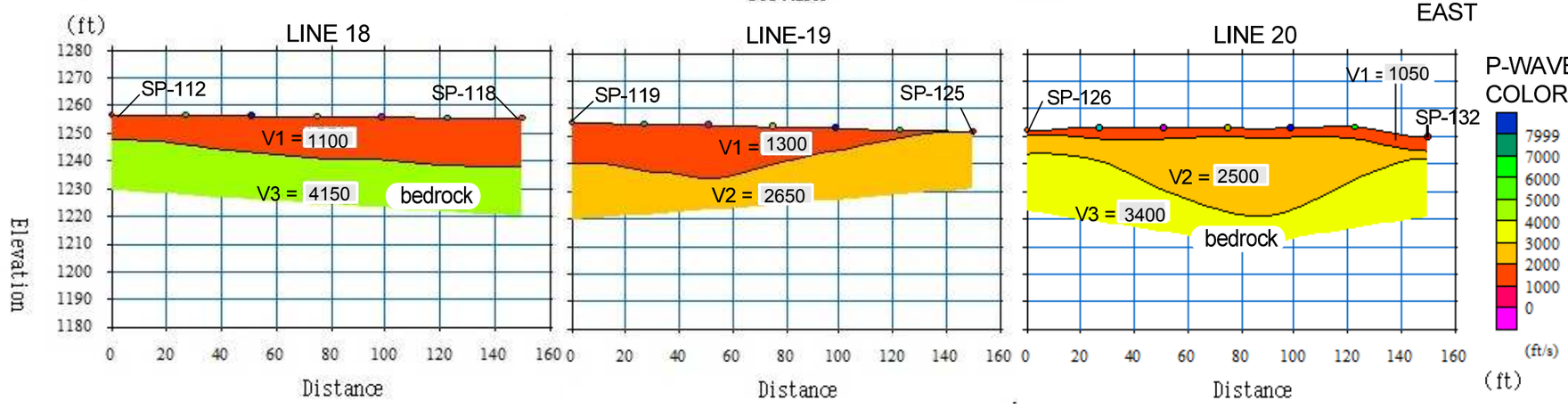


UPSLOPE OF STREAM BED

WEST

EAST

SEISMIC LINES ALONG STREAM BED



P-WAVE VELOCITY COLOR SCALE

DOWNSTREAM

EXPLANATION

V2 = 7200 Velocity Layer in ft/sec

HORIZONTAL/VERTICAL SCALE: ONE INCH APPROX. EQUAL 50 FEET

NORCAL

SEISIMC REFRACTION PROFILES
LINES 18, 19, 20 AND 21

LOCATION: PERMANENTE QUARRY, CUPERTINO, CA

CLIENT: GOLDER ASSOCIATES, INC

JOB #: 14-245.15B

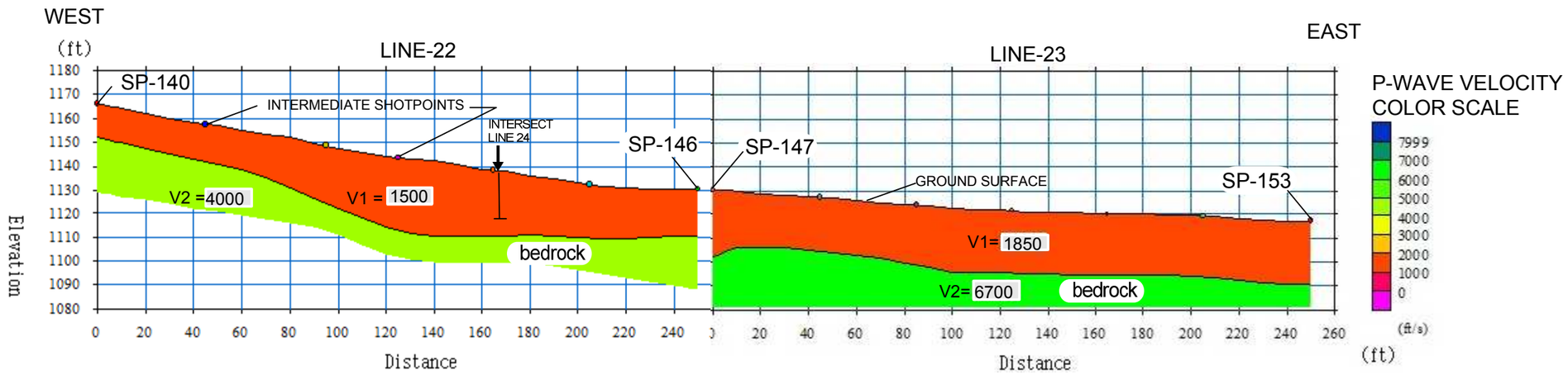
NORCAL GEOPHYSICAL CONSULTANTS INC.

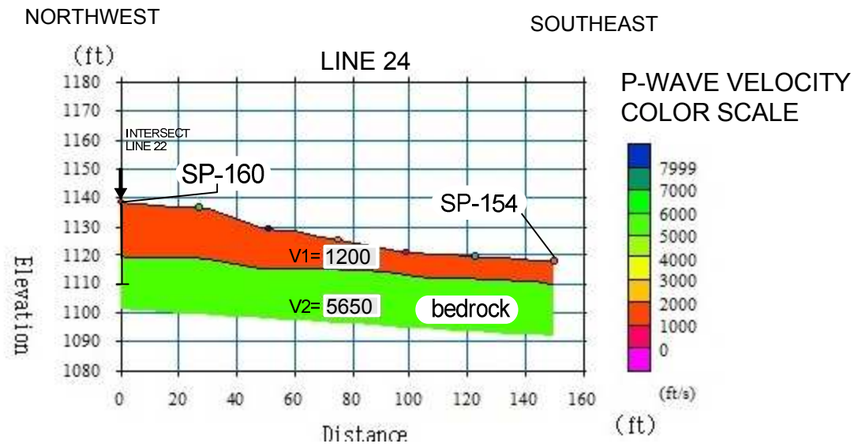
DATE: APRIL, 2014

DRAWN BY: W. HENRICH

APPROVED BY: WJH

PLATE 7





EXPLANATION

V2 = 7200 Velocity Layer in ft/sec

NORCAL

SEISIMC REFRACTION PROFILES
LINES-22, -23 and -24

LOCATION: PERMANENTE QUARRY, CUPERTINO, CA

CLIENT: GOLDER ASSOCIATES, INC

JOB #: 14-245.15B

NORCAL GEOPHYSICAL CONSULTANTS INC.

DATE: APRIL, 2014

DRAWN BY: W. HENRICH

APPROVED BY: WJH

PLATE 8

Appendix A

SEISMIC REFRACTION (SR)

SEISMIC REFRACTION (SR)

1.0 METHODOLOGY

The seismic refraction method provides information regarding the seismic velocity structure of the subsurface. An impulsive (mechanical or explosive) source is used to produce compressional (P) wave seismic energy. The P-waves propagate into the earth and are refracted along interfaces caused by an increase in velocity. A portion of the P-wave energy is refracted back to the surface where it is detected by sensors (geophones) that are coupled to the ground surface in a collinear array (spread). The detected signals are recorded on a multi-channel seismograph and are analyzed to determine the shot point-to-geophone travel times. These data can be used along with the corresponding shot point-to-geophone distances to determine the depth, thickness, and velocity of subsurface seismic layers.

The seismic refraction technique is based on several assumptions. Paramount among these are that seismic velocity:

1) Increases with depth, and,
2) Is uniform within each layer over the length of the given spread.

In cases where these assumptions do not hold, the accuracy of the technique decreases. For example, if a low velocity layer occurs between two layers of higher velocity, the low velocity layer will not be detected and the depth to the underlying high velocity layer will be erroneously large. Also, if the velocity of a seismic layer varies laterally within a spread, those variations will be interpreted as fluctuations in the elevation of the underlying seismic layer.

2.0 DATA ACQUISITION/INSTRUMENTATION

Each SR line consisted of 24-geophones and 7-shot points distributed in a collinear array (spread). In most areas, the geophones were coupled to the ground surface by metal spike affixed to the bottom of each geophone case. In areas where the ground surface was too hard to penetrate (e.g. the road) the geophones were mounted on weighted pedestals that coupled them to the ground by their weight. The geophone intervals ranged from 3- to 10-ft depending on access. For each spread, the two end shot points were located one-geophone spacing beyond the end geophone at both ends of the spread. The remaining five shot points were evenly spaced along the spread. This distribution of shot points and geophones yielded total draped line lengths (end-geophone to end-geophone) ranging from 77- to 250-ft. The SR survey was designed to target the upper 15 to 50 feet of geologic material beneath each line, generally consisting of native soil, fill (mine waste) alluvium/stream deposits, weathered and un-weathered bedrock.

Data acquisition was initiated along each SR line by producing seismic energy using a mechanical source. Seismic energy was produced by impacting a metal strike plate on the ground surface with a 12-16 pound sledge hammer. The resulting seismic waveforms are recorded using a Geometrics ***Geode*** 24-channel engineering distributed array seismograph and Mark Products geophones with a natural frequency of 8-Hz. The seismic waveforms were digitized, processed and amplified by the Geode and transmitted via a ruggedized Ethernet cable to a field computer. There the data were archived for subsequent processing and displayed on the computers LCD screen in the form of seismograms. These were subsequently used to determine the time required for P-waves to travel from each shot point to each geophone in a given array (spread).

3.0 DATA ANALYSIS

The recorded seismic data were processed using the software package ***SeisImager*** which was written by Oyo Corporation (Japan) and distributed by Geometrics Inc. The first stage of seismic processing included compilation (7 shot points per line) and identification of first arriving P-wave energy. This process was conducted using ***Pickwin, Version 3.2.0.1*** (2004), which is part of the ***SeisImager*** package. A second interactive program ***Plotrefa, Version 2.8.0.1*** (2006) was used to assign geophone travel times, geophone/shot point surface elevations and velocity layer assignments to compute a 2D seismic velocity model based on these inputs. Example Time-Distance graph from a 7 shot point refraction line and inverted seismic layer model are presented in the following figures.

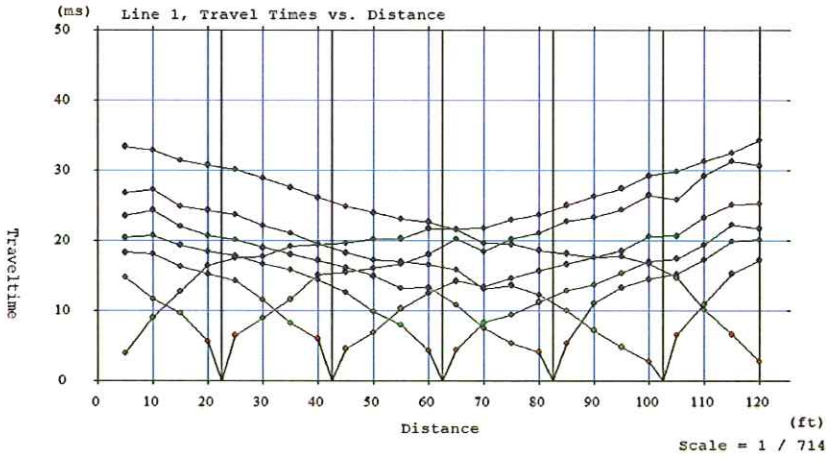


Figure 1 Example SR Time-Distance Graph, 24-geophones; 7 equal spaced shot points

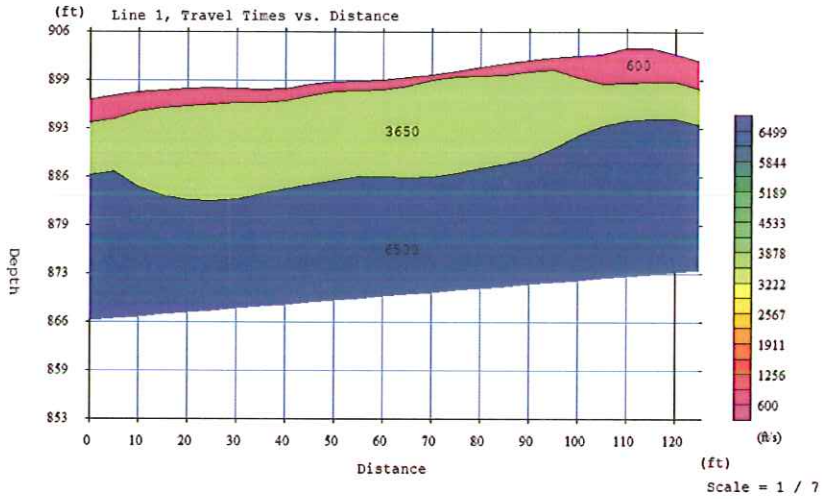


Figure 2 Time-Term Inverted Seismic Velocity Model

For this survey we have chosen an inversion routine that is based on the time-term method. The time-term method employs a combination of linear least squares and delay time analysis to invert the first arrivals into a velocity model. The model can consist of two or three velocity layers depending on the presence of significant line slopes that can be fitted to the first arrival times. Depths to the tops of the velocity layers are calculated below each geophone. For end and interior shot points the depths are extrapolated from the nearest geophone. This inversion as described above produces simplified velocity layers that, though generalized, will provide an adequate, useable characterization of the depth to bedrock.

4.0 LIMITATIONS

In general, there are limitations unique to the SR method. These limitations are primarily based on assumptions that are made by the data analysis routine. First, the data analysis routine assumes that the velocities along the length of each spread are uniform. If there are localized zones within each layer where the velocities are higher or lower than indicated, the analysis routine will interpret these zones as changes in the surface topography of the underlying layer. A zone of higher velocity material would be interpreted as a low in the surface of the underlying layer. Zones of lower velocity material would be interpreted as a high in the underlying layer.

Second, the data analysis routine assumes that the velocity of subsurface materials increase with depth. Therefore, if a layer exhibits velocities that are slower than those of the material above it, the slower layer will not be resolved. Also, a velocity layer may simply be too thin to be detected. Due to these and other limitations inherent to the SR method, the results of the SR survey should be considered only as approximations of the subsurface conditions. The actual conditions may vary locally. Other independent data (e.g., surface and borehole geology) should be integrated with SR data to enhance the subsurface interpretation.

Appendix B

MULTI-CHANNEL ANALYSIS OF SURFACE WAVES (MASW)

MULTI-CHANNEL ANALYSIS OF SURFACE WAVES (MASW)

1.0 METHODOLOGY

When seismic energy is generated at or near the ground surface, seismic waves are produced. Those that travel along the ground surface are referred to as ground roll or surface waves. Those that propagate into the earth are referred to as body waves. When a vertical impact seismic energy source is used, the resulting surface waves account for more than two-thirds of the energy that is produced. As a result, surface waves are the most prominent signal on multi-channel seismic records. In addition, surface waves have dispersion properties that body waves lack. That is, different wavelengths have different penetration depths and, therefore, propagate at different velocities. This is referred to as dispersion. Since surface waves travel at 0.9 times the velocity of S-waves, it is possible to determine subsurface Vs by analyzing the dispersion of surface waves. Furthermore, since S-wave velocities are directly proportional to shear modulus, this provides a direct indication in the variation of stiffness (or rigidity) of subsurface materials.

Computer software and processing techniques developed by researchers at the University of Kansas have made it possible to analyze surface waves using a large number of shot points and geophones. This is referred to as multi-channel analysis of surface waves (MASW). Surface wave data are gathered in much the same way as high resolution seismic reflection data. Seismic energy generated by vertical impacts on the ground surface is detected by an array of closely spaced geophones (spread). The energy source and the geophones are sequentially moved along a profile as the survey progresses.

The data gathered from each shot point are analyzed to determine the variation in surface wave velocity versus frequency (dispersion curve). Computer software then inverts the dispersion curve to determine the variation in Vs versus depth. The data gathered from multiple shot points and geophone locations can be collated to produce a two dimensional (2D) cross-section showing the variation in Vs with depth and distance beneath a line.

2.0 DATA ACQUISITION/INSTRUMENTATION

Soundings MASW-9 and -10 each comprised an array of 24-geophones distributed at 3-ft intervals in a collinear array (spread). Seismic energy was produced at four shot points on each spread through multiple impacts with a 12-pound sledge hammer against a metal strike plate placed on the ground surface. The shot points were positioned at distances of 3- and 12-ft beyond the end geophones at both ends of each spread. The resulting seismic waveforms were recorded using a Geometrics ***Geode*** 24-channel distributed array seismograph and Oyo ***Geospace*** geophones with a natural frequency of 8-Hz. The seismograph was networked to a field computer where the data were displayed on a LCD screen for QA/QC review and archived for subsequent processing.

3.0 DATA ANALYSIS

The MASW data were processed using the software package ***SurfSeis 2.05*** which was developed by the Kansas Geological Survey. Using this software, the data acquired from each shot point were processed to develop an overtone display. This is a color contoured plot that depicts phase velocity as a function of frequency and signal amplitude. The overtone display serves as a guide in nominating the dispersion curve that is used by the inversion routine. However, prior to nominating the dispersion curve, the four overtones were merged into one in order to increase the signal to noise ratio and maximize the continuity of the display. The merged and enhanced overtone was then used as a guide in nominating the dispersion curve used in the inversion process. At the onset of the inversion routine the software created a 1D model comprising 10-layers. Starting values of depth, thickness, Vp, Vs and Poisson's ratio (α) were assigned to each layer. The program then proceeded to refine the starting model through an iterative procedure in order to develop a 1D model that provided the best fit to the dispersion curve. In so doing, it was necessary that either Vp or α remain fixed during the inversion process. In this case, we opted to have α remain fixed, at a value of 0.4, so that the final model would provide the best indication of both Vp and Vs as a function of depth. The value of 0.4 was used for α because it is typical of most near surface earth materials.

APPENDIX D

Fish Passage Calculations

Manning's Roughness & Channel Hydraulics using Manning's Equation at a Station

Manning's Roughness Calculations

Project: Permanente Quarry
Project #: 13-016
Date: 10/30/2018
Calculated by: B.M.Z.
Checked by: B.M.S.

Instructions: Enter variables in RED cells only

Design equations to determine roughness coefficient of typical roughened channel section at adult fish passage design flows.

Culvert #7 Replacement Area Slope = 3.9%

Fish Passage Low Flows (Q=2 cfs)

Mussetter (1989)

Equation for steep, boulder conditions

$(8/f)^{0.5} = 1.11\,(d/D_{84})^{0.46}(D_{84}/D_{50})^{-0.85}\,S^{-0.39}$

$n = 0.0926\,R^{1/6}\,f^{1/2}$

Therefore: **$n = 0.236\,R^{1/6}\,(d/D_{84})^{-0.46}\,(D_{84}/D_{50})^{0.85}\,S^{0.39}$**

d = hydraulic depth Area/Top Width
S = slope
R = hydraulic radius

Equation developed for:
d/D_{84} range (0.24 to 3.72)
D_{50} range (0.1 to 2.1 feet)
S range (0.54 to 16.8 percent)

S =	0.039	
R =	0.32	ft
d =	0.38	ft
D_{84} =	2.3	ft
D_{50} =	1.2	ft
d/D_{84} =	0.17	

n= 0.22

Fish Passage High Flow (Q=4.1 cfs)

Mussetter (1989)

Equation for steep, boulder conditions

$(8/f)^{0.5} = 1.11\,(d/D_{84})^{0.46}(D_{84}/D_{50})^{-0.85}\,S^{-0.39}$

$n = 0.0926\,R^{1/6}\,f^{1/2}$

Therefore: **$n = 0.236\,R^{1/6}\,(d/D_{84})^{-0.46}\,(D_{84}/D_{50})^{0.85}\,S^{0.39}$**

d = hydraulic depth Area/Top Width
S = slope
R = hydraulic radius

Equation developed for:
d/D_{84} range (0.24 to 3.72)
D_{50} range (0.1 to 2.1 feet)
S range (0.54 to 16.8 percent)

S =	0.039	
R =	0.3	ft
d =	0.36	ft
D_{84} =	2.3	ft
D_{50} =	1.2	ft
d/D_{84} =	0.16	

n= 0.22

Culvert #8 Replacement Area Slope = 2.7%

Fish Passage Low Flows (Q=2 cfs)

Mussetter (1989)

Equation for steep, boulder conditions

$(8/f)^{0.5} = 1.11\,(d/D_{84})^{0.46}(D_{84}/D_{50})^{-0.85}\,S^{-0.39}$

$n = 0.0926\,R^{1/6}\,f^{1/2}$

Therefore: **$n = 0.236\,R^{1/6}\,(d/D_{84})^{-0.46}\,(D_{84}/D_{50})^{0.85}\,S^{0.39}$**

d = hydraulic depth Area/Top Width
S = slope
R = hydraulic radius

Equation developed for:
d/D_{84} range (0.24 to 3.72)
D_{50} range (0.1 to 2.1 feet)
S range (0.54 to 16.8 percent)

S =	0.027	
R =	0.32	ft
d =	0.38	ft
D_{84} =	2	ft
D_{50} =	1	ft
d/D_{84} =	0.19	

n= 0.18

Fish Passage High Flow (Q=4.1 cfs)

Mussetter (1989)

Equation for steep, boulder conditions

$(8/f)^{0.5} = 1.11\,(d/D_{84})^{0.46}(D_{84}/D_{50})^{-0.85}\,S^{-0.39}$

$n = 0.0926\,R^{1/6}\,f^{1/2}$

Therefore: **$n = 0.236\,R^{1/6}\,(d/D_{84})^{-0.46}\,(D_{84}/D_{50})^{0.85}\,S^{0.39}$**

d = hydraulic depth Area/Top Width
S = slope
R = hydraulic radius

Equation developed for:
d/D_{84} range (0.24 to 3.72)
D_{50} range (0.1 to 2.1 feet)
S range (0.54 to 16.8 percent)

S =	0.027	
R =	0.42	ft
d =	0.49	ft
D_{84} =	2	ft
D_{50} =	1	ft
d/D_{84} =	0.25	

n= 0.17

Rock Pile/Material Removal Area Slope = 12%

Fish Passage Low Flows (Q=2 cfs)

Mussetter (1989)

Equation for steep, boulder conditions

$(8/f)^{0.5} = 1.11\,(d/D_{84})^{0.46}(D_{84}/D_{50})^{-0.85}\,S^{-0.39}$

$n = 0.0926\,R^{1/6}\,f^{1/2}$

Therefore: **$n = 0.236\,R^{1/6}\,(d/D_{84})^{-0.46}\,(D_{84}/D_{50})^{0.85}\,S^{0.39}$**

d = hydraulic depth Area/Top Width
S = slope
R = hydraulic radius

Equation developed for:
d/D_{84} range (0.24 to 3.72)
D_{50} range (0.1 to 2.1 feet)
S range (0.54 to 16.8 percent)

S =	0.12	
R =	0.34	ft
d =	0.41	ft
D_{84} =	3	ft
D_{50} =	1.5	ft
d/D_{84} =	0.14	

n= 0.39

Use roughness of 0.25 (max from literature)

Fish Passage High Flow (Q=2.8 cfs)

Mussetter (1989)

Equation for steep, boulder conditions

$(8/f)^{0.5} = 1.11\,(d/D_{84})^{0.46}(D_{84}/D_{50})^{-0.85}\,S^{-0.39}$

$n = 0.0926\,R^{1/6}\,f^{1/2}$

Therefore: **$n = 0.236\,R^{1/6}\,(d/D_{84})^{-0.46}\,(D_{84}/D_{50})^{0.85}\,S^{0.39}$**

d = hydraulic depth Area/Top Width
S = slope
R = hydraulic radius

Equation developed for:
d/D_{84} range (0.24 to 3.72)
D_{50} range (0.1 to 2.1 feet)
S range (0.54 to 16.8 percent)

S =	0.12	
R =	0.36	ft
d =	0.43	ft
D_{84} =	3	ft
D_{50} =	1.5	ft
d/D_{84} =	0.14	

n= 0.38

Note:
Julien (2002) reports typical boulder bed stream n-values ranging from 0.25 to 0.04

1.) Bathurst, J.C., 1985, Flow resistance estimation in mountain rivers, Journal of Hydraulic Engineering, ASCE, Vol. 111, No.4

2.) California Department of Fish and Game (CDFG). 2009. Fish Passage Design and Implementation: Part XII of the California Salmonid Stream Habitat Restoration Manual. Sacramento, CA, CA Department of Fish and Game.

3.) U.S. Department of the Interior Bureau of Reclamation. 2007. Rock Ramp Design Guidelines.

4.) Julien, P.Y. 2002. River Mechanics. Cambridge University Press, Cambridge, United Kingdon

Manning's Roughness Calculations

Project: Permanente Quarry
Project #: 13-016
Date: 10/30/2018
Calculated by: B.M.Z.
Checked by: B.M.S.

Instructions: Enter variables in RED cells only

Design equations to determine roughness coefficient of typical roughened channel section at juvenile fish passage design flows.

Culvert #7 Replacement Area Slope = 3.9%

Fish Passage Low Flows (Q=1 cfs)

Mussetter (1989)

Equation for steep, boulder conditions

$(8/f)^{0.5} = 1.11\,(d/D_{84})^{0.46}(D_{84}/D_{50})^{-0.85}\,S^{-0.39}$

$n = 0.0926\,R^{1/6}\,f^{1/2}$

Therefore: $\mathbf{n = 0.236\,R^{1/6}\,(d/D_{84})^{-0.46}\,(D_{84}/D_{50})^{0.85}\,S^{0.39}}$

d = hydraulic depth Area/Top Width
S = slope
R = hydraulic radius

Equation developed for:
d/D_{84} range (0.24 to 3.72)
D_{50} range (0.1 to 2.1 feet)
S range (0.54 to 16.8 percent)

S =	0.039	
R =	0.28	ft
d =	0.35	ft
D_{84} =	2.3	ft
D_{50} =	1.2	ft
d/D_{84} =	0.15	

n= 0.22

Fish Passage High Flow (Q=1.5 cfs)

Mussetter (1989)

Equation for steep, boulder conditions

$(8/f)^{0.5} = 1.11\,(d/D_{84})^{0.46}(D_{84}/D_{50})^{-0.85}\,S^{-0.39}$

$n = 0.0926\,R^{1/6}\,f^{1/2}$

Therefore: $\mathbf{n = 0.236\,R^{1/6}\,(d/D_{84})^{-0.46}\,(D_{84}/D_{50})^{0.85}\,S^{0.39}}$

d = hydraulic depth Area/Top Width
S = slope
R = hydraulic radius

Equation developed for:
d/D_{84} range (0.24 to 3.72)
D_{50} range (0.1 to 2.1 feet)
S range (0.54 to 16.8 percent)

S =	0.039	
R =	0.32	ft
d =	0.38	ft
D_{84} =	2.3	ft
D_{50} =	1.2	ft
d/D_{84} =	0.17	

n= 0.22

Culvert #8 Replacement Area Slope = 2.7%

Fish Passage Low Flows (Q=1 cfs)

Mussetter (1989)

Equation for steep, boulder conditions

$(8/f)^{0.5} = 1.11\,(d/D_{84})^{0.46}(D_{84}/D_{50})^{-0.85}\,S^{-0.39}$

$n = 0.0926\,R^{1/6}\,f^{1/2}$

Therefore: $\mathbf{n = 0.236\,R^{1/6}\,(d/D_{84})^{-0.46}\,(D_{84}/D_{50})^{0.85}\,S^{0.39}}$

d = hydraulic depth Area/Top Width
S = slope
R = hydraulic radius

Equation developed for:
d/D_{84} range (0.24 to 3.72)
D_{50} range (0.1 to 2.1 feet)
S range (0.54 to 16.8 percent)

S =	0.027	
R =	0.26	ft
d =	0.32	ft
D_{84} =	2	ft
D_{50} =	1	ft
d/D_{84} =	0.16	

n= 0.19

Fish Passage High Flow (Q=1.5 cfs)

Mussetter (1989)

Equation for steep, boulder conditions

$(8/f)^{0.5} = 1.11\,(d/D_{84})^{0.46}(D_{84}/D_{50})^{-0.85}\,S^{-0.39}$

$n = 0.0926\,R^{1/6}\,f^{1/2}$

Therefore: $\mathbf{n = 0.236\,R^{1/6}\,(d/D_{84})^{-0.46}\,(D_{84}/D_{50})^{0.85}\,S^{0.39}}$

d = hydraulic depth Area/Top Width
S = slope
R = hydraulic radius

Equation developed for:
d/D_{84} range (0.24 to 3.72)
D_{50} range (0.1 to 2.1 feet)
S range (0.54 to 16.8 percent)

S =	0.027	
R =	0.29	ft
d =	0.36	ft
D_{84} =	2	ft
D_{50} =	1	ft
d/D_{84} =	0.18	

n= 0.19

Rock Pile/Material Removal Area Slope = 12%

Fish Passage Low Flows (Q=1 cfs)

Mussetter (1989)

Equation for steep, boulder conditions

$(8/f)^{0.5} = 1.11\,(d/D_{84})^{0.46}(D_{84}/D_{50})^{-0.85}\,S^{-0.39}$

$n = 0.0926\,R^{1/6}\,f^{1/2}$

Therefore: $\mathbf{n = 0.236\,R^{1/6}\,(d/D_{84})^{-0.46}\,(D_{84}/D_{50})^{0.85}\,S^{0.39}}$

d = hydraulic depth Area/Top Width
S = slope
R = hydraulic radius

Equation developed for:
d/D_{84} range (0.24 to 3.72)
D_{50} range (0.1 to 2.1 feet)
S range (0.54 to 16.8 percent)

S =	0.12	
R =	0.28	ft
d =	0.34	ft
D_{84} =	3	ft
D_{50} =	1.5	ft
d/D_{84} =	0.11	

n= 0.41

Use roughness of 0.25 (max from literature)

Fish Passage High Flow (Q=1 cfs)

Mussetter (1989)

Equation for steep, boulder conditions

$(8/f)^{0.5} = 1.11\,(d/D_{84})^{0.46}(D_{84}/D_{50})^{-0.85}\,S^{-0.39}$

$n = 0.0926\,R^{1/6}\,f^{1/2}$

Therefore: $\mathbf{n = 0.236\,R^{1/6}\,(d/D_{84})^{-0.46}\,(D_{84}/D_{50})^{0.85}\,S^{0.39}}$

d = hydraulic depth Area/Top Width
S = slope
R = hydraulic radius

Equation developed for:
d/D_{84} range (0.24 to 3.72)
D_{50} range (0.1 to 2.1 feet)
S range (0.54 to 16.8 percent)

S =	0.12	
R =	0.28	ft
d =	0.34	ft
D_{84} =	3	ft
D_{50} =	1.5	ft
d/D_{84} =	0.11	

n= 0.41

Note:
Julien (2002) reports typical boulder bed stream n-values ranging from 0.25 to 0.04

1.) Bathurst, J.C., 1985, Flow resistance estimation in mountain rivers, Journal of Hydraulic Engineering, ASCE, Vol. 111, No.4

2.) California Department of Fish and Game (CDFG). 2009. Fish Passage Design and Implementation: Part XII of the California Salmonid Stream Habitat Restoration Manual. Sacramento, CA, CA Department of Fish and Game.

3.) U.S. Department of the Interior Bureau of Reclamation. 2007. Rock Ramp Design Guidelines.

4.) Julien, P.Y. 2002. River Mechanics. Cambridge University Press, Cambridge, United Kingdon

Channel Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Friday, Nov 2 2018

Adult High Flow at Culvert #7 - Typical Channel (10'-12' Base Width, 3.9% Slope)

User-defined

Invert Elev (ft)	= 0.02
Slope (%)	= 3.90
N-Value	= 0.200

Calculations

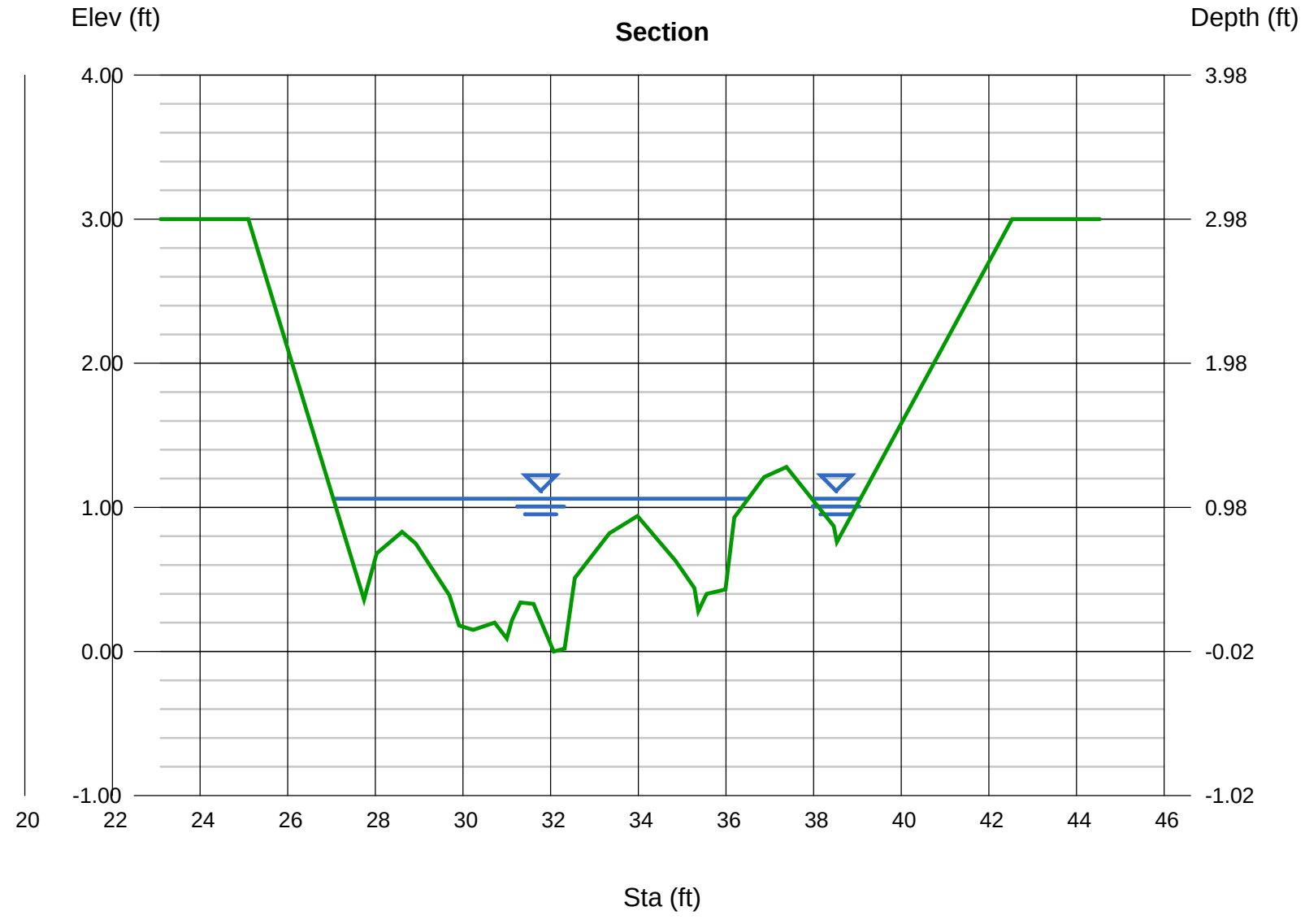
Compute by:	Known Q
Known Q (cfs)	= 4.10

Highlighted

Depth (ft)	= 1.04
Q (cfs)	= 4.100
Area (sqft)	= 5.13
Velocity (ft/s)	= 0.80
Wetted Perim (ft)	= 12.56
Crit Depth, Yc (ft)	= 0.57
Top Width (ft)	= 10.57
EGL (ft)	= 1.05

(Sta, El, n)-(Sta, El, n)...

(25.10, 3.00)-(27.74, 0.36, 0.200)-(28.03, 0.68, 0.200)-(28.61, 0.83, 0.200)-(28.92, 0.75, 0.200)-(29.69, 0.39, 0.200)-(29.91, 0.18, 0.200)
-(30.23, 0.15, 0.200)-(30.72, 0.20, 0.200)-(31.00, 0.09, 0.200)-(31.12, 0.22, 0.200)-(31.31, 0.34, 0.200)-(31.61, 0.33, 0.200)-(32.32, 0.02, 0.200)
-(32.55, 0.51, 0.200)-(33.34, 0.82, 0.200)-(33.98, 0.94, 0.200)-(34.85, 0.63, 0.200)-(35.28, 0.44, 0.200)-(35.37, 0.28, 0.200)-(35.56, 0.40, 0.200)
-(35.99, 0.43, 0.200)-(36.19, 0.93, 0.200)-(36.87, 1.21, 0.200)-(37.38, 1.28, 0.200)-(38.46, 0.87, 0.200)-(38.53, 0.76, 0.200)-(42.53, 3.00, 0.200)



Channel Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Friday, Nov 2 2018

Adult Low Flow at Culvert #7 - Typical Channel (10'-12' Base Width, 3.9% Slope)

User-defined

Invert Elev (ft)	= 0.02
Slope (%)	= 3.90
N-Value	= 0.220

Calculations

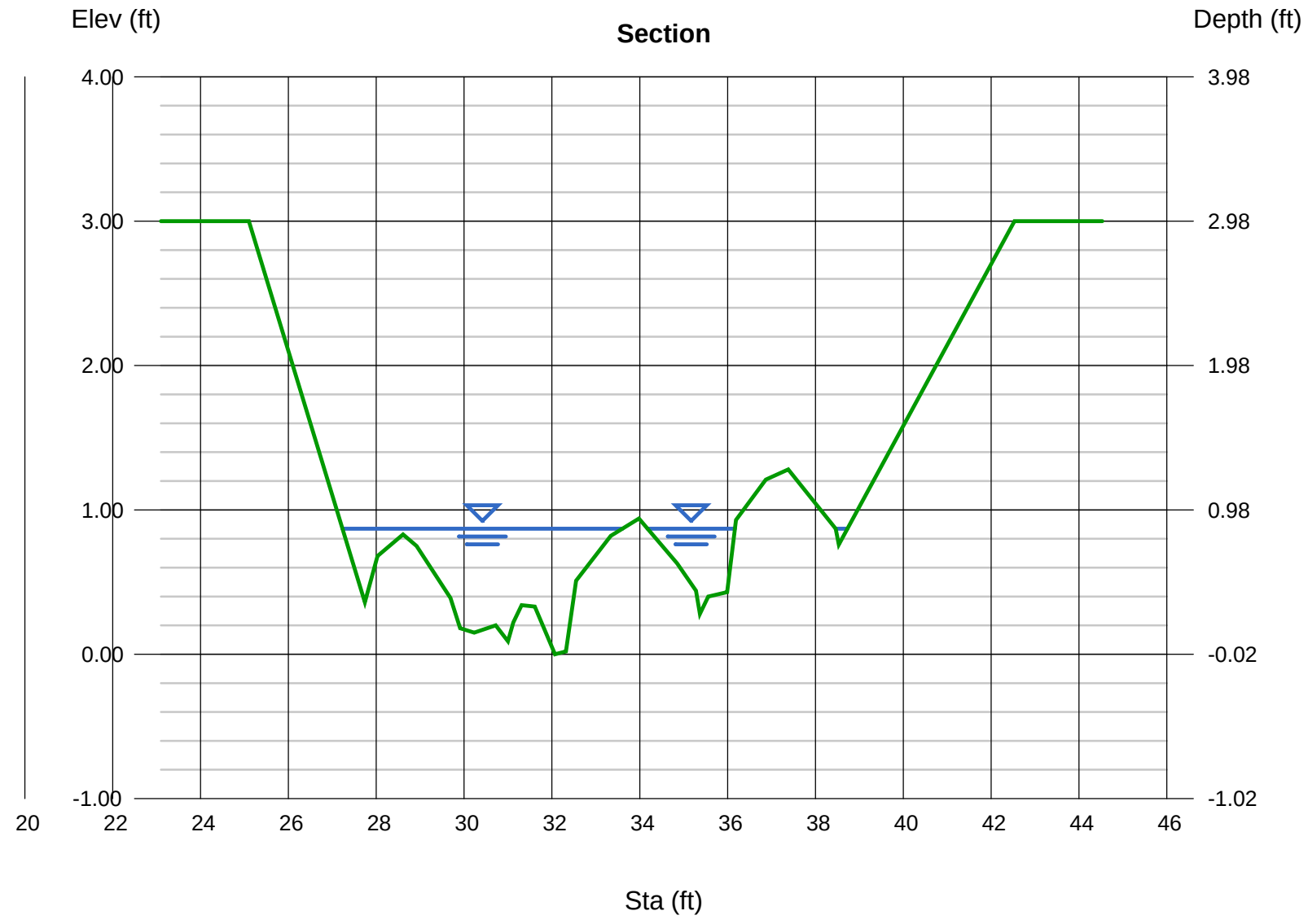
Compute by:	Known Q
Known Q (cfs)	= 2.00

Highlighted

Depth (ft)	= 0.85
Q (cfs)	= 2.000
Area (sqft)	= 3.28
Velocity (ft/s)	= 0.61
Wetted Perim (ft)	= 10.38
Crit Depth, Yc (ft)	= 0.43
Top Width (ft)	= 8.63
EGL (ft)	= 0.86

(Sta, El, n)-(Sta, El, n)...

(25.10, 3.00)-(27.74, 0.36, 0.220)-(28.03, 0.68, 0.220)-(28.61, 0.83, 0.220)-(28.92, 0.75, 0.220)-(29.69, 0.39, 0.220)-(29.91, 0.18, 0.220)
-(30.23, 0.15, 0.220)-(30.72, 0.20, 0.220)-(31.00, 0.09, 0.220)-(31.12, 0.22, 0.220)-(31.31, 0.34, 0.220)-(31.61, 0.33, 0.220)-(32.32, 0.02, 0.220)
-(32.55, 0.51, 0.220)-(33.34, 0.82, 0.220)-(33.98, 0.94, 0.220)-(34.85, 0.63, 0.220)-(35.28, 0.44, 0.220)-(35.37, 0.28, 0.220)-(35.56, 0.40, 0.220)
-(35.99, 0.43, 0.220)-(36.19, 0.93, 0.220)-(36.87, 1.21, 0.220)-(37.38, 1.28, 0.220)-(38.46, 0.87, 0.220)-(38.53, 0.76, 0.220)-(42.53, 3.00, 0.220)



Channel Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Friday, Nov 2 2018

Juvenile High Flow at Culvert #7 - Typical Channel (10'-12' Base Width, 3.9% Slope)

User-defined

Invert Elev (ft)	= 0.02
Slope (%)	= 3.90
N-Value	= 0.220

Calculations

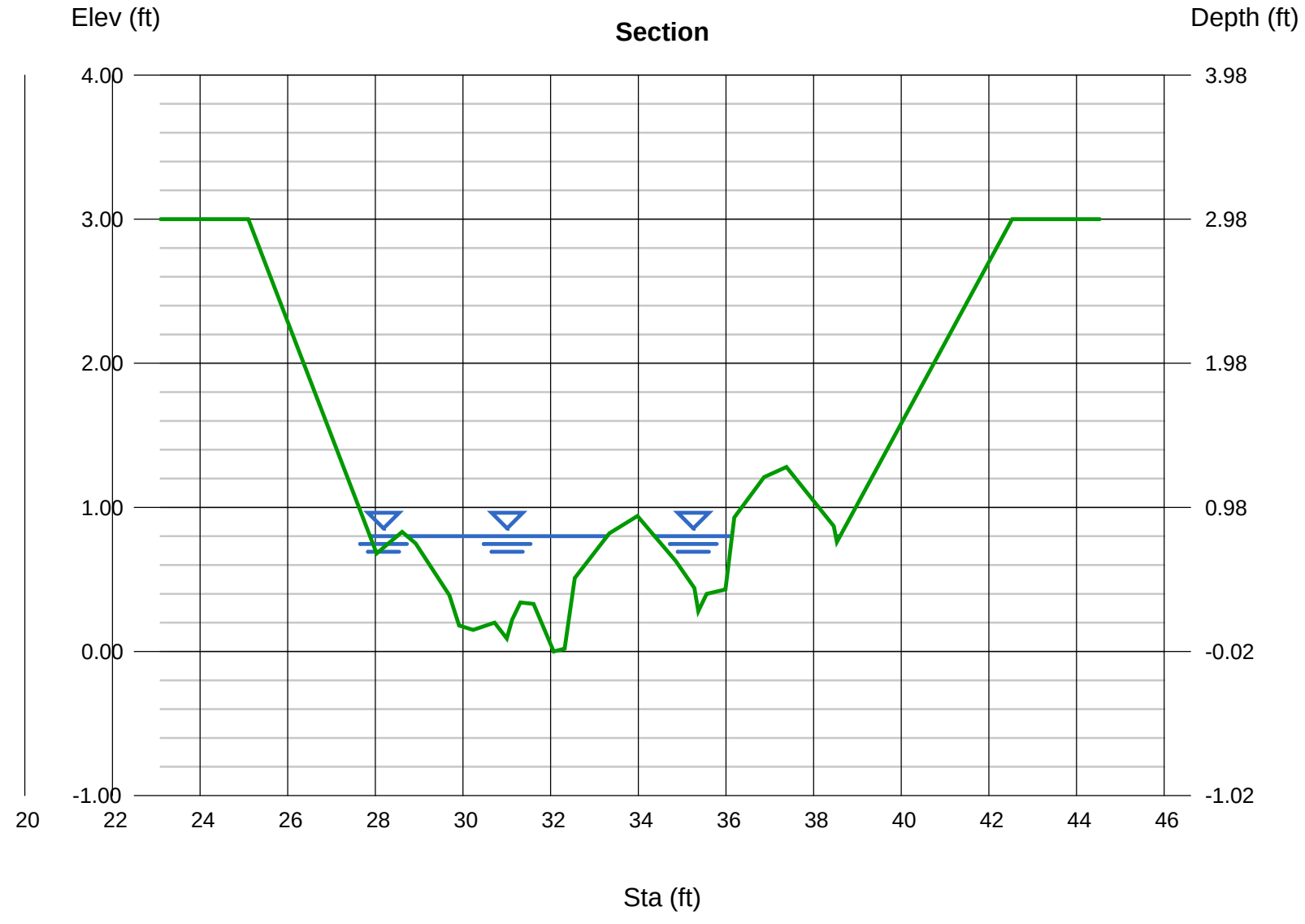
Compute by:	Known Q
Known Q (cfs)	= 1.50

Highlighted

Depth (ft)	= 0.78
Q (cfs)	= 1.500
Area (sqft)	= 2.54
Velocity (ft/s)	= 0.59
Wetted Perim (ft)	= 8.34
Crit Depth, Yc (ft)	= 0.38
Top Width (ft)	= 7.04
EGL (ft)	= 0.79

(Sta, El, n)-(Sta, El, n)...

(25.10, 3.00)-(28.03, 0.68, 0.220)-(28.61, 0.83, 0.220)-(28.92, 0.75, 0.220)-(29.69, 0.39, 0.220)-(29.91, 0.18, 0.220)-(30.23, 0.15, 0.220)
-(30.72, 0.20, 0.220)-(31.00, 0.09, 0.220)-(31.12, 0.22, 0.220)-(31.31, 0.34, 0.220)-(31.61, 0.33, 0.220)-(32.32, 0.02, 0.220)-(32.55, 0.51, 0.220)
-(33.34, 0.82, 0.220)-(33.98, 0.94, 0.220)-(34.85, 0.63, 0.220)-(35.28, 0.44, 0.220)-(35.37, 0.28, 0.220)-(35.56, 0.40, 0.220)-(35.99, 0.43, 0.220)
-(36.19, 0.93, 0.220)-(36.87, 1.21, 0.220)-(37.38, 1.28, 0.220)-(38.46, 0.87, 0.220)-(38.53, 0.76, 0.220)-(42.53, 3.00, 0.220)



Channel Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Friday, Nov 2 2018

Juvenile Low Flow at Culvert #7 - Typical Channel (10'-12' Base Width, 3.9% Slope)

User-defined

Invert Elev (ft)	= 0.02
Slope (%)	= 3.90
N-Value	= 0.220

Calculations

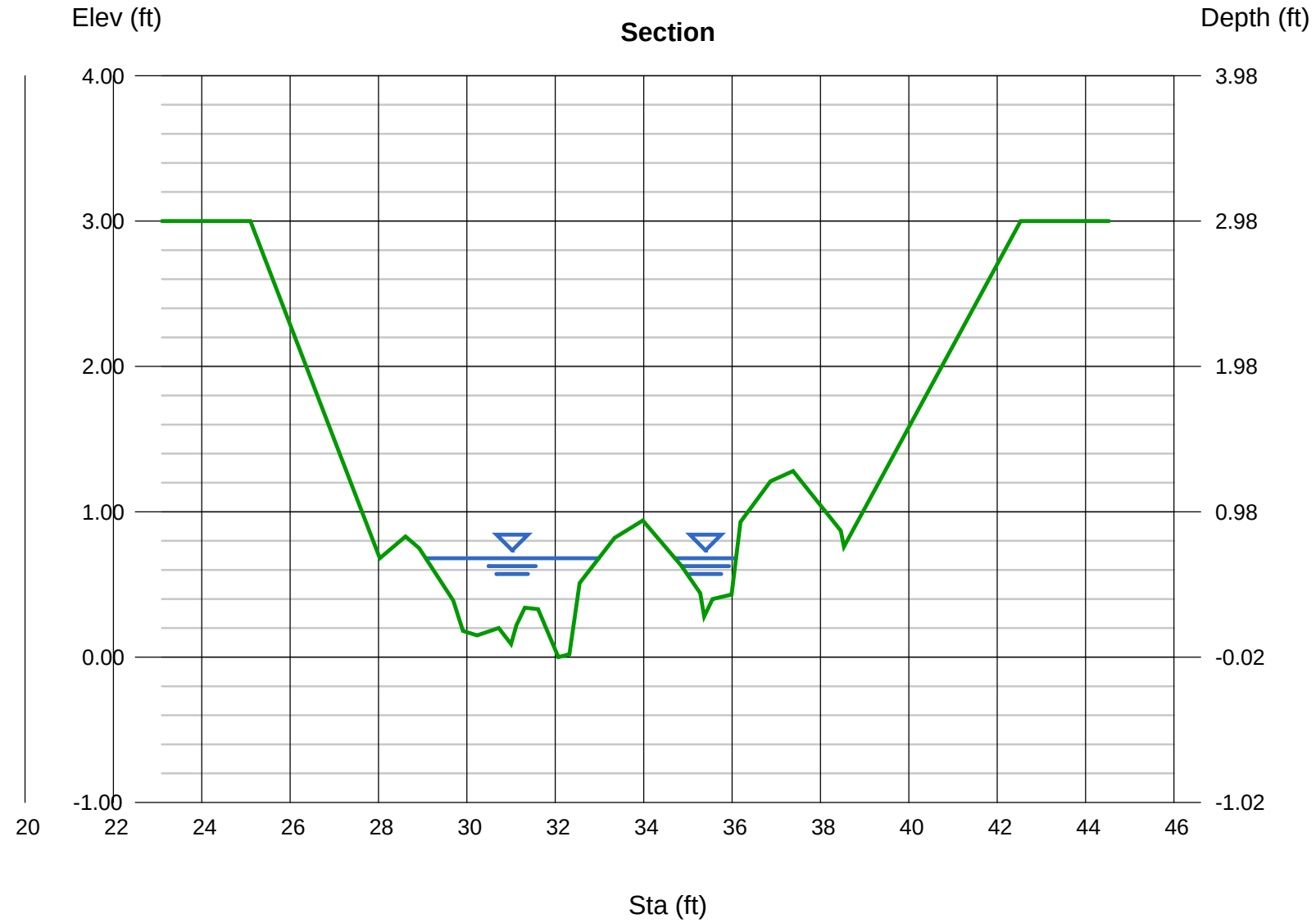
Compute by:	Known Q
Known Q (cfs)	= 1.00

Highlighted

Depth (ft)	= 0.66
Q (cfs)	= 1.000
Area (sqft)	= 1.80
Velocity (ft/s)	= 0.55
Wetted Perim (ft)	= 6.36
Crit Depth, Yc (ft)	= 0.33
Top Width (ft)	= 5.29
EGL (ft)	= 0.66

(Sta, El, n)-(Sta, El, n)...

(25.10, 3.00)-(28.03, 0.68, 0.220)-(28.61, 0.83, 0.220)-(28.92, 0.75, 0.220)-(29.69, 0.39, 0.220)-(29.91, 0.18, 0.220)-(30.23, 0.15, 0.220)
-(30.72, 0.20, 0.220)-(31.00, 0.09, 0.220)-(31.12, 0.22, 0.220)-(31.31, 0.34, 0.220)-(31.61, 0.33, 0.220)-(32.32, 0.02, 0.220)-(32.55, 0.51, 0.220)
-(33.34, 0.82, 0.220)-(33.98, 0.94, 0.220)-(34.85, 0.63, 0.220)-(35.28, 0.44, 0.220)-(35.37, 0.28, 0.220)-(35.56, 0.40, 0.220)-(35.99, 0.43, 0.220)
-(36.19, 0.93, 0.220)-(36.87, 1.21, 0.220)-(37.38, 1.28, 0.220)-(38.46, 0.87, 0.220)-(38.53, 0.76, 0.220)-(42.53, 3.00, 0.220)



Channel Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Friday, Nov 2 2018

Adult High Flow at Culvert #8 - Typical Channel (10'-12' Base Width, 2.7% Slope)

User-defined

Invert Elev (ft)	= 0.02
Slope (%)	= 2.70
N-Value	= 0.170

Calculations

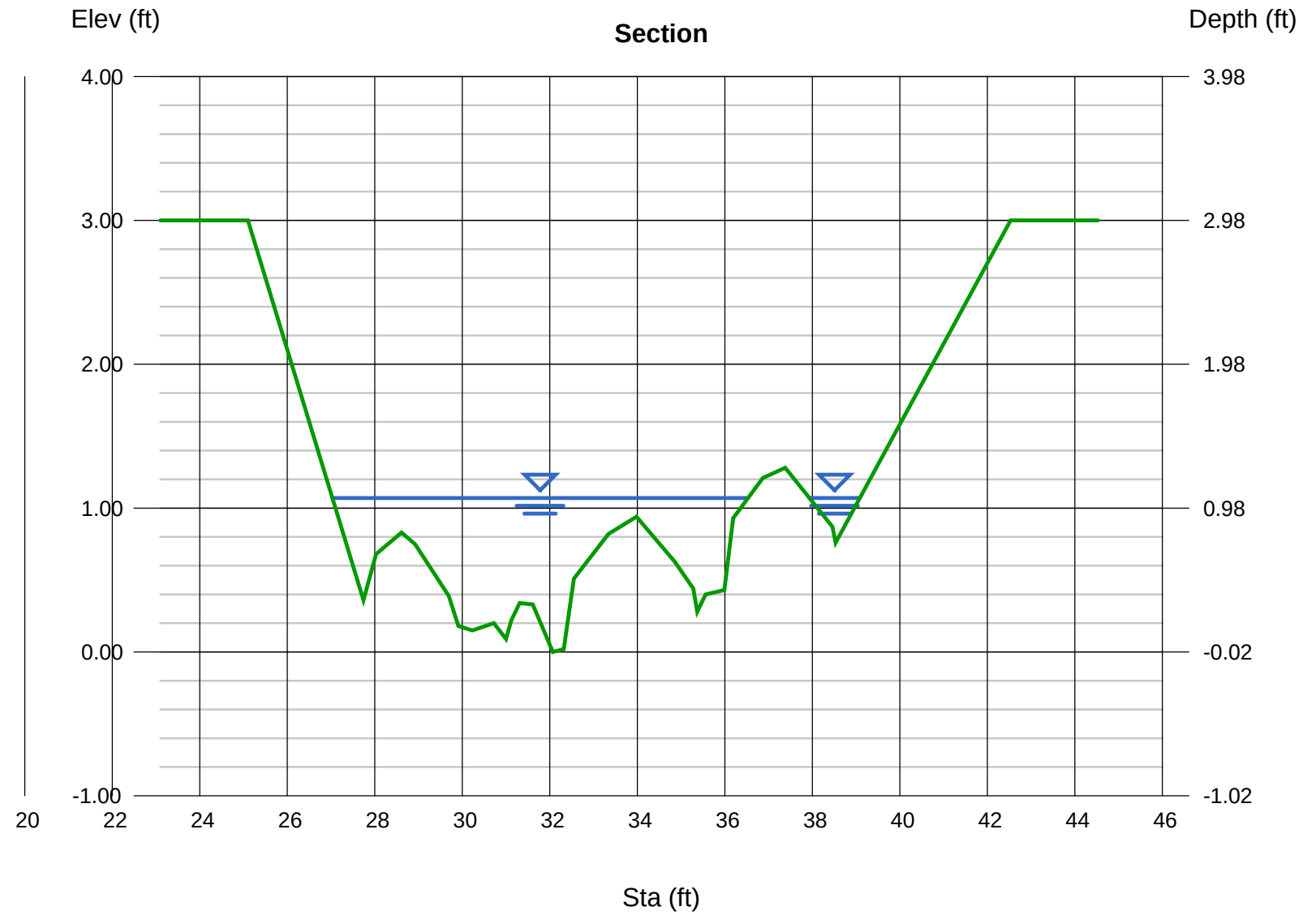
Compute by:	Known Q
Known Q (cfs)	= 4.10

Highlighted

Depth (ft)	= 1.05
Q (cfs)	= 4.100
Area (sqft)	= 5.23
Velocity (ft/s)	= 0.78
Wetted Perim (ft)	= 12.65
Crit Depth, Yc (ft)	= 0.57
Top Width (ft)	= 10.65
EGL (ft)	= 1.06

(Sta, El, n)-(Sta, El, n)...

(25.10, 3.00)-(27.74, 0.36, 0.170)-(28.03, 0.68, 0.170)-(28.61, 0.83, 0.170)-(28.92, 0.75, 0.170)-(29.69, 0.39, 0.170)-(29.91, 0.18, 0.170)
-(30.23, 0.15, 0.170)-(30.72, 0.20, 0.170)-(31.00, 0.09, 0.170)-(31.12, 0.22, 0.170)-(31.31, 0.34, 0.170)-(31.61, 0.33, 0.170)-(32.32, 0.02, 0.170)
-(32.55, 0.51, 0.170)-(33.34, 0.82, 0.170)-(33.98, 0.94, 0.170)-(34.85, 0.63, 0.170)-(35.28, 0.44, 0.170)-(35.37, 0.28, 0.170)-(35.56, 0.40, 0.170)
-(35.99, 0.43, 0.170)-(36.19, 0.93, 0.170)-(36.87, 1.21, 0.170)-(37.38, 1.28, 0.170)-(38.46, 0.87, 0.170)-(38.53, 0.76, 0.170)-(42.53, 3.00, 0.170)



Channel Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Friday, Nov 2 2018

Adult Low Flow at Culvert #8 - Typical Channel (10'-12' Base Width, 2.7% Slope)

User-defined

Invert Elev (ft)	= 0.02
Slope (%)	= 2.70
N-Value	= 0.180

Calculations

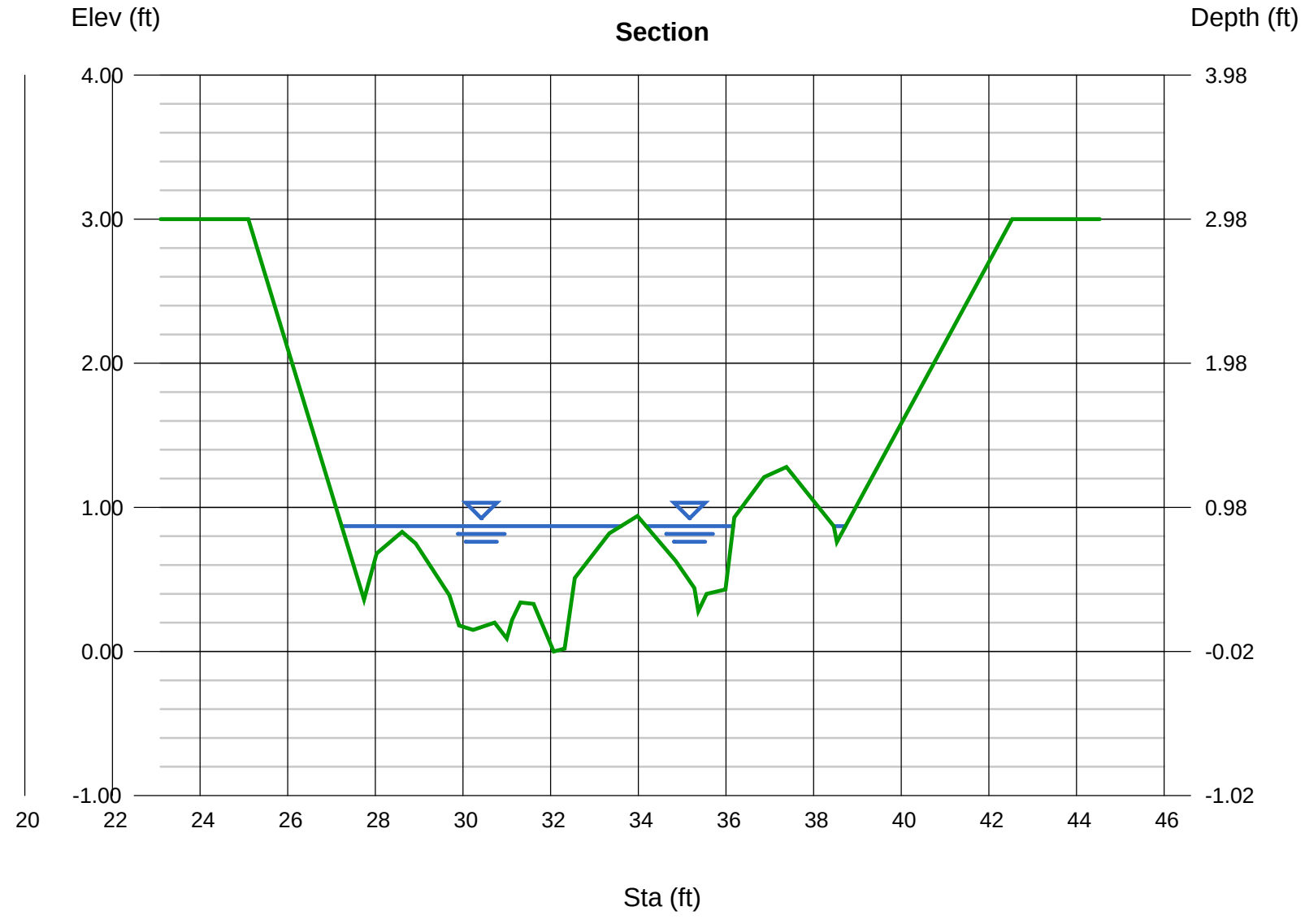
Compute by:	Known Q
Known Q (cfs)	= 2.00

Highlighted

Depth (ft)	= 0.85
Q (cfs)	= 2.000
Area (sqft)	= 3.28
Velocity (ft/s)	= 0.61
Wetted Perim (ft)	= 10.38
Crit Depth, Yc (ft)	= 0.43
Top Width (ft)	= 8.63
EGL (ft)	= 0.86

(Sta, El, n)-(Sta, El, n)...

(25.10, 3.00)-(27.74, 0.36, 0.180)-(28.03, 0.68, 0.180)-(28.61, 0.83, 0.180)-(28.92, 0.75, 0.180)-(29.69, 0.39, 0.180)-(29.91, 0.18, 0.180)
-(30.23, 0.15, 0.180)-(30.72, 0.20, 0.180)-(31.00, 0.09, 0.180)-(31.12, 0.22, 0.180)-(31.31, 0.34, 0.180)-(31.61, 0.33, 0.180)-(32.32, 0.02, 0.180)
-(32.55, 0.51, 0.180)-(33.34, 0.82, 0.180)-(33.98, 0.94, 0.180)-(34.85, 0.63, 0.180)-(35.28, 0.44, 0.180)-(35.37, 0.28, 0.180)-(35.56, 0.40, 0.180)
-(35.99, 0.43, 0.180)-(36.19, 0.93, 0.180)-(36.87, 1.21, 0.180)-(37.38, 1.28, 0.180)-(38.46, 0.87, 0.180)-(38.53, 0.76, 0.180)-(42.53, 3.00, 0.180)



Channel Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Friday, Nov 2 2018

Juvenile High Flow at Culvert #8 - Typical Channel (10'-12' Base Width, 2.7% Slope)

User-defined

Invert Elev (ft)	= 0.02
Slope (%)	= 2.70
N-Value	= 0.190

Calculations

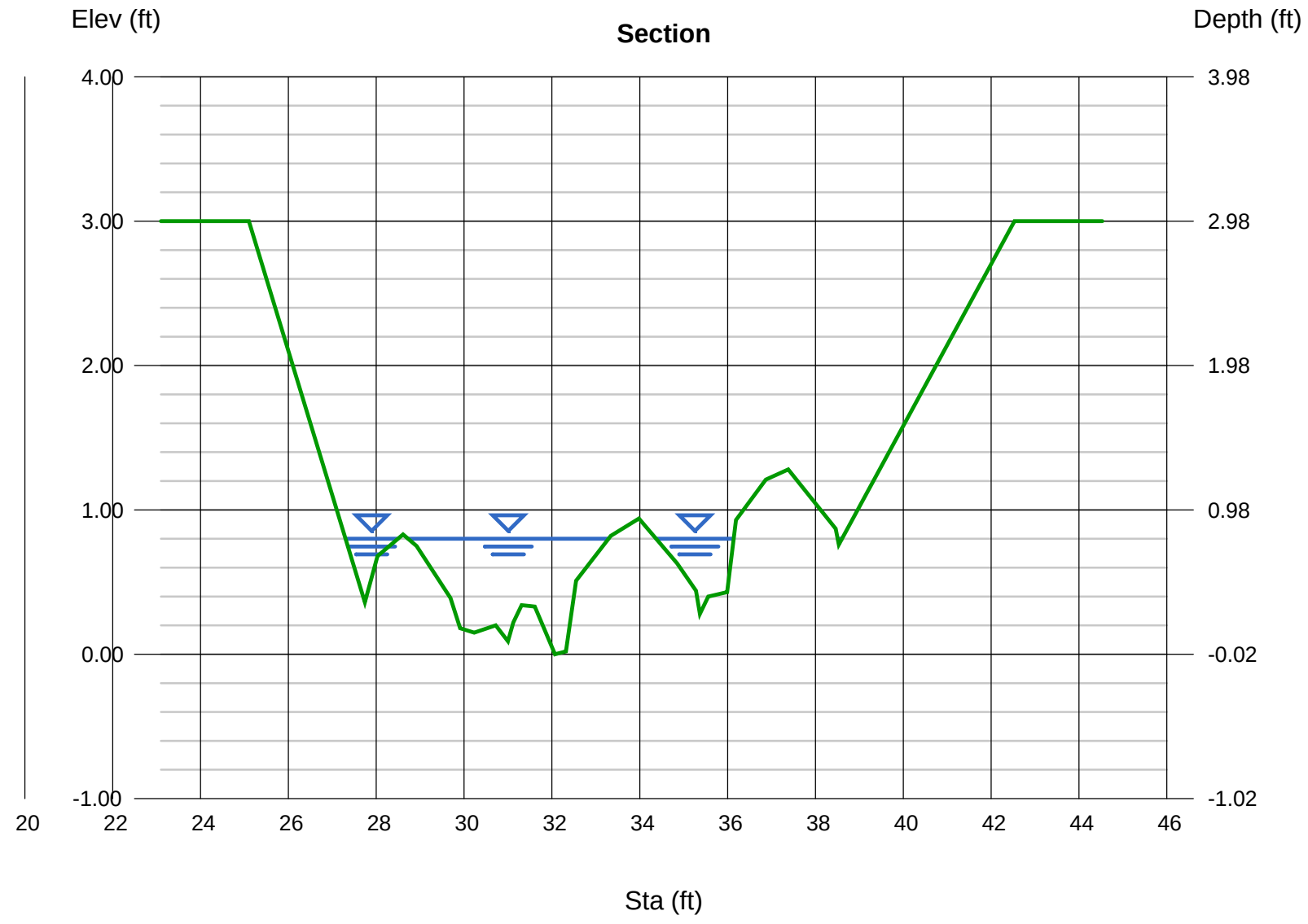
Compute by:	Known Q
Known Q (cfs)	= 1.50

Highlighted

Depth (ft)	= 0.78
Q (cfs)	= 1.500
Area (sqft)	= 2.71
Velocity (ft/s)	= 0.55
Wetted Perim (ft)	= 9.20
Crit Depth, Yc (ft)	= 0.38
Top Width (ft)	= 7.62
EGL (ft)	= 0.78

(Sta, El, n)-(Sta, El, n)...

(25.10, 3.00)-(27.74, 0.36, 0.190)-(28.03, 0.68, 0.190)-(28.61, 0.83, 0.190)-(28.92, 0.75, 0.190)-(29.69, 0.39, 0.190)-(29.91, 0.18, 0.190)
-(30.23, 0.15, 0.190)-(30.72, 0.20, 0.190)-(31.00, 0.09, 0.190)-(31.12, 0.22, 0.190)-(31.31, 0.34, 0.190)-(31.61, 0.33, 0.190)-(32.32, 0.02, 0.190)
-(32.55, 0.51, 0.190)-(33.34, 0.82, 0.190)-(33.98, 0.94, 0.190)-(34.85, 0.63, 0.190)-(35.28, 0.44, 0.190)-(35.37, 0.28, 0.190)-(35.56, 0.40, 0.190)
-(35.99, 0.43, 0.190)-(36.19, 0.93, 0.190)-(36.87, 1.21, 0.190)-(37.38, 1.28, 0.190)-(38.46, 0.87, 0.190)-(38.53, 0.76, 0.190)-(42.53, 3.00, 0.190)



Channel Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Friday, Nov 2 2018

Juvenile Low Flow at Culvert #8 - Typical Channel (10'-12' Base Width, 2.7% Slope)

User-defined

Invert Elev (ft)	= 0.02
Slope (%)	= 2.70
N-Value	= 0.190

Calculations

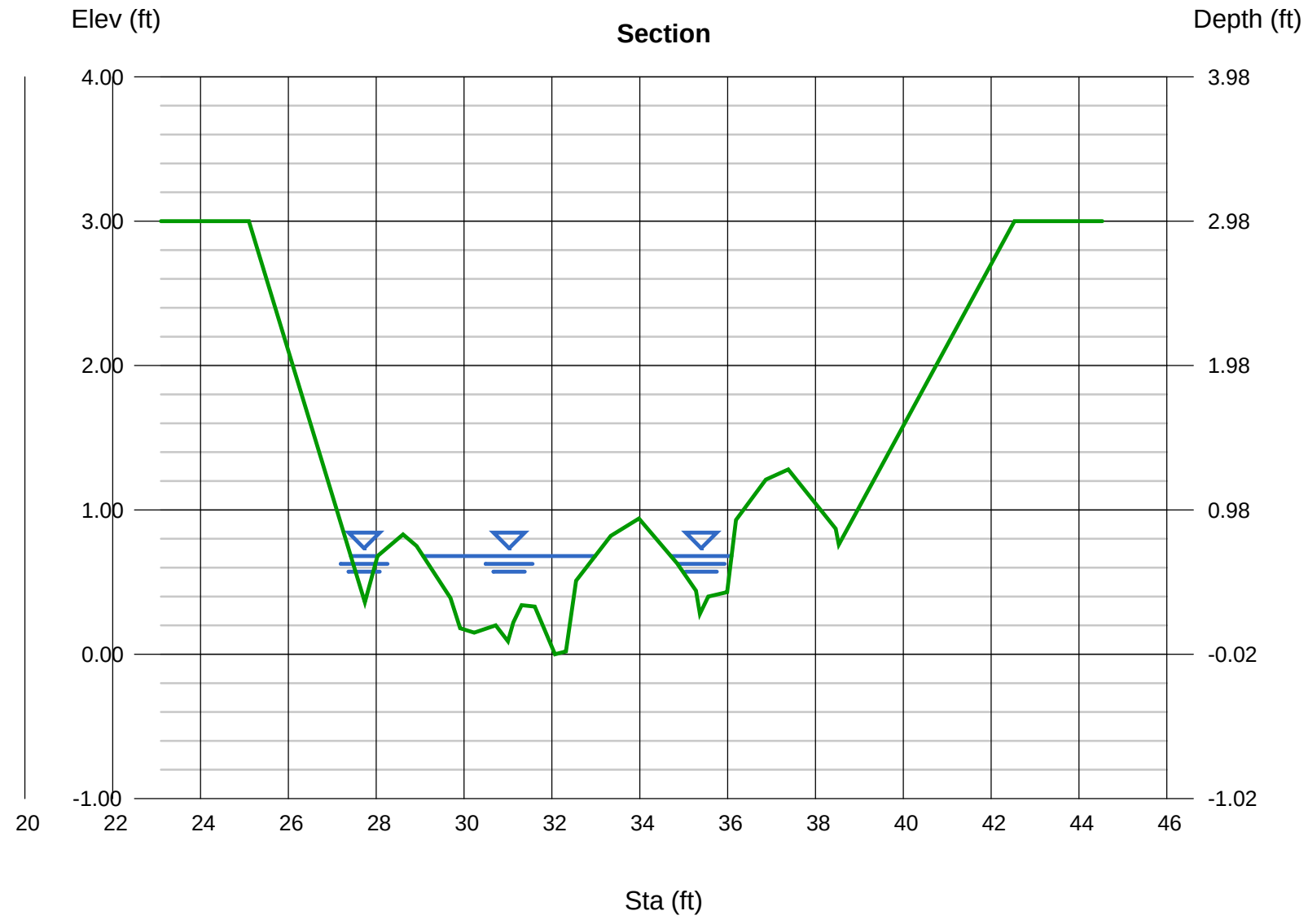
Compute by:	Known Q
Known Q (cfs)	= 1.00

Highlighted

Depth (ft)	= 0.66
Q (cfs)	= 1.000
Area (sqft)	= 1.90
Velocity (ft/s)	= 0.53
Wetted Perim (ft)	= 7.24
Crit Depth, Yc (ft)	= 0.33
Top Width (ft)	= 5.90
EGL (ft)	= 0.66

(Sta, El, n)-(Sta, El, n)...

(25.10, 3.00)-(27.74, 0.36, 0.190)-(28.03, 0.68, 0.190)-(28.61, 0.83, 0.190)-(28.92, 0.75, 0.190)-(29.69, 0.39, 0.190)-(29.91, 0.18, 0.190)
-(30.23, 0.15, 0.190)-(30.72, 0.20, 0.190)-(31.00, 0.09, 0.190)-(31.12, 0.22, 0.190)-(31.31, 0.34, 0.190)-(31.61, 0.33, 0.190)-(32.32, 0.02, 0.190)
-(32.55, 0.51, 0.190)-(33.34, 0.82, 0.190)-(33.98, 0.94, 0.190)-(34.85, 0.63, 0.190)-(35.28, 0.44, 0.190)-(35.37, 0.28, 0.190)-(35.56, 0.40, 0.190)
-(35.99, 0.43, 0.190)-(36.19, 0.93, 0.190)-(36.87, 1.21, 0.190)-(37.38, 1.28, 0.190)-(38.46, 0.87, 0.190)-(38.53, 0.76, 0.190)-(42.53, 3.00, 0.190)



Channel Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Friday, Nov 2 2018

Adult High Flow at Rock Pile/Mat. Rem. Area - Typ. Chnl (9'-10' Base Width, 12% Slope)

User-defined

Invert Elev (ft)	= 0.01
Slope (%)	= 12.00
N-Value	= 0.250

Calculations

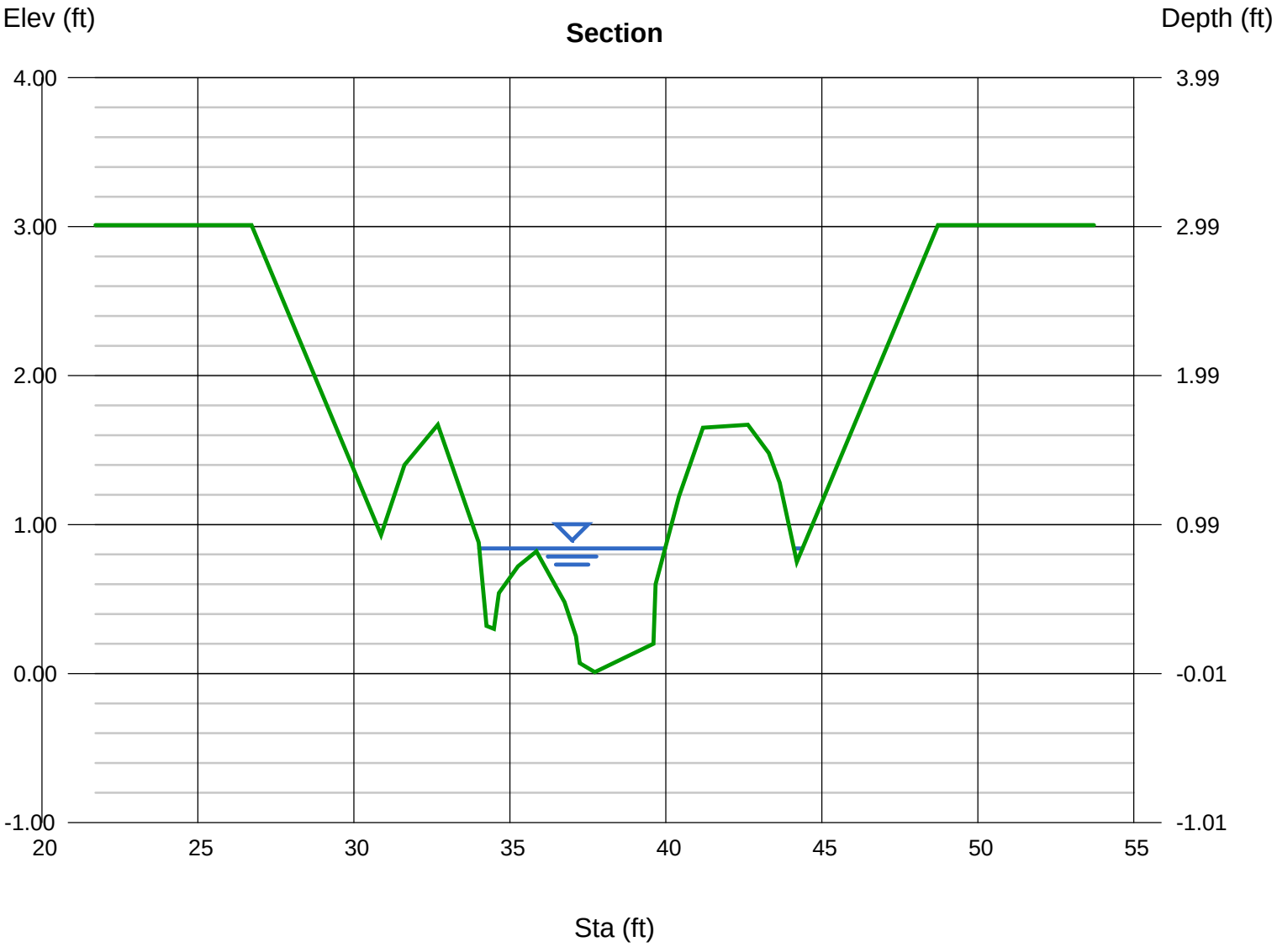
Compute by:	Known Q
Known Q (cfs)	= 2.80

Highlighted

Depth (ft)	= 0.83
Q (cfs)	= 2.800
Area (sqft)	= 2.70
Velocity (ft/s)	= 1.04
Wetted Perim (ft)	= 7.45
Crit Depth, Yc (ft)	= 0.43
Top Width (ft)	= 6.23
EGL (ft)	= 0.85

(Sta, El, n)-(Sta, El, n)...

(26.72, 3.01)-(30.87, 0.93, 0.250)-(31.62, 1.40, 0.250)-(32.69, 1.67, 0.250)-(34.00, 0.88, 0.250)-(34.25, 0.32, 0.250)-(34.49, 0.30, 0.250)
-(34.65, 0.54, 0.250)-(35.26, 0.72, 0.250)-(35.85, 0.82, 0.250)-(36.75, 0.48, 0.250)-(37.12, 0.25, 0.250)-(37.24, 0.07, 0.250)-(37.72, 0.01, 0.250)
-(39.60, 0.20, 0.250)-(39.67, 0.60, 0.250)-(40.42, 1.19, 0.250)-(41.19, 1.65, 0.250)-(42.63, 1.67, 0.250)-(43.30, 1.48, 0.250)-(43.65, 1.28, 0.250)
-(44.20, 0.75, 0.250)-(48.72, 3.01, 0.250)



Channel Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Friday, Nov 2 2018

Adult Low Flow at Rock Pile/Mat. Rem. Area - Typ. Chnl (9'-10' Base Width, 12% Slope)

User-defined

Invert Elev (ft)	= 0.01
Slope (%)	= 12.00
N-Value	= 0.250

Calculations

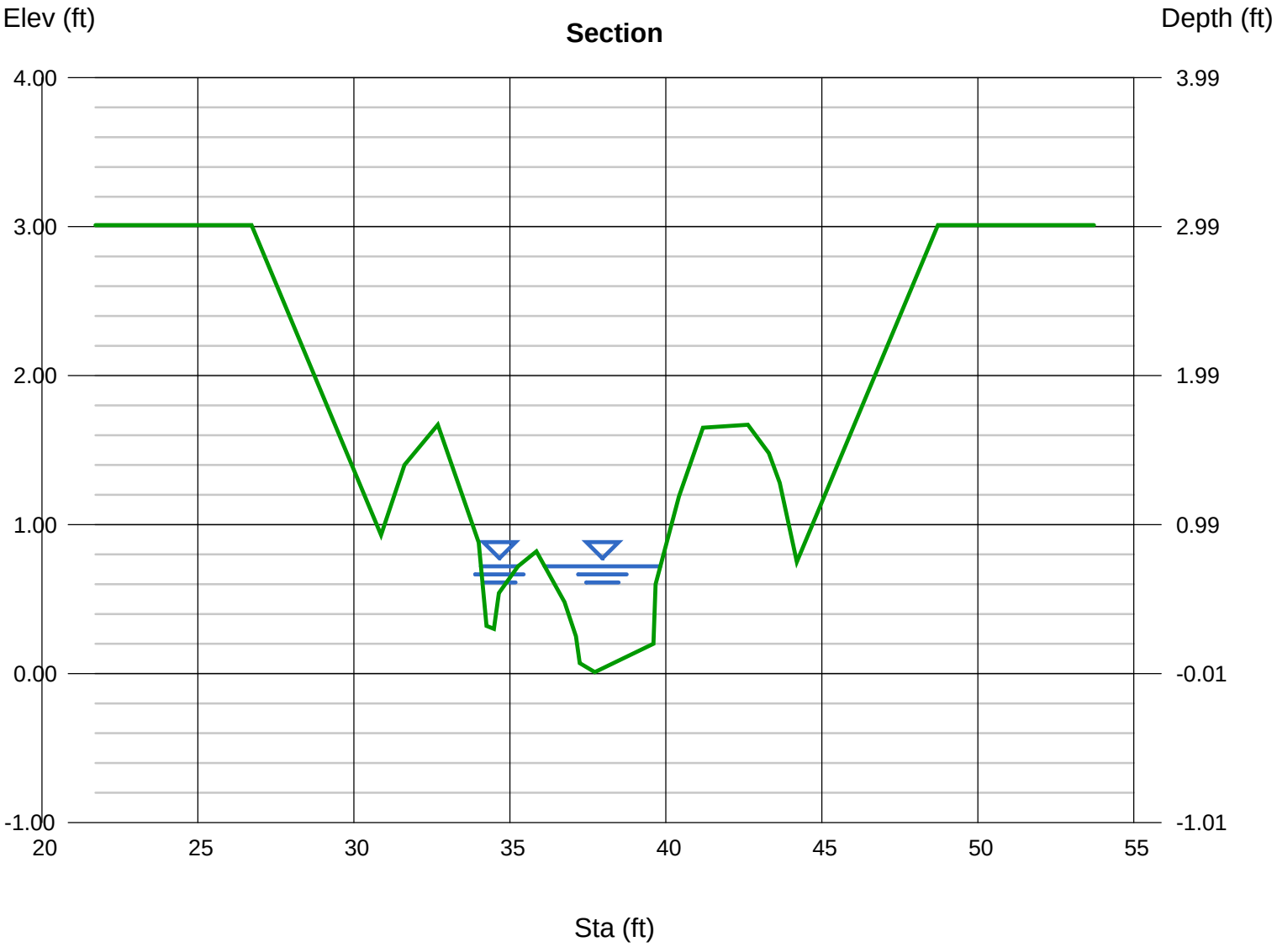
Compute by:	Known Q
Known Q (cfs)	= 2.00

Highlighted

Depth (ft)	= 0.71
Q (cfs)	= 2.000
Area (sqft)	= 2.03
Velocity (ft/s)	= 0.99
Wetted Perim (ft)	= 5.91
Crit Depth, Yc (ft)	= 0.37
Top Width (ft)	= 4.90
EGL (ft)	= 0.73

(Sta, El, n)-(Sta, El, n)...

(26.72, 3.01)-(30.87, 0.93, 0.250)-(31.62, 1.40, 0.250)-(32.69, 1.67, 0.250)-(34.00, 0.88, 0.250)-(34.25, 0.32, 0.250)-(34.49, 0.30, 0.250)
-(34.65, 0.54, 0.250)-(35.26, 0.72, 0.250)-(35.85, 0.82, 0.250)-(36.75, 0.48, 0.250)-(37.12, 0.25, 0.250)-(37.24, 0.07, 0.250)-(37.72, 0.01, 0.250)
-(39.60, 0.20, 0.250)-(39.67, 0.60, 0.250)-(40.42, 1.19, 0.250)-(41.19, 1.65, 0.250)-(42.63, 1.67, 0.250)-(43.30, 1.48, 0.250)-(43.65, 1.28, 0.250)
-(44.20, 0.75, 0.250)-(48.72, 3.01, 0.250)



Channel Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Friday, Nov 2 2018

Juvenile High/Low Flow at Rock Pile/Mat. Rem. Area-Typ. Chnl (9'-10' Base Width, 12%

User-defined

Invert Elev (ft)	= 0.01
Slope (%)	= 12.00
N-Value	= 0.250

Calculations

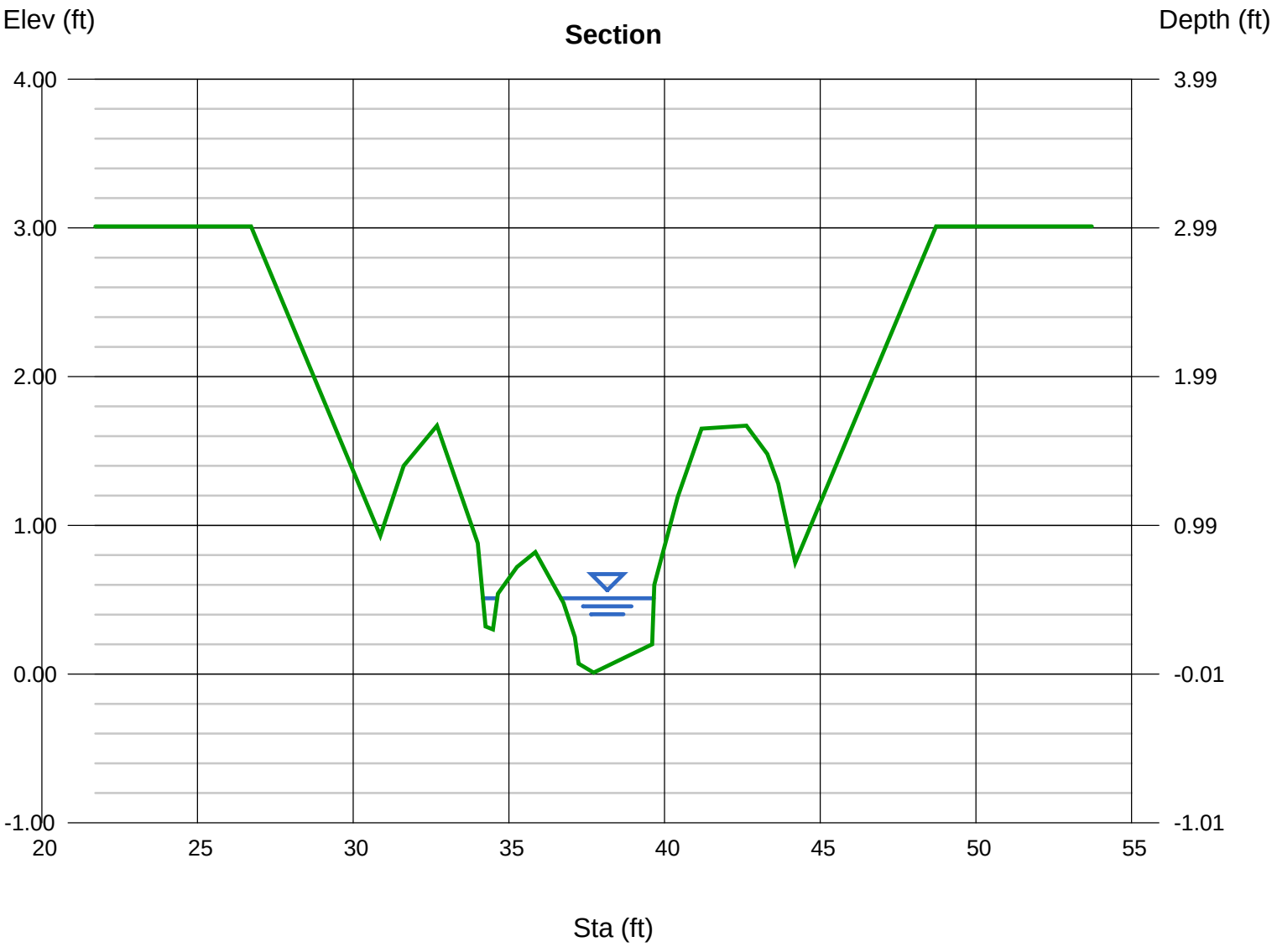
Compute by:	Known Q
Known Q (cfs)	= 1.00

Highlighted

Depth (ft)	= 0.50
Q (cfs)	= 1.000
Area (sqft)	= 1.16
Velocity (ft/s)	= 0.86
Wetted Perim (ft)	= 4.13
Crit Depth, Yc (ft)	= 0.26
Top Width (ft)	= 3.45
EGL (ft)	= 0.51

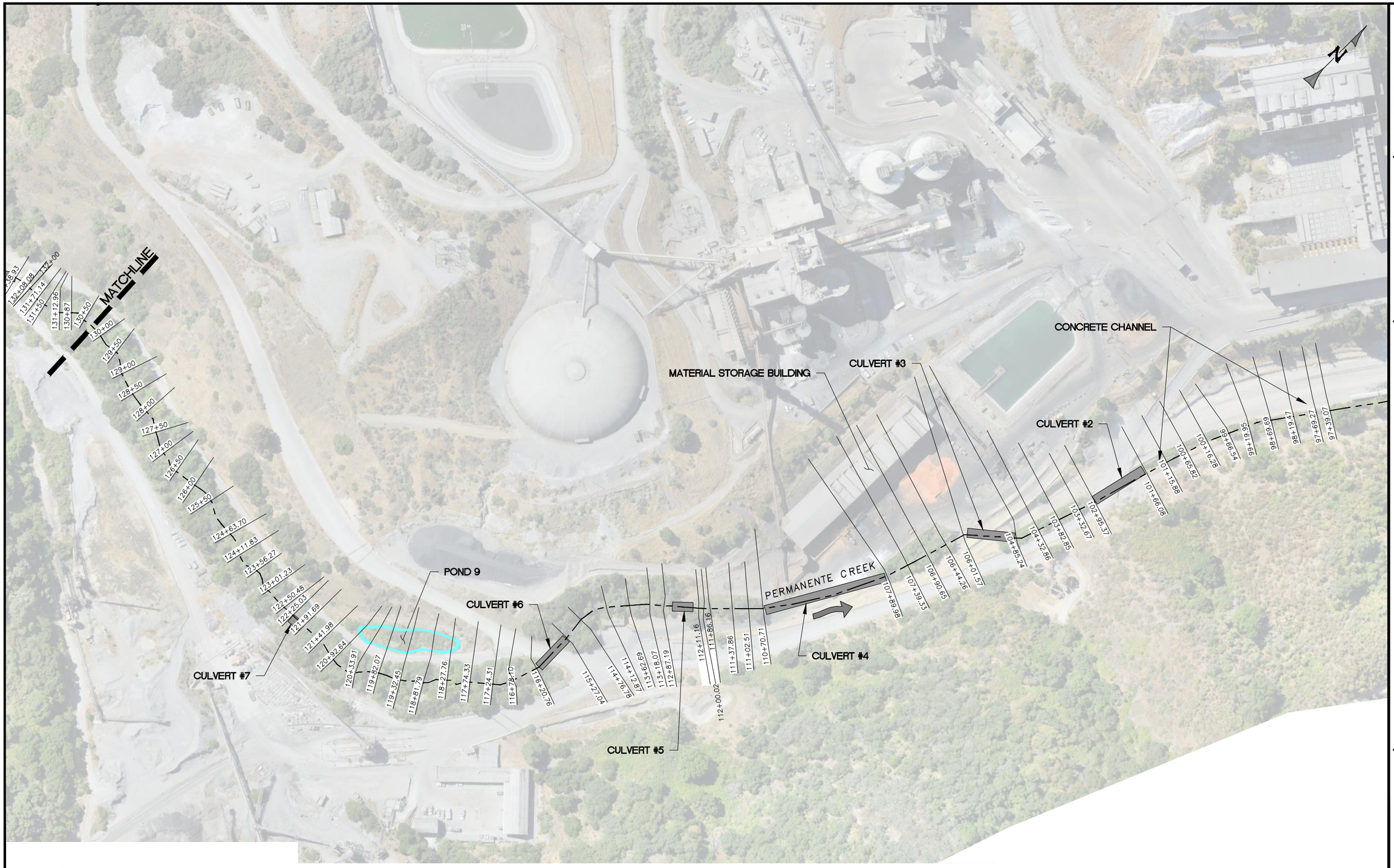
(Sta, El, n)-(Sta, El, n)...

(26.72, 3.01)-(30.87, 0.93, 0.250)-(31.62, 1.40, 0.250)-(32.69, 1.67, 0.250)-(34.00, 0.88, 0.250)-(34.25, 0.32, 0.250)-(34.49, 0.30, 0.250)
-(34.65, 0.54, 0.250)-(35.26, 0.72, 0.250)-(35.85, 0.82, 0.250)-(36.75, 0.48, 0.250)-(37.12, 0.25, 0.250)-(37.24, 0.07, 0.250)-(37.72, 0.01, 0.250)
-(39.60, 0.20, 0.250)-(39.67, 0.60, 0.250)-(40.42, 1.19, 0.250)-(41.19, 1.65, 0.250)-(42.63, 1.67, 0.250)-(43.30, 1.48, 0.250)-(43.65, 1.28, 0.250)
-(44.20, 0.75, 0.250)-(48.72, 3.01, 0.250)



APPENDIX E

HEC-RAS Model Results



LEGEND

132+00 — HEC–RAS ALIGNMENT

HEC–RAS CROSS SECTION LOCATION

HEC-RAS CROSS SECTION OVERVIEW

SCALE: 1"=200'

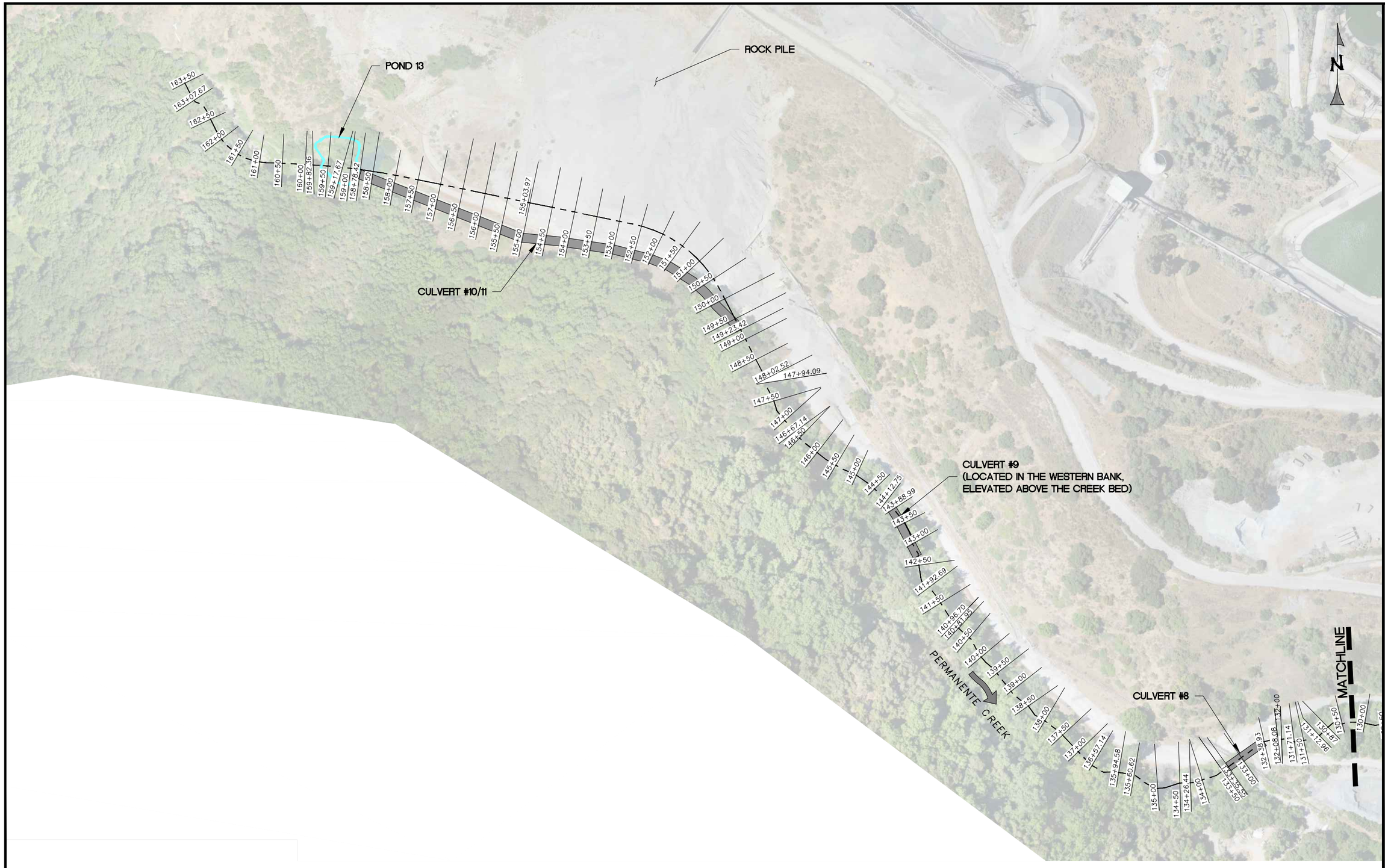
WATERWAYS CONSULTING INC.
Santa Cruz, CA | watways.com | Portland, OR

CHANNEL WIDENING TO ROCK PILE AREA
HEC-RAS CROSS SECTION OVERVIEW (1 OF 2)

BAR IS ONE INCH ON ORIGINAL DRAWING. ADJUST SCALES FOR REDUCED PLOTS

0 1"

FIGURE
1.0



LEGEND

HEC-RAS ALIGNMENT

132+00 HEC-RAS CROSS SECTION LOCATION

HEC-RAS CROSS SECTION OVERVIEW

SCALE: 1"=200'

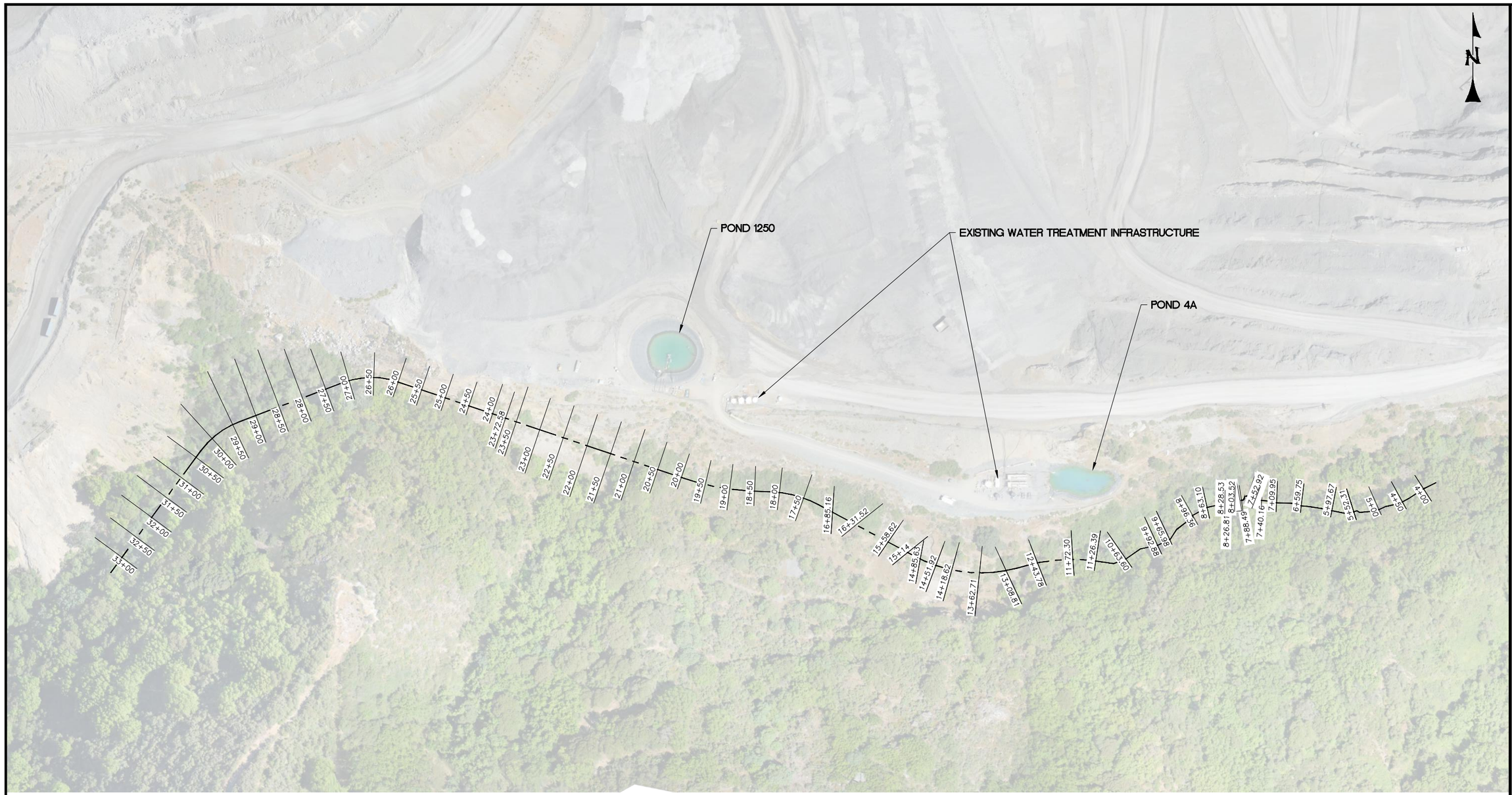
WATERWAYS CONSULTING INC.
Santa Cruz, CA | watways.com | Portland, OR

CHANNEL WIDENING TO ROCK PILE AREA
HEC-RAS CROSS SECTION OVERVIEW (2 OF 2)

BAR IS ONE INCH ON ORIGINAL DRAWING. ADJUST SCALES FOR REDUCED PLOTS

0 1"

FIGURE
2.0



HEC-RAS CROSS SECTION OVERVIEW

SCALE: 1" = 200'

LEGEND

- HEC-RAS ALIGNMENT
- 6+40.16 — HEC-RAS CROSS SECTION LOCATION

WATERWAYS CONSULTING INC.
Santa Cruz, CA | watways.com | Portland, OR

OVERBURDEN REMOVAL AREA
HEC-RAS CROSS SECTION OVERVIEW

BAR IS ONE INCH ON ORIGINAL DRAWING. ADJUST SCALES FOR REDUCED PLOTS

0 1"

FIGURE
3.0

APPENDIX F. HEC-RAS OUTPUT
PERMANENTE CREEK RESTORATION PLAN
LIST OF FIGURES AND TABLES

FIGURE/TABLE #	DESCRIPTION
EXISTING CONDITIONS	
F1	CHANNEL WIDENING TO ROCK PILE AREAS (EXISTING CONDITIONS), 1.5-YEAR, 10-YEAR, & 100-YEAR WATER SURFACE PROFILES
F2	CHANNEL WIDENING TO ROCK PILE AREAS (EXISTING CONDITIONS), 1.5-YEAR, 10-YEAR, & 100-YEAR WATER SURFACE PROFILES
F3	CHANNEL WIDENING TO ROCK PILE AREAS (EXISTING CONDITIONS), 1.5-YEAR, 10-YEAR, & 100-YEAR WATER SURFACE PROFILES
F4	MATERIAL REMOVAL AREA (EXISTING CONDITIONS), 1.5-YEAR, 10-YEAR, & 100-YEAR WATER SURFACE PROFILES
F5	MATERIAL REMOVAL AREA (EXISTING CONDITIONS), 1.5-YEAR, 10-YEAR, & 100-YEAR WATER SURFACE PROFILES
PROPOSED CONDITIONS	
F6	CHANNEL WIDENING TO ROCK PILE AREAS (PROPOSED CONDITIONS), 1.5-YEAR, 10-YEAR, & 100-YEAR WATER SURFACE PROFILES
F7	CHANNEL WIDENING TO ROCK PILE AREAS (PROPOSED CONDITIONS), 1.5-YEAR, 10-YEAR, & 100-YEAR WATER SURFACE PROFILES
F8	CHANNEL WIDENING TO ROCK PILE AREAS (PROPOSED CONDITIONS), 1.5-YEAR, 10-YEAR, & 100-YEAR WATER SURFACE PROFILES
F9	MATERIAL REMOVAL AREA (PROPOSED CONDITIONS), 1.5-YEAR, 10-YEAR, & 100-YEAR WATER SURFACE PROFILES
F10	MATERIAL REMOVAL AREA (PROPOSED CONDITIONS), 1.5-YEAR, 10-YEAR, & 100-YEAR WATER SURFACE PROFILES
FISH PASSAGE	
F11	WATER SURFACE PROFILES FOR ADULT NON-ANADROMOUS SALMONID FISH PASSAGE FLOWS AT CULVERT #7, CHANNEL WIDENING AREA
F12	WATER SURFACE PROFILES FOR JUVENILE NON-ANADROMOUS SALMONID FISH PASSAGE FLOWS AT CULVERT #7, CHANNEL WIDENING AREA
F13	WATER SURFACE PROFILES FOR ADULT NON-ANADROMOUS SALMONID FISH PASSAGE FLOWS AT CULVERT #8, CHANNEL WIDENING AREA
F14	WATER SURFACE PROFILES FOR JUVENILE NON-ANADROMOUS SALMONID FISH PASSAGE FLOWS AT CULVERT #8, CHANNEL WIDENING AREA
F15	VELOCITY PROFILES FOR ADULT NON-ANADROMOUS SALMONID FISH PASSAGE FLOWS AT CULVERT #7, CHANNEL WIDENING AREA
F16	VELOCITY PROFILES FOR JUVENILE NON-ANADROMOUS SALMONID FISH PASSAGE FLOWS AT CULVERT #7, CHANNEL WIDENING AREA
F17	VELOCITY PROFILES FOR ADULT NON-ANADROMOUS SALMONID FISH PASSAGE FLOWS AT CULVERT #8, CHANNEL WIDENING AREA
F18	VELOCITY PROFILES FOR JUVENILE NON-ANADROMOUS SALMONID FISH PASSAGE FLOWS AT CULVERT #8, CHANNEL WIDENING AREA
TABLES	
T1	CHANNEL WIDENING AND ROCK PILE AREAS TABULAR OUTPUT FROM HEC-RAS
T2	MATERIAL REMOVAL AREA TABULAR OUTPUT FROM HEC-RAS
T3	OVERTOPPING FLOW EVALUATION ALONG ANGULAR ROCK VEHICLE BARRIER
T4	SENSITIVITY ANALYSIS: COMPARISON OF WATER SURFACE ELEVATIONS FROM HEC-RAS BY RAISING AND LOWERING CHANNEL ROUGHNESS BY 10%

WATERWAYS CONSULTING, INC.

HEC-RAS MODEL RESULTS

Existing Conditions

Channel Widening and Rock Pile Areas

Material Removal Area

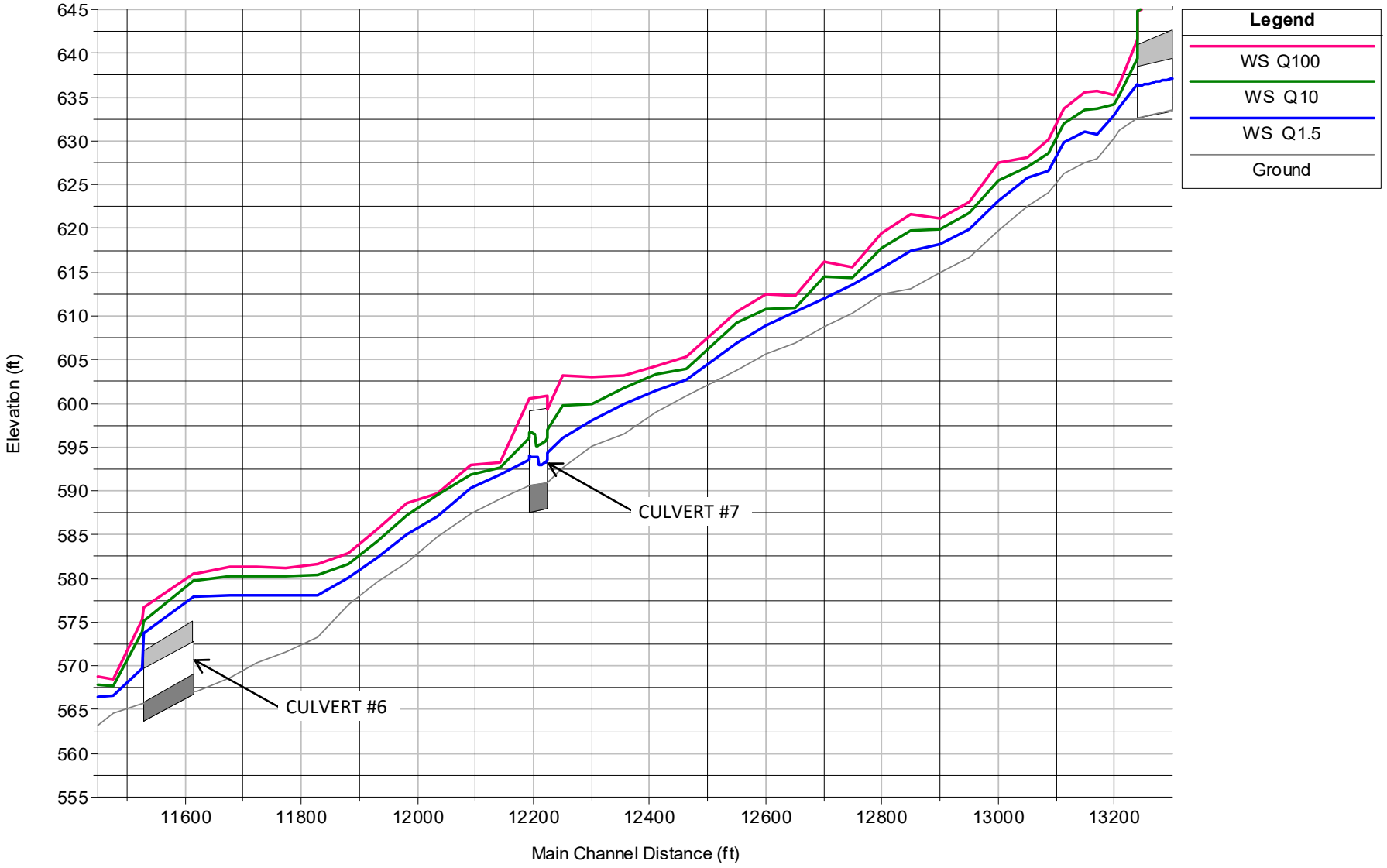


FIGURE
F1

CHANNEL WIDENING TO ROCK PILE AREAS (EXISTING CONDITIONS)
1.5-YEAR, 10-YEAR, & 100-YEAR WATER SURFACE PROFILES

PERMANENTE CREEK

90% SUBMITTAL

WATERWAYS CONSULTING, INC.
Santa Cruz, CA | watways.com | Portland, OR

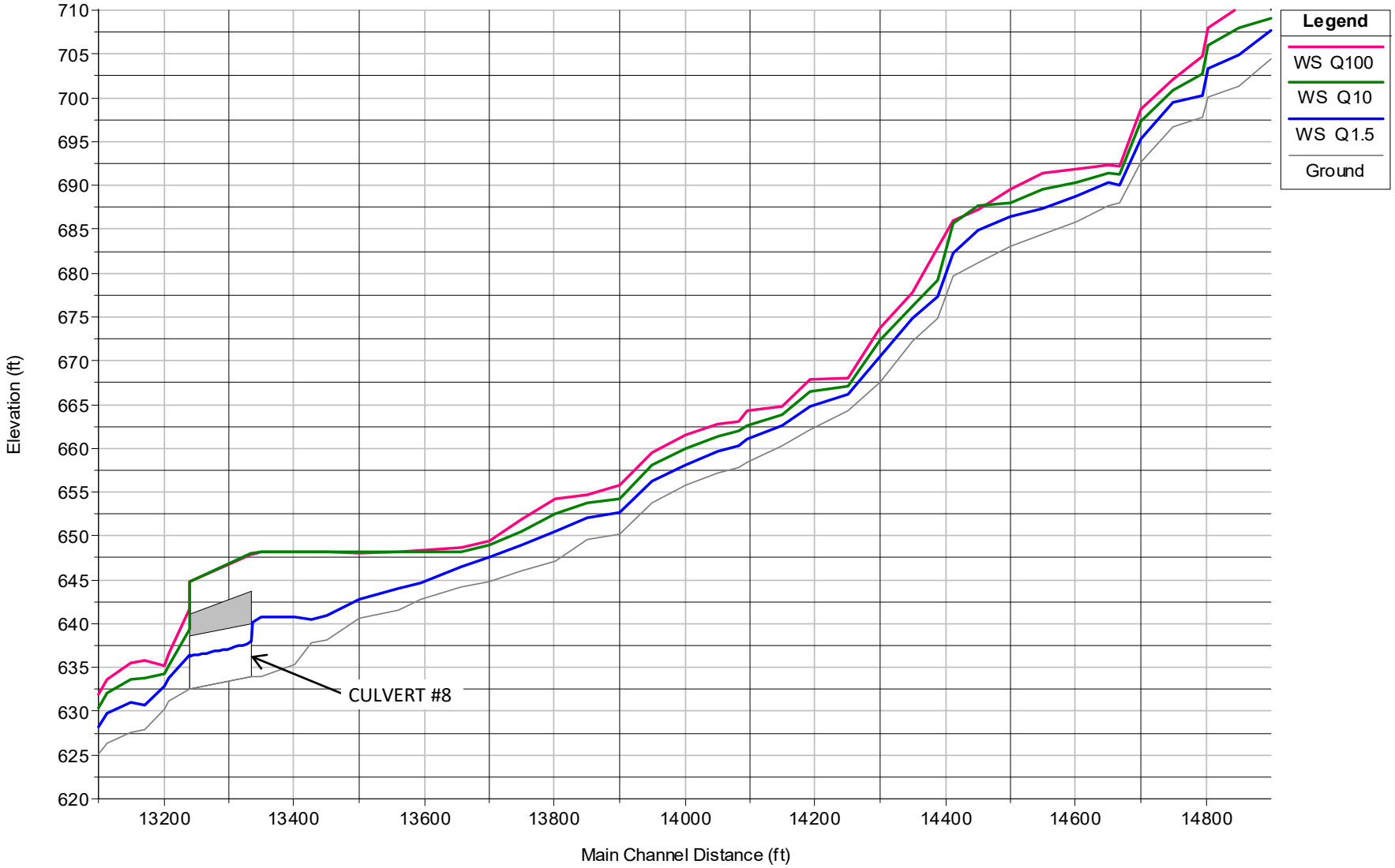


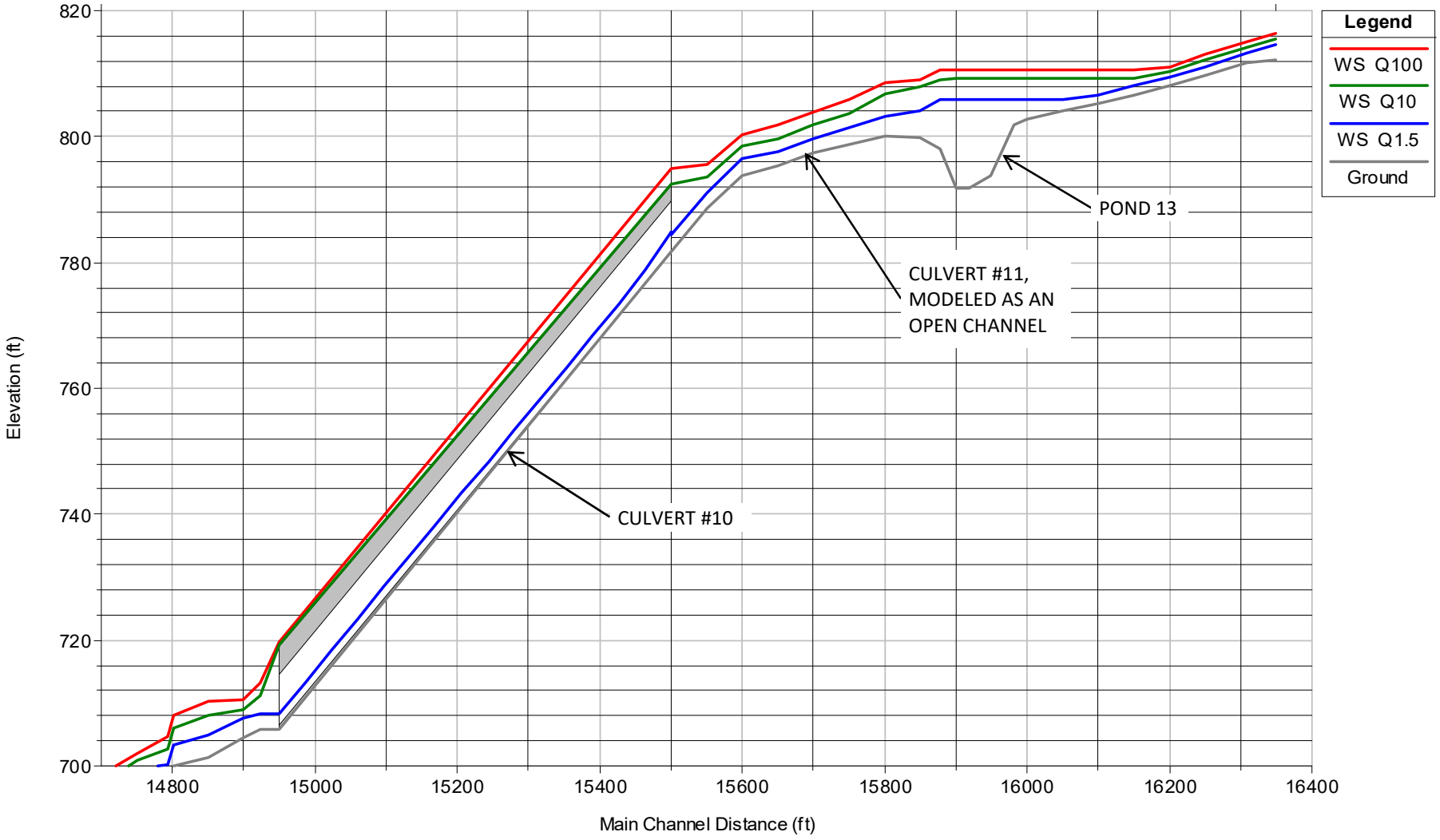
FIGURE
F2

CHANNEL WIDENING TO ROCK PILE AREAS (EXISTING CONDITIONS)
1.5-YEAR, 10-YEAR, & 100-YEAR WATER SURFACE PROFILES

PERMANENTE CREEK

90% SUBMITTAL

WATERWAYS CONSULTING, INC.
Santa Cruz, CA | watways.com | Portland, OR



FIGURE

F3

CHANNEL WIDENING TO ROCK PILE AREAS (EXISTING CONDITIONS)

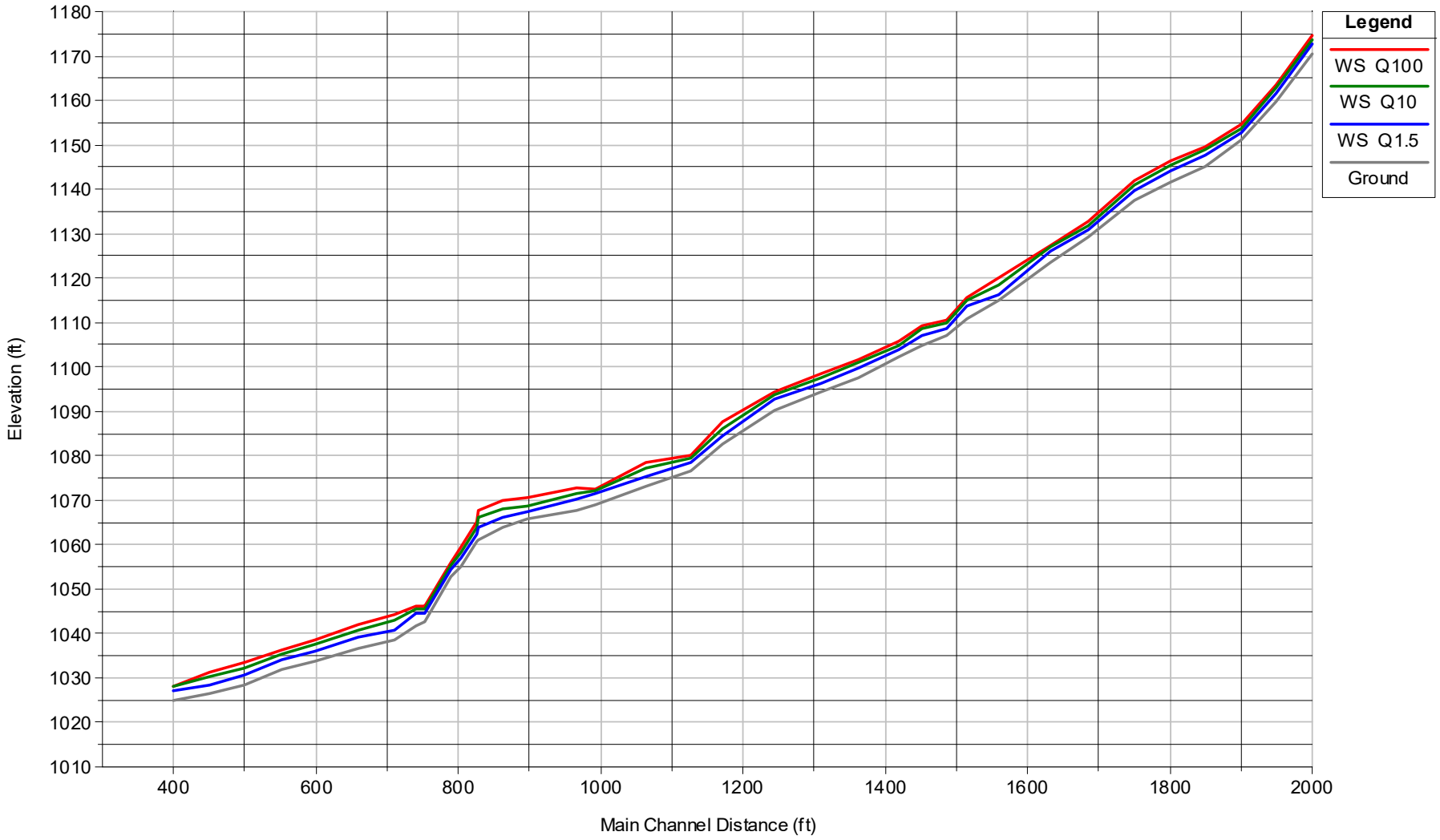
1.5-YEAR, 10-YEAR, & 100-YEAR WATER SURFACE PROFILES

PERMANENTE CREEK

90% SUBMITTAL

WATERWAYS CONSULTING, INC.

Santa Cruz, CA | watways.com | Portland, OR



FIGURE

F4

MATERIAL REMOVAL AREA (EXISTING CONDITIONS)

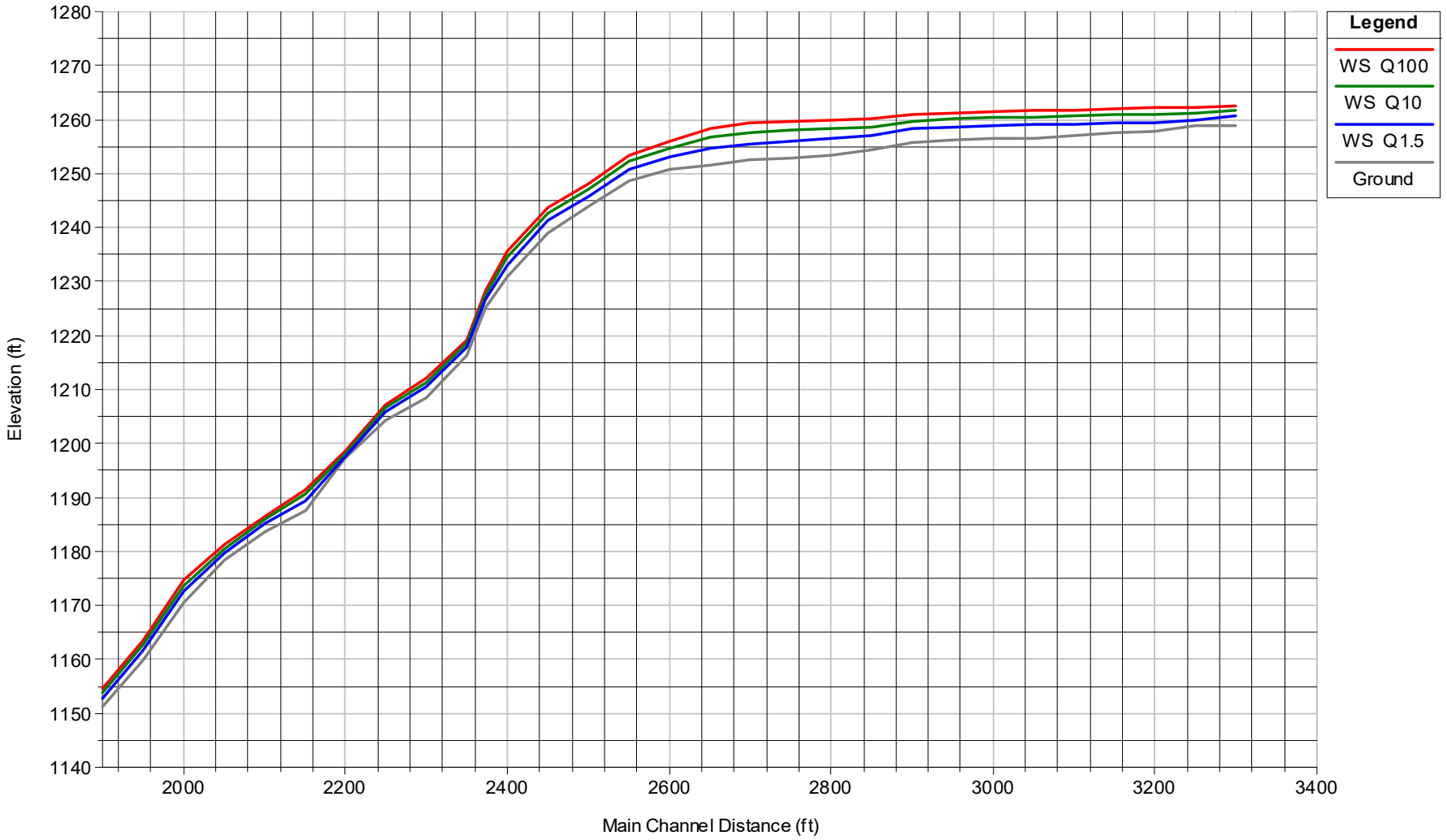
1.5-YEAR, 10-YEAR, & 100-YEAR WATER SURFACE PROFILES

PERMANENTE CREEK

90% SUBMITTAL

WATERWAYS CONSULTING, INC.

Santa Cruz, CA | watways.com | Portland, OR



FIGURE

F5

MATERIAL REMOVAL AREA (EXISTING CONDITIONS)

1.5-YEAR, 10-YEAR, & 100-YEAR WATER SURFACE PROFILES

PERMANENTE CREEK

90% SUBMITTAL

WATERWAYS CONSULTING, INC.

Santa Cruz, CA | watways.com | Portland, OR

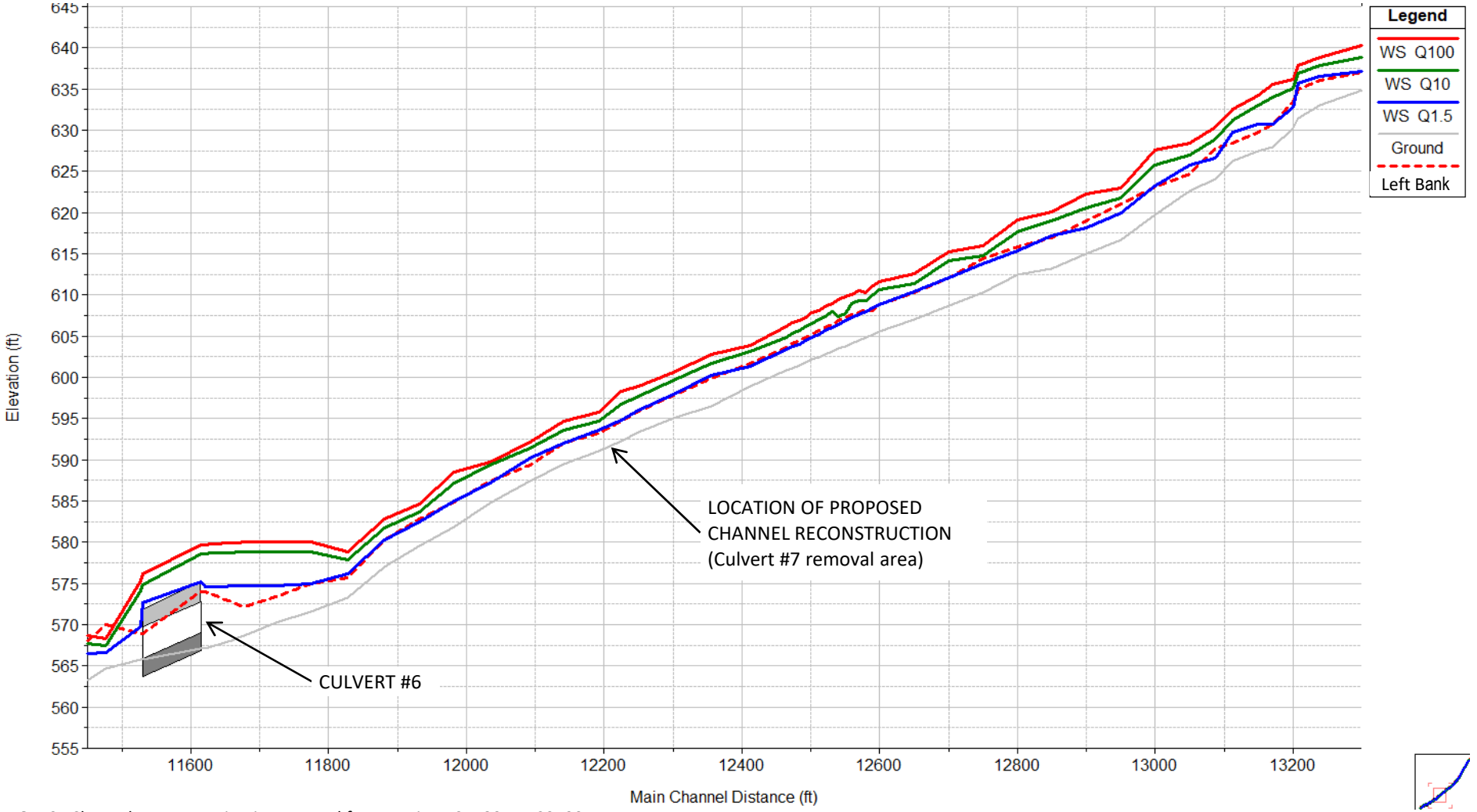
WATERWAYS CONSULTING, INC.

HEC-RAS MODEL RESULTS

Proposed Conditions

Channel Widening and Rock Pile Areas

Material Removal Area



NOTES: Channel reconstruction is proposed from station 121+80 to 123+00 where Culvert #7 is removed. Left bank is floodplain design elevation.

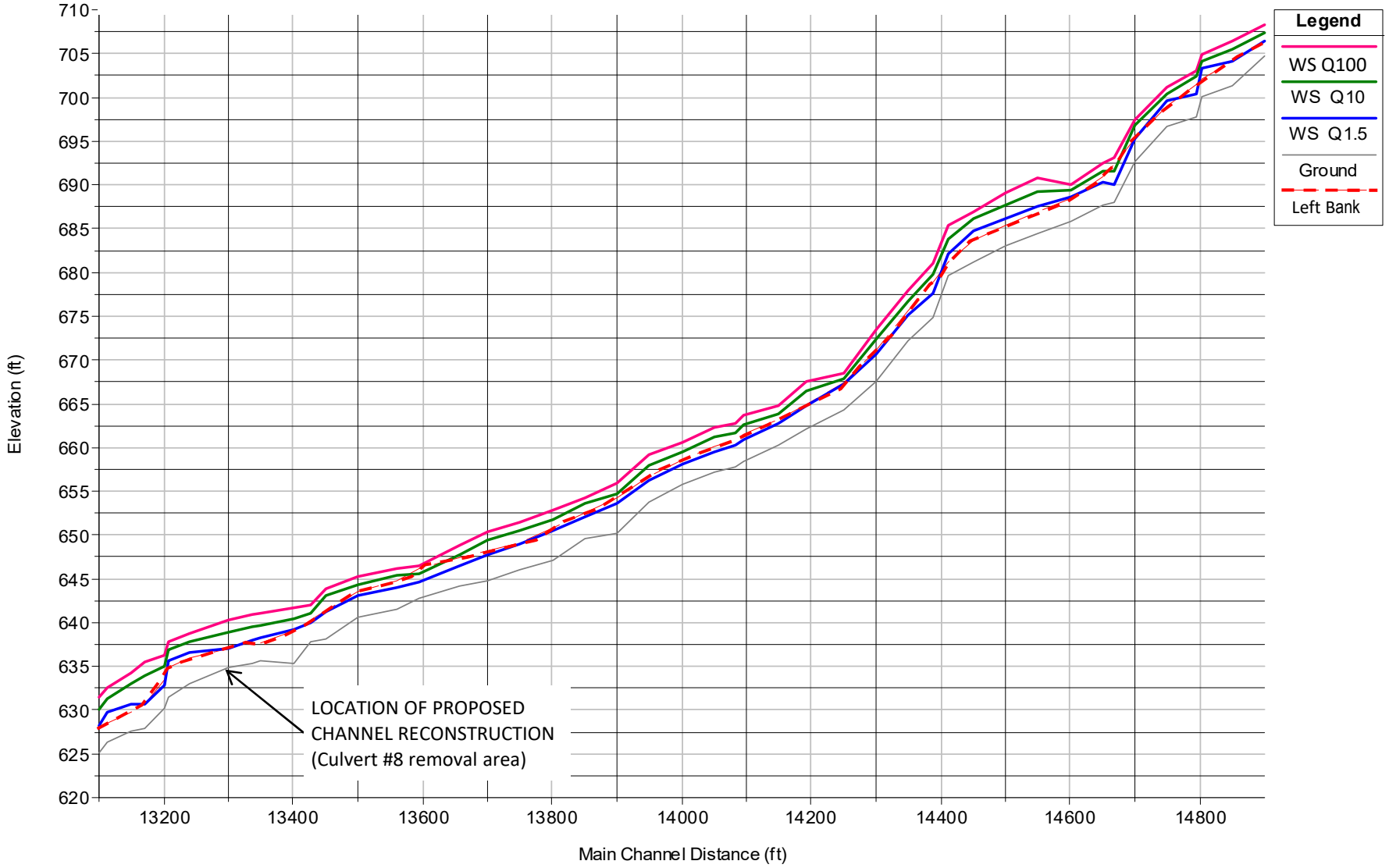
FIGURE
F6

CHANNEL WIDENING TO ROCK PILE AREAS (PROPOSED CONDITIONS)
1.5-YEAR, 10-YEAR, & 100-YEAR WATER SURFACE PROFILES

PERMANENTE CREEK

90% SUBMITTAL

WATERWAYS CONSULTING, INC.
Santa Cruz, CA | watways.com | Portland, OR



NOTES: Channel reconstruction is proposed from station 132+00 to 134+00 where Culvert #8 is removed. Left bank is floodplain design elevation.

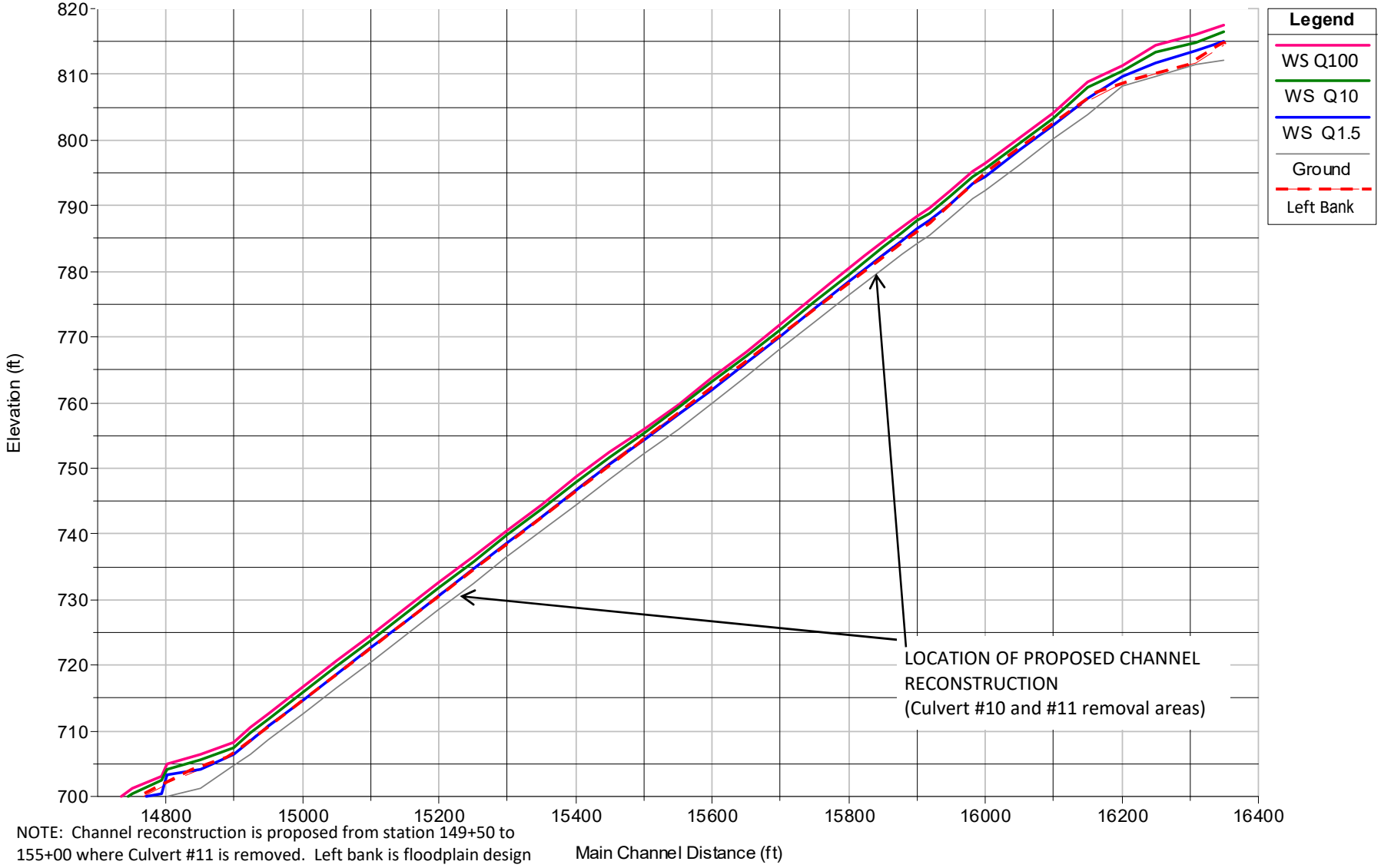
FIGURE
F7

CHANNEL WIDENING TO ROCK PILE AREAS (PROPOSED CONDITIONS)
1.5-YEAR, 10-YEAR, & 100-YEAR WATER SURFACE PROFILES

PERMANENTE CREEK

90% SUBMITTAL

WATERWAYS CONSULTING, INC.
Santa Cruz, CA | watways.com | Portland, OR



NOTE: Channel reconstruction is proposed from station 149+50 to 155+00 where Culvert #11 is removed. Left bank is floodplain design elevation.

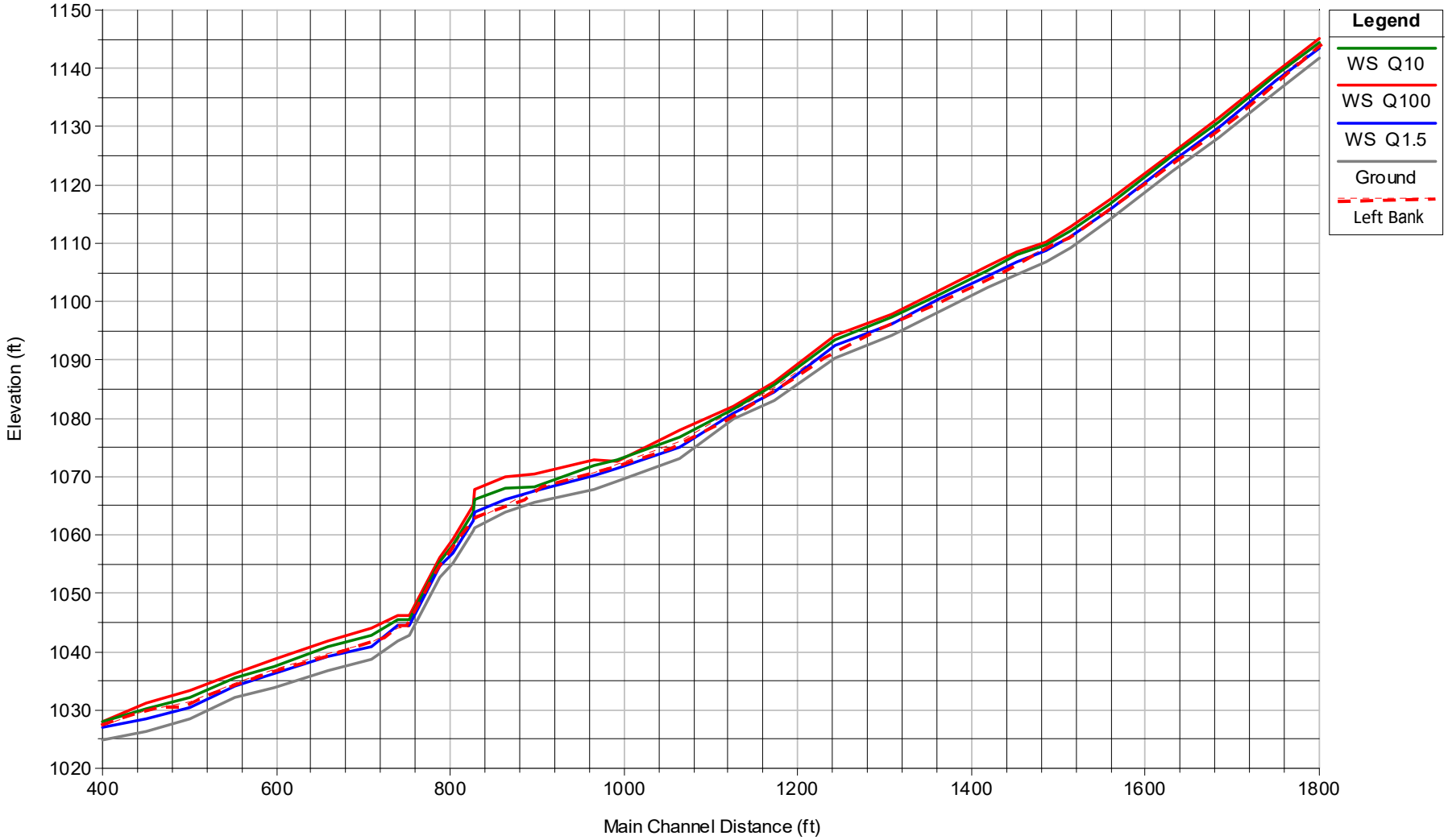
FIGURE
F8

CHANNEL WIDENING TO ROCK PILE AREAS (PROPOSED CONDITIONS)
1.5-YEAR, 10-YEAR, & 100-YEAR WATER SURFACE PROFILES

PERMANENTE CREEK

90% SUBMITTAL

WATERWAYS CONSULTING, INC.
Santa Cruz, CA | watways.com | Portland, OR



NOTE: Left bank is floodplain design elevation.

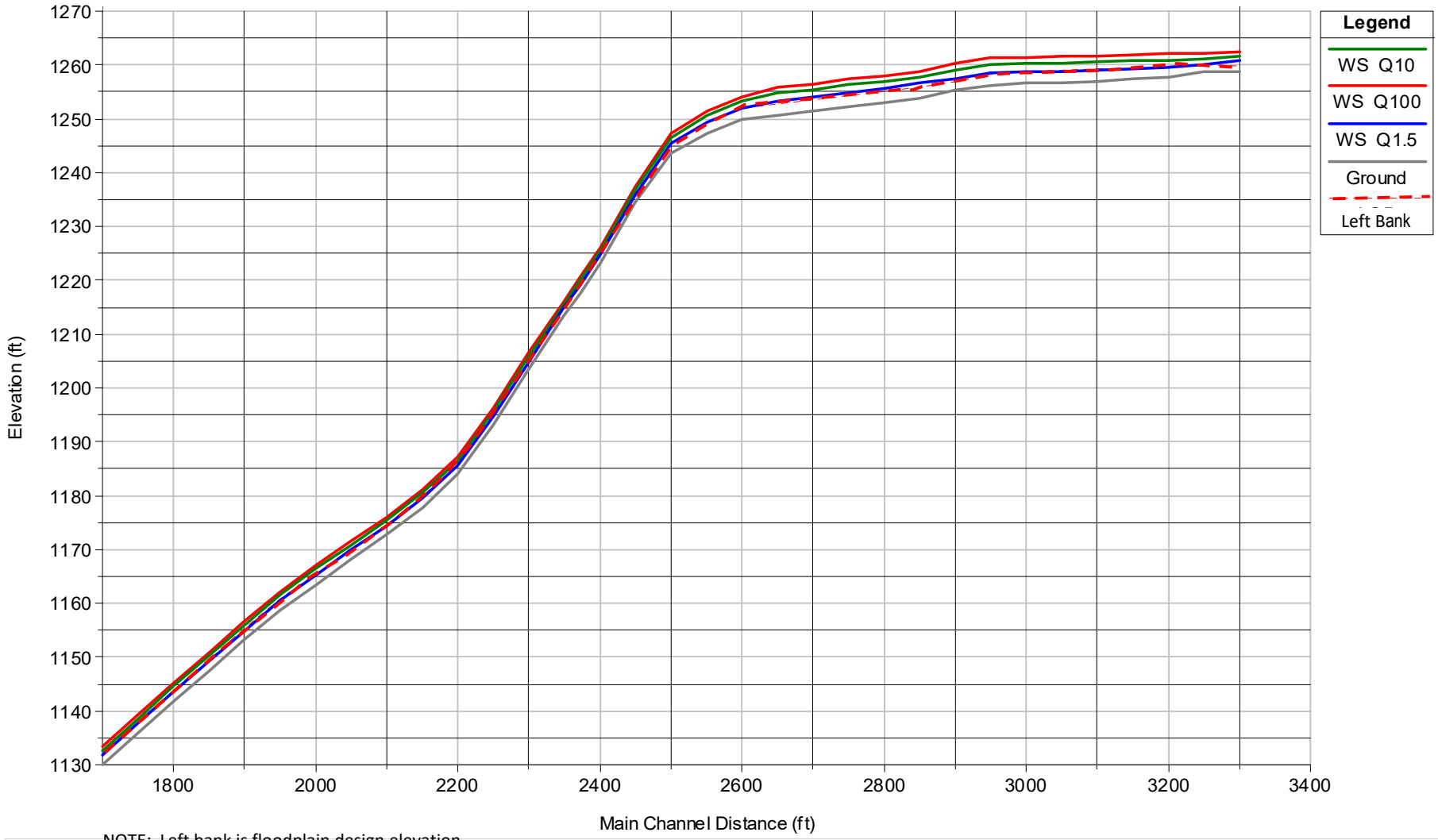
FIGURE
F9

MATERIAL REMOVAL AREA (PROPOSED CONDITIONS)
1.5-YEAR, 10-YEAR, & 100-YEAR WATER SURFACE PROFILES

PERMANENTE CREEK

90% SUBMITTAL

WATERWAYS CONSULTING, INC.
Santa Cruz, CA | watways.com | Portland, OR



NOTE: Left bank is floodplain design elevation.

FIGURE
F10

MATERIAL REMOVAL AREA (PROPOSED CONDITIONS)
1.5-YEAR, 10-YEAR, & 100-YEAR WATER SURFACE PROFILES

PERMANENTE CREEK

90% SUBMITTAL

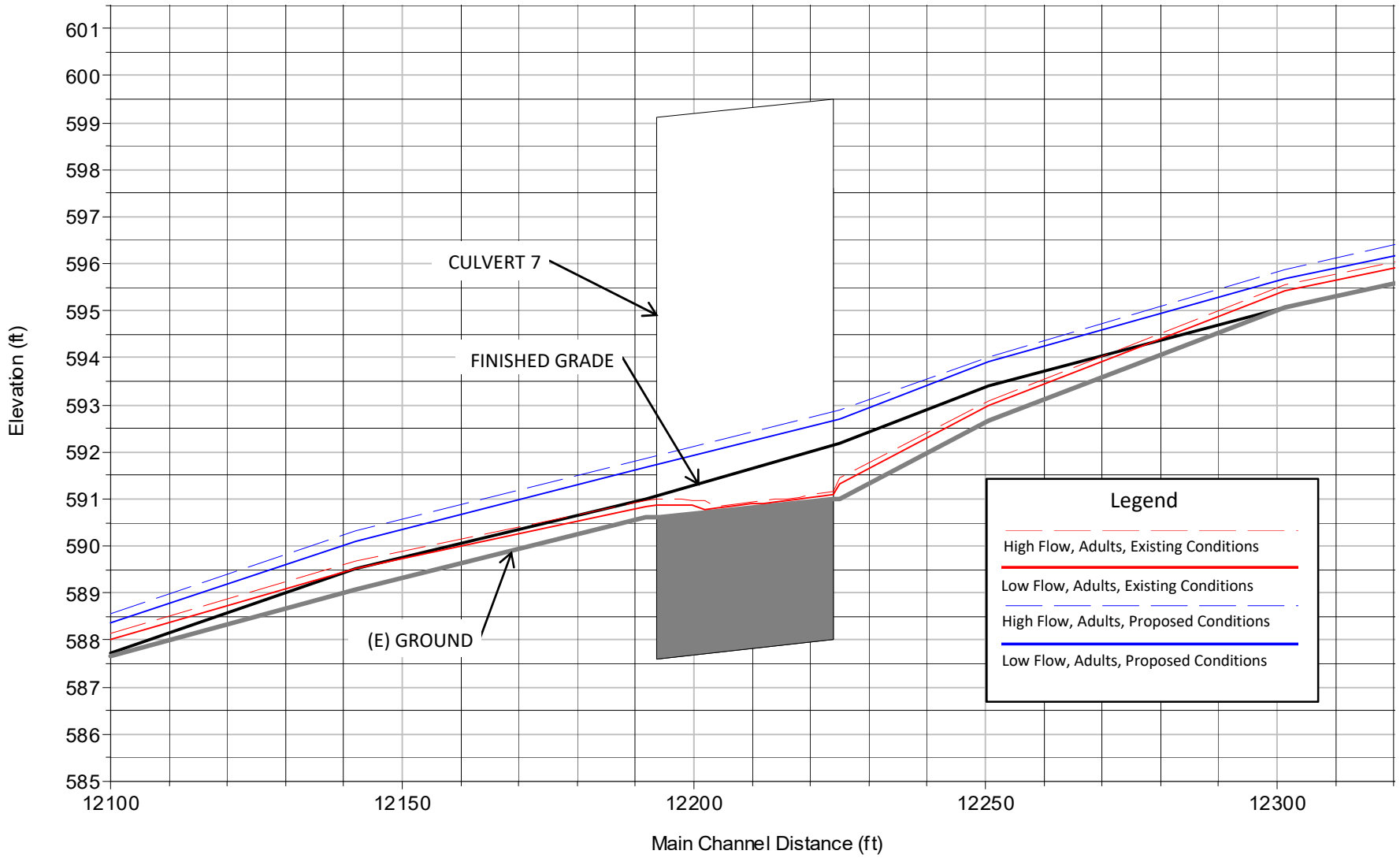
WATERWAYS CONSULTING, INC.
Santa Cruz, CA | watways.com | Portland, OR

WATERWAYS CONSULTING, INC.

HEC-RAS MODEL RESULTS

Fish Passage for Existing and Proposed Conditions

Culvert #7 and Culvert #8



FIGURE

F11

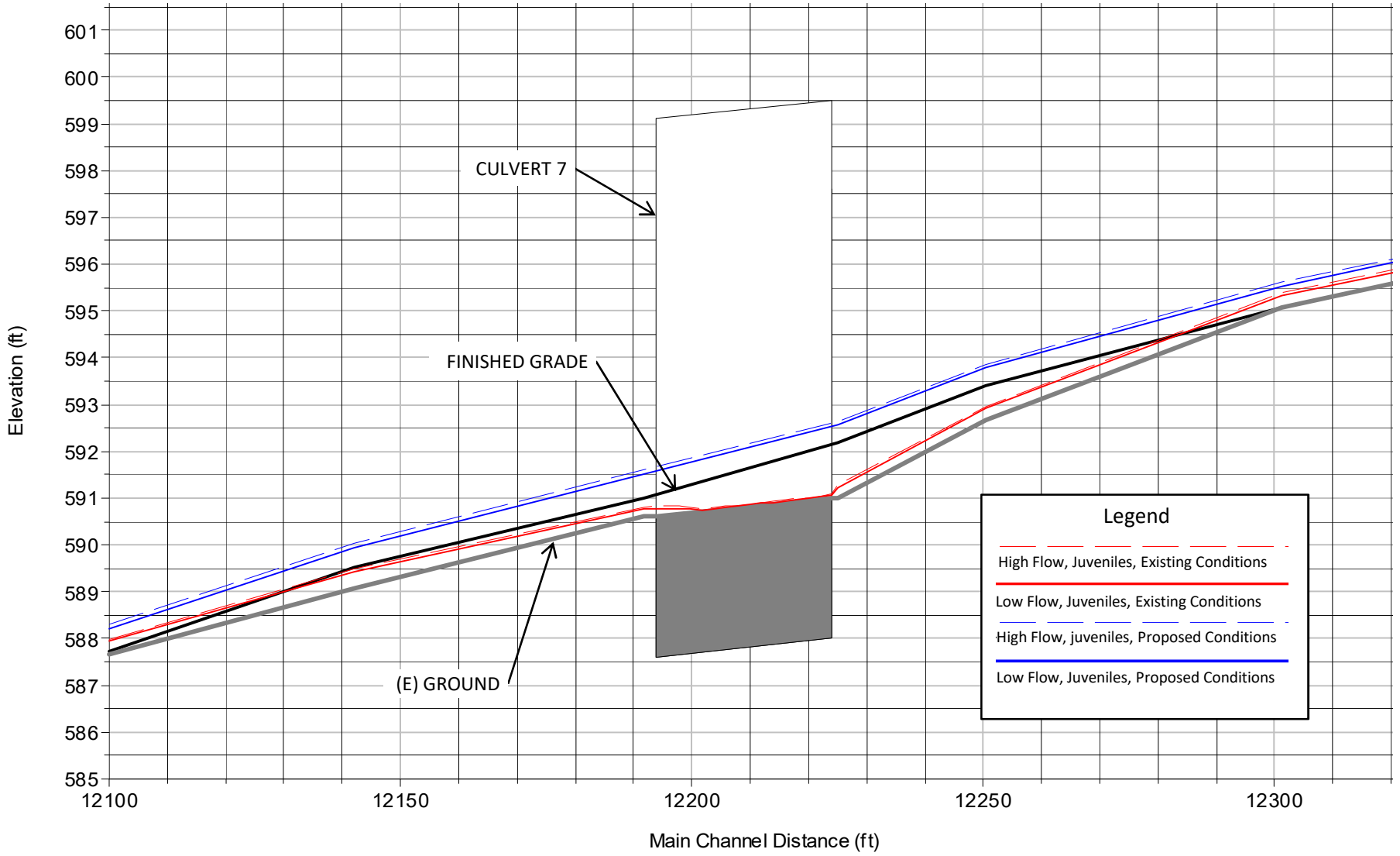
WATER SURFACE PROFILES FOR ADULT NON-ANADROMOUS SALMONID FISH PASSAGE FLOWS AT CULVERT #7, CHANNEL WIDENING AREA

PERMANENTE CREEK

90% SUBMITTAL

WATERWAYS CONSULTING, INC.

Santa Cruz, CA | watways.com | Portland, OR



FIGURE

F12

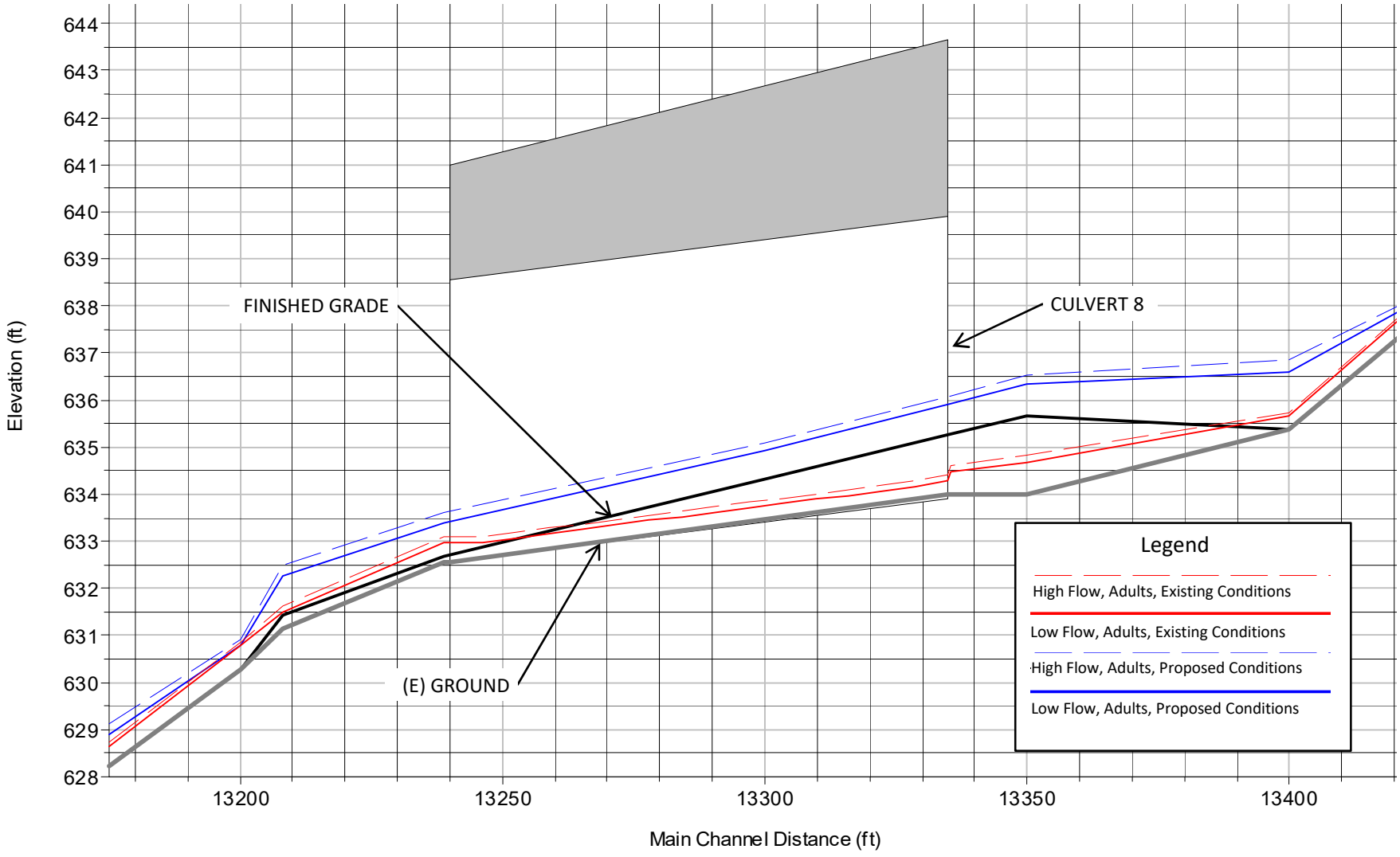
WATER SURFACE PROFILES FOR JUVENILE NON-ANADROMOUS SALMONID FISH PASSAGE FLOWS AT CULVERT #7, CHANNEL WIDENING AREA

PERMANENTE CREEK

90% SUBMITTAL

WATERWAYS CONSULTING, INC.

Santa Cruz, CA | watways.com | Portland, OR



FIGURE

F13

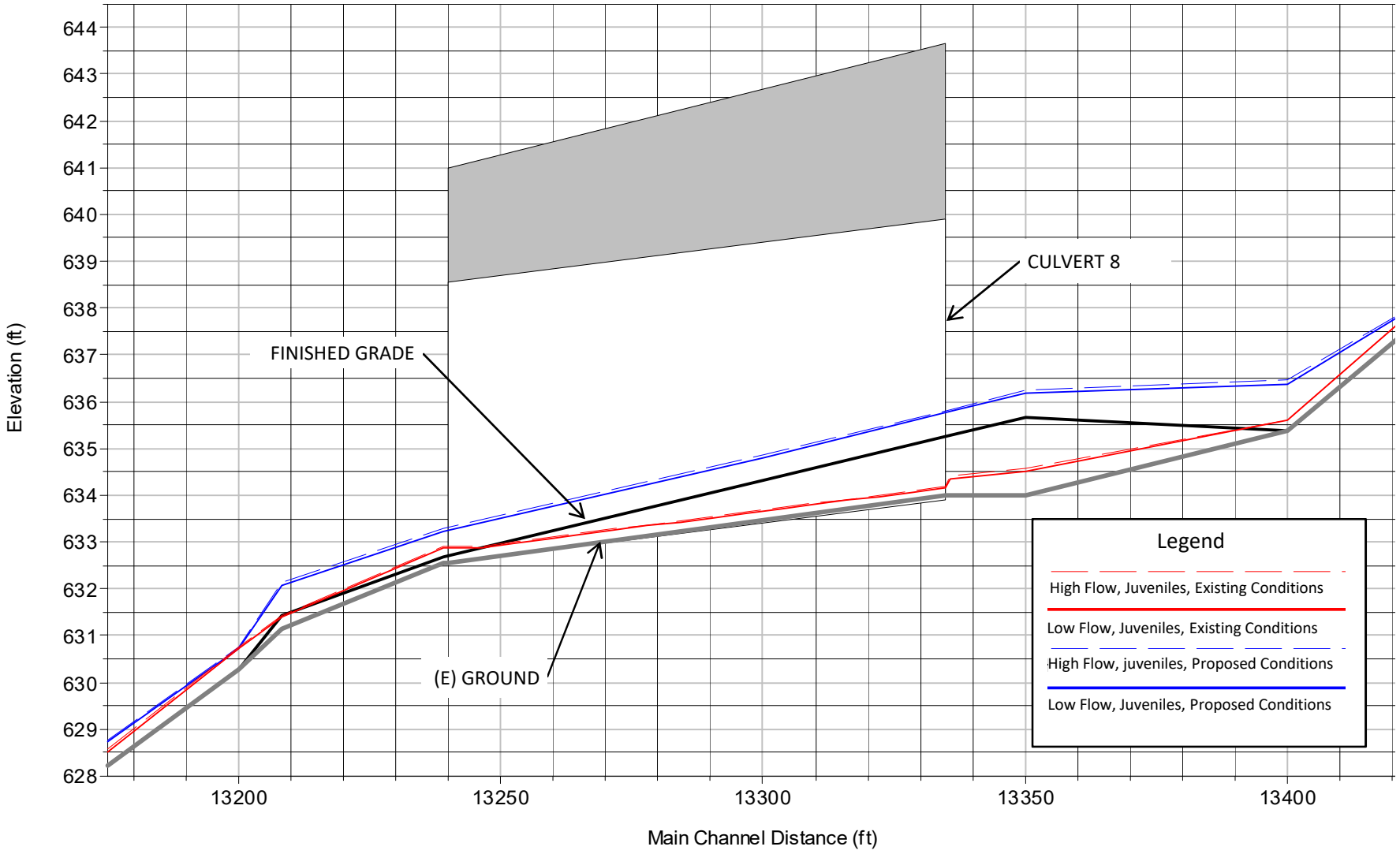
WATER SURFACE PROFILES FOR ADULT NON-ANADROMOUS SALMONID FISH PASSAGE FLOWS AT CULVERT #8, CHANNEL WIDENING AREA

PERMANENTE CREEK

90% SUBMITTAL

WATERWAYS CONSULTING, INC.

Santa Cruz, CA | watways.com | Portland, OR



FIGURE

F14

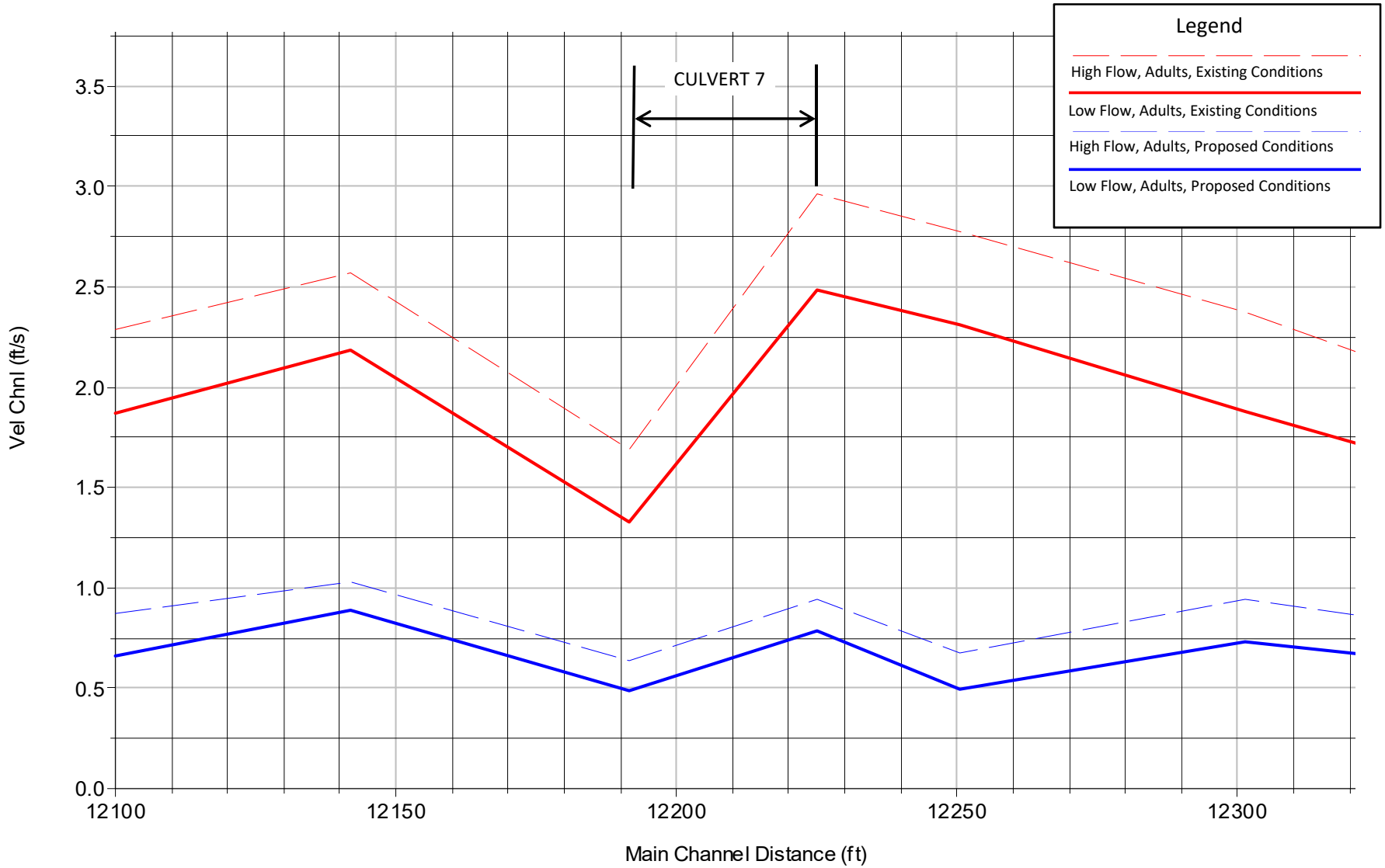
WATER SURFACE PROFILES FOR JUVENILE NON-ANADROMOUS SALMONID FISH PASSAGE FLOWS AT CULVERT #8, CHANNEL WIDENING AREA

PERMANENTE CREEK

90% SUBMITTAL

WATERWAYS CONSULTING, INC.

Santa Cruz, CA | watways.com | Portland, OR



NOTE: Channel reconstruction is proposed from station 121+50 to 122+65 where Culvert #7 is removed.

FIGURE

F15

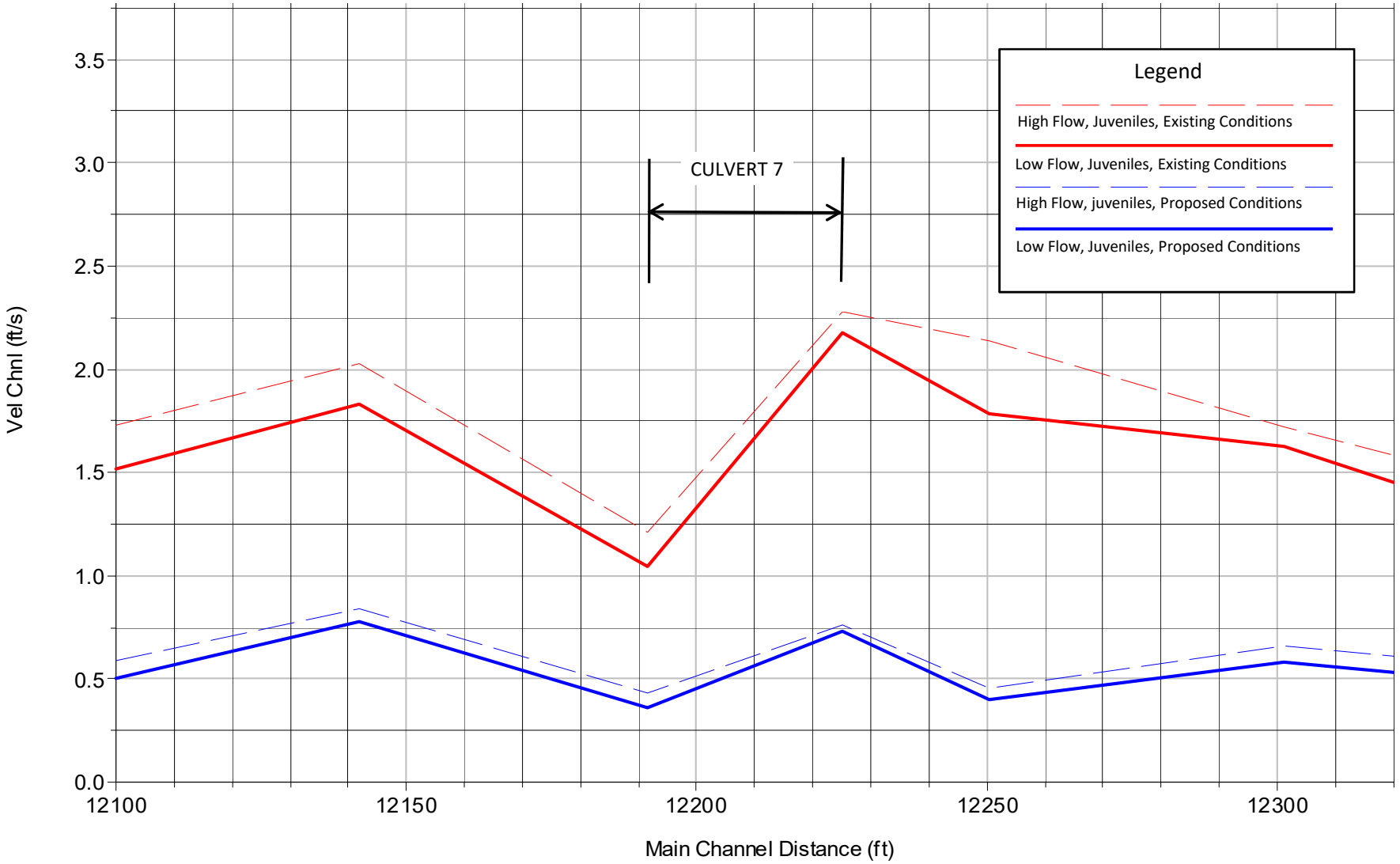
VELOCITY PROFILES FOR ADULT NON-ANADROMOUS SALMONID FISH PASSAGE FLOWS AT CULVERT #7, CHANNEL WIDENING AREA

PERMANENTE CREEK

90% SUBMITTAL

WATERWAYS CONSULTING, INC.

Santa Cruz, CA | watways.com | Portland, OR



FIGURE

F16

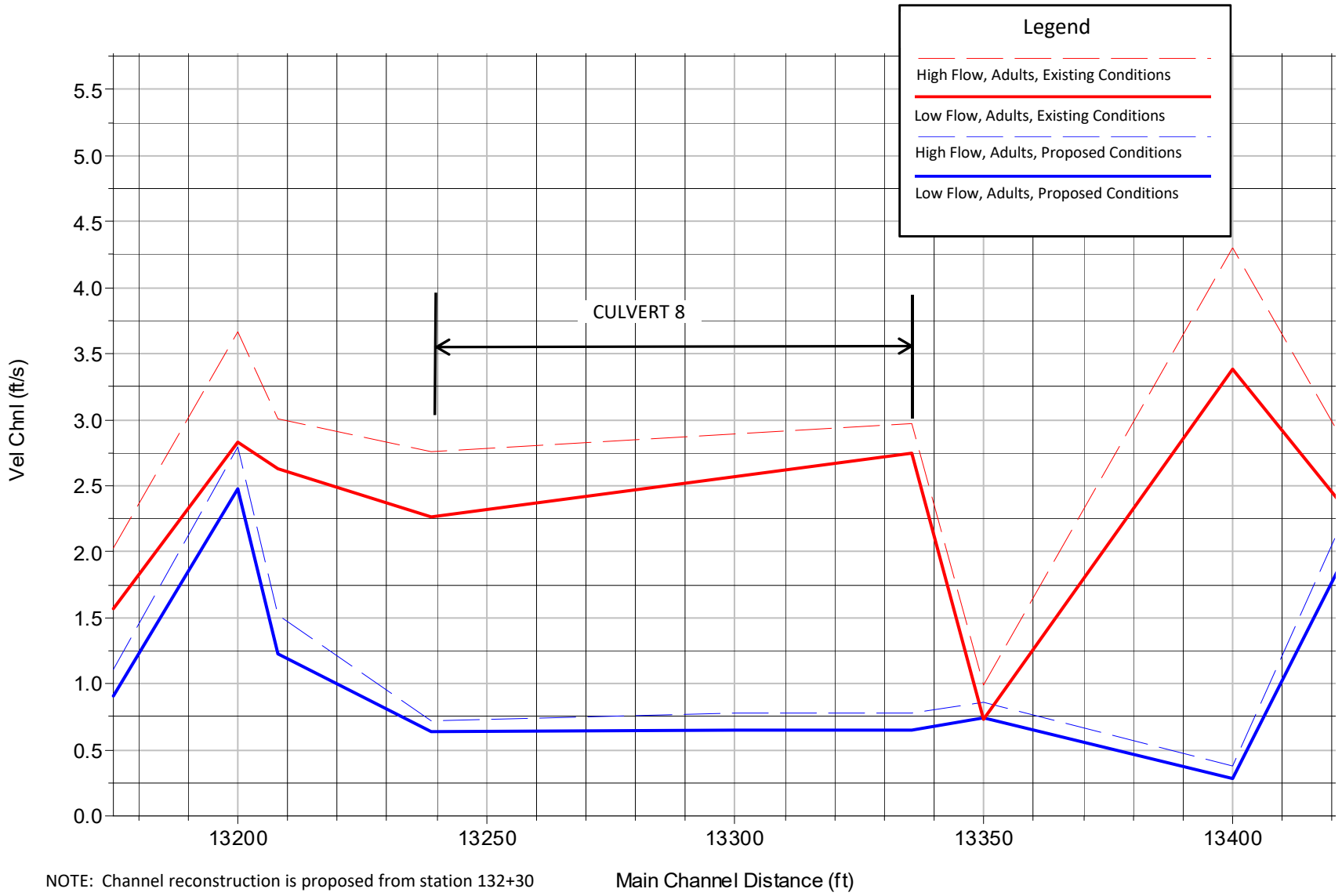
VELOCITY PROFILES FOR JUVENILE NON-ANADROMOUS SALMONID FISH PASSAGE FLOWS AT CULVERT #7, CHANNEL WIDENING AREA

PERMANENTE CREEK

90% SUBMITTAL

WATERWAYS CONSULTING, INC.

Santa Cruz, CA | watways.com | Portland, OR



NOTE: Channel reconstruction is proposed from station 132+30 to 133+90 where Culvert #8 is removed.

FIGURE

F17

VELOCITY PROFILES FOR ADULT NON-ANADROMOUS SALMONID FISH PASSAGE FLOWS AT CULVERT #8, CHANNEL WIDENING AREA

PERMANENTE CREEK

90% SUBMITTAL

WATERWAYS CONSULTING, INC.
Santa Cruz, CA | watways.com | Portland, OR

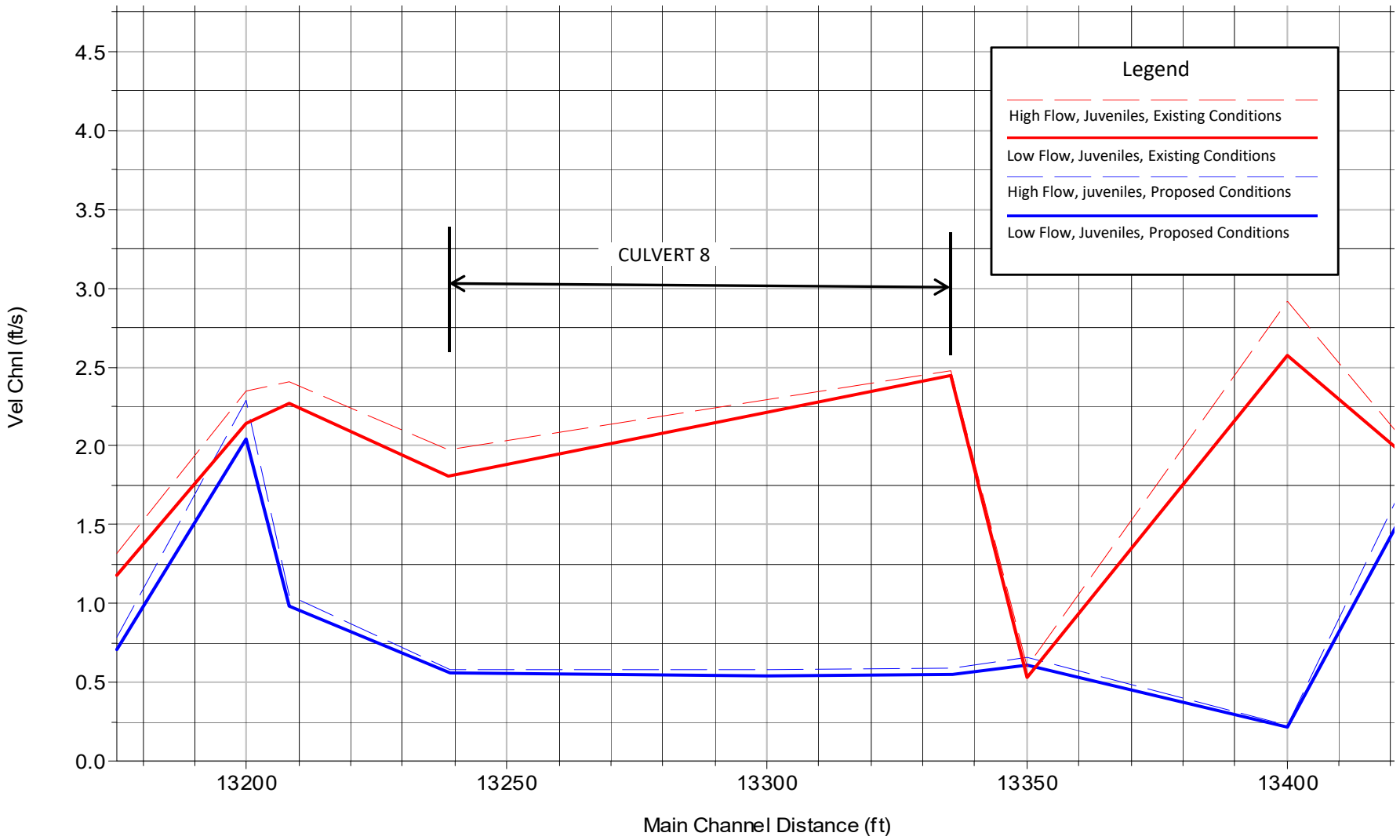


FIGURE
F18

VELOCITY PROFILES FOR JUVENILE NON-ANADROMOUS SALMONID FISH PASSAGE FLOWS AT CULVERT #8, CHANNEL WIDENING AREA

PERMANENTE CREEK

90% SUBMITTAL

WATERWAYS CONSULTING, INC.
Santa Cruz, CA | watways.com | Portland, OR

WATERWAYS CONSULTING, INC.

HEC-RAS MODEL RESULTS

Tabular Data

Channel Widening and Rock Pile Areas Material Removal Area

Evaluation of Overtopping Flow along Vehicle Barrier

TABLE T1. HEC-RAS OUTPUT FOR CHANNEL WIDENING AND ROCK PILE AREAS, EXISTING AND PROPOSED CONDITIONS
PERMANENTE CREEK RESTORATION PLAN

Culvert	RiverSta	Profile	Plan	QTotal (cfs)	MinChEl (ft)	W.S.Elev (ft)	HydrDepth (ft)	VelChnl (ft/s)	FlowArea (sqft)	TopWidth (ft)	Manning LOB --	Manning Chan --	Manning ROB --	Manning avg --
	UPSTREAM BOUNDARY CONDITION = NORMAL DEPTH, SLOPE 0.015													
	DOWNSTREAM BOUNDARY CONDITION = NORMAL DEPTH, SLOPE 0.023													
	16150	Q100	Existing	1145	806.67	810.64	3.39	5.67	207	60.9		0.05	0.10	0.05
	16150	Q100	Proposed	1145	803.98	808.86	2.58	10.82	151	58.3	0.10	0.06	0.10	0.06
	16150	Q10	Existing	653	806.67	809.22	2.08	5.43	122	58.5		0.05	0.10	0.05
	16150	Q10	Proposed	653	803.98	807.96	1.85	8.84	100	54.1	0.10	0.06	0.10	0.06
	16150	Q1.5	Existing	219	806.67	808.05	0.97	4.02	55	56.4		0.05	0.10	0.05
	16150	Q1.5	Proposed	219	803.98	806.33	1.30	6.95	33	25.2	0.10	0.06		0.05
	16100	Q100	Existing	1145	805.24	810.65	4.53	3.85	305	67.4	0.10	0.05	0.10	0.05
	16100	Q100	Proposed	1145	800.19	804.08	1.72	16.32	99	57.2	0.10	0.06	0.10	0.06
	16100	Q10	Existing	653	805.24	809.20	3.22	3.17	209	64.9	0.10	0.05	0.10	0.05
	16100	Q10	Proposed	653	800.19	803.27	1.20	14.34	55	46.2	0.10	0.06	0.10	0.05
	16100	Q1.5	Existing	219	805.24	806.55	0.74	4.98	44	59.4		0.05	0.10	0.05
	16100	Q1.5	Proposed	219	800.19	802.14	1.29	9.84	22	17.3		0.06		0.06
	16050	Q100	Existing	1145	804.14	810.62	5.31	3.27	374	70.5	0.10	0.05	0.10	0.05
	16050	Q100	Proposed	1145	796.29	800.40	2.15	14.6	106	49.4	0.09	0.06	0.10	0.06
	16050	Q10	Existing	653	804.14	809.17	4.11	2.49	275	66.9	0.10	0.05	0.10	0.05
	16050	Q10	Proposed	653	796.29	799.66	1.50	11.96	70	47.1	0.10	0.06	0.10	0.05
	16050	Q1.5	Existing	219	804.14	805.94	1.26	3.01	73	58.1		0.05	0.10	0.05
	16050	Q1.5	Proposed	219	796.29	798.58	1.28	7.69	29	22.3	0.10	0.06	0.10	0.05
	16000	Q100	Existing	1145	802.84	810.61	5.98	2.74	450	75.3	0.10	0.05	0.10	0.05
	16000	Q100	Proposed	1145	792.29	796.45	2.38	14.94	97	41.0	0.09	0.06	0.10	0.06
	16000	Q10	Existing	653	802.84	809.16	4.79	2.01	344	71.7	0.10	0.05	0.10	0.05
	16000	Q10	Proposed	653	792.29	795.55	1.65	12.77	62	37.7	0.10	0.06	0.10	0.06
	16000	Q1.5	Existing	219	802.84	805.85	1.91	1.84	121	63.0		0.05	0.10	0.05
	16000	Q1.5	Proposed	219	792.29	794.29	1.32	9.45	23	17.5		0.06		0.06

TABLE T1. HEC-RAS OUTPUT FOR CHANNEL WIDENING AND ROCK PILE AREAS, EXISTING AND PROPOSED CONDITIONS
PERMANENTE CREEK RESTORATION PLAN

Culvert	RiverSta	Profile	Plan	QTotal (cfs)	MinChEl (ft)	W.S.Elev (ft)	HydrDepth (ft)	VelChnl (ft/s)	FlowArea (sqft)	TopWidth (ft)	Manning LOB --	Manning Chan --	Manning ROB --	Manning avg --
	15982.36	Q100	Existing	1145	801.83	810.60	5.48	2.68	498	90.9	0.10	0.05	0.10	0.05
	15982.36	Q100	Proposed	1145	791.02	795.19	2.38	14.83	100	42.3	0.10	0.06	0.10	0.06
	15982.36	Q10	Existing	653	801.83	809.15	4.93	1.94	378	76.7	0.10	0.05	0.10	0.05
	15982.36	Q10	Proposed	653	791.02	794.35	1.70	12.23	66	38.9	0.10	0.06	0.10	0.06
	15982.36	Q1.5	Existing	219	801.83	805.83	2.06	1.69	139	67.3	0.10	0.05	0.10	0.05
	15982.36	Q1.5	Proposed	219	791.02	793.32	1.12	7.62	29	26.4		0.06	0.10	0.05
	15950	Q100	Existing	1145	793.81	810.62	7.88	2.88	855	108.6	0.10	0.05	0.10	0.08
	15950	Q100	Proposed	1145	788.29	792.29	2.24	15.54	93	41.7	0.08	0.06	0.10	0.06
	15950	Q10	Existing	653	793.81	809.16	6.87	1.97	699	101.8	0.10	0.05	0.10	0.08
	15950	Q10	Proposed	653	788.29	791.50	1.59	12.89	61	38.6	0.09	0.06	0.10	0.06
	15950	Q1.5	Existing	219	793.81	805.85	4.67	1.1	398	85.3	0.10	0.05	0.10	0.08
	15950	Q1.5	Proposed	219	788.29	790.24	1.30	9.63	23	17.6		0.06		0.06
	15917.67	Q100	Existing	1145	791.85	810.64	9.23	1.04	1153	124.9	0.10	0.05	0.10	0.05
	15917.67	Q100	Proposed	1145	785.57	789.55	2.15	15.52	95	44.2	0.08	0.06	0.10	0.06
	15917.67	Q10	Existing	653	791.85	809.17	7.96	0.69	972	122.1	0.10	0.05	0.10	0.05
	15917.67	Q10	Proposed	653	785.57	788.79	1.54	12.81	63	40.7	0.09	0.06	0.10	0.05
	15917.67	Q1.5	Existing	219	791.85	805.85	5.66	0.37	600	106.1	0.10	0.05		0.05
	15917.67	Q1.5	Proposed	219	785.57	787.78	1.29	8.1	27	21.1	0.10	0.06		0.06
	15900	Q100	Existing	1145	791.72	810.64	9.20	1.01	1184	128.7	0.10	0.05	0.10	0.05
	15900	Q100	Proposed	1145	784.31	788.49	2.31	14.49	103	44.6	0.09	0.06	0.10	0.06
	15900	Q10	Existing	653	791.72	809.17	8.23	0.67	1000	121.6	0.10	0.05	0.10	0.05
	15900	Q10	Proposed	653	784.31	787.69	1.65	11.96	68	41.5	0.09	0.06	0.10	0.06
	15900	Q1.5	Existing	219	791.72	805.85	5.72	0.36	623	109.0	0.10	0.05		0.05
	15900	Q1.5	Proposed	219	784.31	786.49	1.38	8.31	26	19.0		0.06	0.10	0.06
Culvert #11	15878.42	Q100	Existing	1145	798.16	810.56	5.09	2.74	659	129.6	0.10	0.05	0.10	0.06
	15878.42	Q100	Proposed	1145	782.58	786.73	2.29	14.91	102	44.4	0.10	0.06	0.10	0.06
	15878.42	Q10	Existing	653	798.16	809.13	4.11	2.01	477	116.1	0.10	0.05	0.10	0.05
	15878.42	Q10	Proposed	653	782.58	785.88	1.58	12.54	65	41.3	0.10	0.06	0.10	0.06
	15878.42	Q1.5	Existing	219	798.16	805.82	2.92	1.41	189	64.9	0.10	0.05		0.05
	15878.42	Q1.5	Proposed	219	782.58	784.70	1.39	8.69	25	18.1		0.06		0.06

TABLE T1. HEC-RAS OUTPUT FOR CHANNEL WIDENING AND ROCK PILE AREAS, EXISTING AND PROPOSED CONDITIONS
PERMANENTE CREEK RESTORATION PLAN

Culvert	RiverSta	Profile	Plan	QTotal (cfs)	MinChEl (ft)	W.S.Elev (ft)	HydrDepth (ft)	VelChnl (ft/s)	FlowArea (sqft)	TopWidth (ft)	Manning LOB --	Manning Chan --	Manning ROB --	Manning avg --
Culvert #11 (Half culvert in Existing Conditions modeled as open channel)	15850	Q100	Existing	1145	799.75	809.03	3.03	10.84	130	42.8	0.03	0.02	0.03	0.03
	15850	Q100	Proposed	1145	780.31	784.40	2.25	15.19	99	44.0	0.10	0.06	0.10	0.06
	15850	Q10	Existing	653	799.75	807.91	2.33	9.24	85	36.7	0.03	0.02	0.03	0.02
	15850	Q10	Proposed	653	780.31	783.59	1.57	12.63	64	41.1	0.10	0.06	0.10	0.06
	15850	Q1.5	Existing	219	799.75	804.06	3.22	10.15	22	6.7		0.02		0.02
	15850	Q1.5	Proposed	219	780.31	782.46	1.42	8.47	26	18.3		0.06		0.06
	15800	Q100	Existing	1145	800.05	808.60	3.25	11.13	131	40.3	0.03	0.02	0.03	0.02
	15800	Q100	Proposed	1145	776.33	780.46	2.30	15.15	99	43.1	0.10	0.06	0.10	0.06
	15800	Q10	Existing	653	800.05	806.81	1.97	10.91	65	32.9	0.03	0.02	0.03	0.02
	15800	Q10	Proposed	653	776.33	779.62	1.59	12.6	64	40.2	0.10	0.06	0.10	0.06
	15800	Q1.5	Existing	219	800.05	803.31	2.26	10.38	21	9.3		0.02		0.02
	15800	Q1.5	Proposed	219	776.33	778.46	1.40	8.61	25	18.2		0.06		0.06
	15750	Q100	Existing	1145	798.71	805.99	2.45	15.87	85	34.8	0.03	0.02	0.03	0.02
	15750	Q100	Proposed	1145	772.22	776.27	2.24	15.47	95	42.4	0.09	0.06	0.10	0.06
	15750	Q10	Existing	653	798.71	803.77	3.69	16.2	40	10.9		0.02		0.02
	15750	Q10	Proposed	653	772.22	775.47	1.58	12.83	62	39.3	0.10	0.06	0.10	0.05
	15750	Q1.5	Existing	219	798.71	801.47	1.90	12.73	17	9.1		0.02		0.02
	15750	Q1.5	Proposed	219	772.22	774.32	1.30	8.71	25	19.4	0.10	0.06		0.06
	15700	Q100	Existing	1145	797.35	803.97	2.21	17.92	73	32.9	0.03	0.02	0.03	0.02
	15700	Q100	Proposed	1145	768.08	771.95	1.82	15.16	95	51.9	0.10	0.06	0.10	0.05
	15700	Q10	Existing	653	797.35	801.84	3.53	17.53	37	10.6		0.02		0.02
	15700	Q10	Proposed	653	768.08	771.12	1.52	12.57	57	37.6	0.10	0.06	0.10	0.05
	15700	Q1.5	Existing	219	797.35	799.64	1.82	13.72	16	8.8		0.02		0.02
	15700	Q1.5	Proposed	219	768.08	769.97	1.25	8.59	25	20.4		0.06		0.06
	15650	Q100	Existing	1145	795.45	801.87	2.52	19.34	61	24.0	0.03	0.02	0.03	0.02
	15650	Q100	Proposed	1145	764.00	767.80	1.51	15.2	110	72.7	0.10	0.06	0.10	0.06
	15650	Q10	Existing	653	795.45	799.74	3.37	18.65	35	10.4		0.02		0.02
	15650	Q10	Proposed	653	764.00	767.15	1.28	12.21	69	53.9	0.10	0.06	0.10	0.05
	15650	Q1.5	Existing	219	795.45	797.67	1.74	14.39	15	8.8		0.02		0.02
	15650	Q1.5	Proposed	219	764.00	766.11	0.96	8.1	28	29.2	0.10	0.06		0.05

TABLE T1. HEC-RAS OUTPUT FOR CHANNEL WIDENING AND ROCK PILE AREAS, EXISTING AND PROPOSED CONDITIONS
PERMANENTE CREEK RESTORATION PLAN

Culvert	RiverSta	Profile	Plan	QTotal (cfs)	MinChEl (ft)	W.S.Elev (ft)	HydrDepth (ft)	VelChnl (ft/s)	FlowArea (sqft)	TopWidth (ft)	Manning LOB --	Manning Chan --	Manning ROB --	Manning avg --
Culvert #11	15600	Q100	Existing	1145	793.89	800.00	4.80	20.24	57	11.8		0.02		0.02
	15600	Q100	Proposed	1145	759.91	763.88	1.44	14.58	125	87.1	0.10	0.06	0.10	0.06
	15600	Q10	Existing	653	793.89	797.99	3.39	18.89	35	10.2		0.02		0.02
	15600	Q10	Proposed	653	759.91	763.17	1.14	12.33	72	63.2	0.10	0.06	0.10	0.05
	15600	Q1.5	Existing	219	793.89	795.98	1.77	14.13	15	8.8		0.02		0.02
	15600	Q1.5	Proposed	219	759.91	761.96	1.36	8.89	25	18.2		0.06		0.06
	15550	Q100	Existing	1145	788.69	794.69	4.59	24.88	46	10.0		0.02		0.02
	15550	Q100	Proposed	1145	756.06	759.77	1.42	14.84	127	89.5	0.10	0.06	0.10	0.06
	15550	Q10	Existing	653	788.69	792.75	3.26	23.27	28	8.6		0.02		0.02
	15550	Q10	Proposed	653	756.06	759.22	0.93	12.4	78	84.5	0.10	0.06	0.10	0.05
	15550	Q1.5	Existing	219	788.69	790.72	1.48	19.03	12	7.8		0.02		0.02
	15550	Q1.5	Proposed	219	756.06	758.23	1.15	8.11	27	23.8		0.06	0.10	0.05
CULVERT #10	15500	Q100	Existing	1145	781.80	787.68	4.37	27.6	41	9.5		0.05		0.05
	15500	Q100	Proposed	1145	752.25	755.99	1.62	13.69	128	79.0	0.10	0.06	0.10	0.06
	15500	Q10	Existing	653	781.80	792.44	6.09	6.77	97	15.9	0.03	0.05		0.05
	15500	Q10	Proposed	653	752.25	755.28	1.14	11.98	76	66.9	0.10	0.06	0.10	0.05
	15500	Q1.5	Existing	219	781.80	784.21	1.55	18.67	12	7.6		0.05		0.05
	15500	Q1.5	Proposed	219	752.25	754.24	1.19	8.65	25	21.3		0.06	0.10	0.06
	15450	Q100	Proposed	1145	748.42	752.41	1.80	13.6	123	68.1	0.10	0.06	0.10	0.06
	15450	Q10	Proposed	653	748.42	751.62	1.40	11.51	75	53.5	0.10	0.06	0.10	0.06
	15450	Q1.5	Proposed	219	748.42	750.55	0.94	7.99	28	29.9		0.06	0.10	0.05
	15400	Q100	Proposed	1145	744.50	748.75	1.78	14.22	118	66.2	0.10	0.06	0.10	0.06
	15400	Q10	Proposed	653	744.50	747.91	1.43	12	70	48.5	0.10	0.06	0.10	0.05
	15400	Q1.5	Proposed	219	744.50	746.62	1.34	8.71	25	18.8		0.06	0.10	0.06
	15350	Q100	Proposed	1145	740.46	744.48	1.69	15.39	108	64.1	0.10	0.06	0.10	0.06
	15350	Q10	Proposed	653	740.46	743.71	1.33	12.91	64	48.4	0.10	0.06	0.10	0.05
	15350	Q1.5	Proposed	219	740.46	742.60	1.41	8.54	26	18.2		0.06		0.06

TABLE T1. HEC-RAS OUTPUT FOR CHANNEL WIDENING AND ROCK PILE AREAS, EXISTING AND PROPOSED CONDITIONS
PERMANENTE CREEK RESTORATION PLAN

Culvert	RiverSta	Profile	Plan	QTotal (cfs)	MinChEl (ft)	W.S.Elev (ft)	HydrDepth (ft)	VelChnl (ft/s)	FlowArea (sqft)	TopWidth (ft)	Manning LOB --	Manning Chan --	Manning ROB --	Manning avg --
CULVERT #10	15300	Q100	Proposed	1145	736.48	740.50	1.96	15.08	108	54.8	0.10	0.06	0.10	0.06
	15300	Q10	Proposed	653	736.48	739.77	1.31	12.53	68	52.2	0.10	0.06	0.10	0.05
	15300	Q1.5	Proposed	219	736.48	738.62	1.41	8.57	26	18.2		0.06		0.06
	15250	Q100	Proposed	1145	732.49	736.55	2.14	14.97	104	48.5	0.10	0.06	0.10	0.06
	15250	Q10	Proposed	653	732.49	735.74	1.45	12.66	66	45.5	0.10	0.06	0.10	0.05
	15250	Q1.5	Proposed	219	732.49	734.62	1.41	8.57	26	18.2		0.06		0.06
	15200			Culvert										
	15200	Q100	Proposed	1145	728.50	732.66	2.33	14.96	101	43.6	0.10	0.06	0.10	0.06
	15200	Q10	Proposed	653	728.50	731.78	1.61	12.55	65	40.3	0.10	0.06	0.10	0.06
	15200	Q1.5	Proposed	219	728.50	730.63	1.41	8.58	26	18.1		0.06		0.06
	15150	Q100	Proposed	1145	724.50	728.61	2.25	15.31	99	43.8	0.10	0.06	0.10	0.06
	15150	Q10	Proposed	653	724.50	727.79	1.58	12.64	64	40.5	0.10	0.06	0.10	0.05
	15150	Q1.5	Proposed	219	724.50	726.63	1.40	8.57	26	18.2		0.06		0.06
	15100	Q100	Proposed	1145	720.52	724.63	2.21	15.28	99	45.0	0.10	0.06	0.10	0.06
	15100	Q10	Proposed	653	720.52	723.81	1.54	12.66	64	41.4	0.10	0.06	0.10	0.05
	15100	Q1.5	Proposed	219	720.52	722.65	1.40	8.54	26	18.3		0.06		0.06
	15050	Q100	Proposed	1145	716.54	720.61	2.16	15.3	100	46.1	0.10	0.06	0.10	0.06
	15050	Q10	Proposed	653	716.54	719.79	1.52	12.66	64	42.1	0.10	0.06	0.10	0.05
	15050	Q1.5	Proposed	219	716.54	718.65	1.40	8.57	26	18.3		0.06		0.06
	15000	Q100	Proposed	1145	712.56	716.64	2.09	15.21	103	49.3	0.10	0.06	0.10	0.06
	15000	Q10	Proposed	653	712.56	715.86	1.45	12.56	66	45.6	0.10	0.06	0.10	0.05
	15000	Q1.5	Proposed	219	712.56	714.71	1.41	8.49	26	18.3		0.06		0.06
	14950	Q100	Proposed	1145	708.59	712.63	1.98	15.17	104	52.6	0.10	0.06	0.10	0.06
	14950	Q10	Proposed	653	708.59	711.83	1.42	12.67	64	45.3	0.10	0.06	0.10	0.05
	14950	Q1.5	Proposed	219	708.59	710.69	1.38	8.6	25	18.4		0.06		0.06

TABLE T1. HEC-RAS OUTPUT FOR CHANNEL WIDENING AND ROCK PILE AREAS, EXISTING AND PROPOSED CONDITIONS
PERMANENTE CREEK RESTORATION PLAN

Culvert	RiverSta	Profile	Plan	QTotal (cfs)	MinChEl (ft)	W.S.Elev (ft)	HydrDepth (ft)	VelChnl (ft/s)	FlowArea (sqft)	TopWidth (ft)	Manning LOB --	Manning Chan --	Manning ROB --	Manning avg --
CULVERT #10	14923.42	Q100	Existing	1145	705.88	713.26	4.60	13.7	101	22.0	0.10	0.05	0.10	0.05
	14923.42	Q100	Proposed	1145	706.35	710.53	1.96	15.07	103	52.9	0.10	0.06	0.10	0.06
	14923.42	Q10	Existing	653	705.88	711.27	3.52	11.64	62	17.6	0.10	0.05	0.10	0.05
	14923.42	Q10	Proposed	653	706.35	709.66	1.52	12.65	62	40.9	0.10	0.06	0.10	0.05
	14923.42	Q1.5	Existing	219	705.88	708.25	1.72	11.59	19	11.0		0.05	0.00	0.05
	14923.42	Q1.5	Proposed	219	706.35	708.43	1.35	8.73	25	18.5		0.06	0.00	0.06
	14900	Q100	Existing	1145	704.46	710.45	3.64	16.92	77	21.1	0.10	0.07	0.10	0.06
	14900	Q100	Proposed	1145	704.78	708.26	2.01	15.55	95	47.1	0.10	0.06	0.10	0.06
	14900	Q10	Existing	653	704.46	709.03	2.85	14.05	49	17.4	0.10	0.07	0.10	0.06
	14900	Q10	Proposed	653	704.78	707.44	1.51	13	59	39.3	0.10	0.06	0.10	0.06
	14900	Q1.5	Existing	219	704.46	707.60	2.01	8.14	27	13.6		0.07	0.10	0.06
	14900	Q1.5	Proposed	219	704.78	706.43	1.22	8.37	27	21.8		0.06	0.10	0.06
	14850	Q100	Existing	1145	701.28	710.33	5.82	7.78	177	30.4	0.10	0.05	0.10	0.05
	14850	Q100	Proposed	1145	701.28	706.42	2.30	13.35	137	59.4	0.10	0.05	0.10	0.05
	14850	Q10	Existing	653	701.28	707.97	4.48	6.47	112	25.0	0.10	0.05	0.10	0.05
	14850	Q10	Proposed	653	701.28	705.50	1.62	10.94	85	52.7	0.10	0.05	0.10	0.05
	14850	Q1.5	Existing	219	701.28	704.90	2.59	4.76	46	17.9	0.10	0.05		0.05
	14850	Q1.5	Proposed	219	701.28	704.19	2.09	6.63	33	15.8	0.10	0.05		0.05
	14802.52	Q100	Existing	1145	700.05	708.01	4.54	14.32	121	26.7	0.10	0.05	0.10	0.05
	14802.52	Q100	Proposed	1145	700.05	704.87	2.24	14.51	156	69.9	0.10	0.05	0.10	0.07
	14802.52	Q10	Existing	653	700.05	705.97	3.48	12.2	73	20.9	0.10	0.05	0.10	0.05
	14802.52	Q10	Proposed	653	700.05	704.19	1.67	11.55	110	65.9	0.10	0.05	0.10	0.06
	14802.52	Q1.5	Existing	219	700.05	703.35	2.07	8.91	28	13.4	0.10	0.05	0.10	0.05
	14802.52	Q1.5	Proposed	219	700.05	703.33	0.92	6.9	55	60.0	0.10	0.05	0.10	0.05
	14794.09	Q100	Existing	1145	697.70	704.67	4.03	20.6	85	21.1	0.10	0.05	0.10	0.05
	14794.09	Q100	Proposed	1145	697.70	703.03	1.62	17.18	127	78.5	0.10	0.05	0.10	0.06
	14794.09	Q10	Existing	653	697.70	702.64	2.94	18.66	47	16.1	0.10	0.05	0.10	0.05
	14794.09	Q10	Proposed	653	697.70	702.39	1.10	14.36	80	72.6	0.10	0.05	0.10	0.05
	14794.09	Q1.5	Existing	219	697.70	700.24	1.54	15.49	16	10.2	0.10	0.05	0.10	0.05
	14794.09	Q1.5	Proposed	219	697.70	700.47	1.72	13.69	16	9.3		0.05		0.05

TABLE T1. HEC-RAS OUTPUT FOR CHANNEL WIDENING AND ROCK PILE AREAS, EXISTING AND PROPOSED CONDITIONS
PERMANENTE CREEK RESTORATION PLAN

Culvert	RiverSta	Profile	Plan	QTotal (cfs)	MinChEl (ft)	W.S.Elev (ft)	HydrDepth (ft)	VelChnl (ft/s)	FlowArea (sqft)	TopWidth (ft)	Manning LOB --	Manning Chan --	Manning ROB --	Manning avg --
	14750	Q100	Existing	1145	696.69	702.06	3.62	19.66	68	18.7	0.10	0.05	0.10	0.04
	14750	Q100	Proposed	1145	696.69	701.15	1.83	14.8	152	82.9	0.10	0.05	0.10	0.06
	14750	Q10	Existing	653	696.69	700.81	2.82	15.62	46	16.2	0.10	0.05	0.10	0.04
	14750	Q10	Proposed	653	696.69	700.44	1.22	12.87	95	78.1	0.10	0.05	0.10	0.05
	14750	Q1.5	Existing	219	696.69	699.52	1.93	8.52	26	13.7	0.10	0.05	0.10	0.05
	14750	Q1.5	Proposed	219	696.69	699.60	0.78	7.75	37	47.3	0.10	0.05	0.10	0.03
	14700	Q100	Existing	1145	692.71	698.67	3.44	20.19	68	19.7	0.10	0.05	0.10	0.05
	14700	Q100	Proposed	1145	692.71	697.47	1.78	17.4	135	76.0	0.10	0.05	0.10	0.07
	14700	Q10	Existing	653	692.71	697.33	2.74	16.38	44	16.0	0.10	0.05	0.10	0.05
	14700	Q10	Proposed	653	692.71	696.78	1.13	15.18	83	73.4	0.10	0.05	0.10	0.05
	14700	Q1.5	Existing	219	692.71	695.33	1.63	12.78	17	10.6		0.05	0.10	0.05
	14700	Q1.5	Proposed	219	692.71	695.30	1.33	12.88	17	13.0	0.10	0.05	0.10	0.04
	14667.14	Q100	Existing	1145	687.94	692.19	2.72	24.05	49	18.1	0.10	0.05	0.10	0.05
	14667.14	Q100	Proposed	1145	687.94	693.05	1.24	18	79	63.8	0.10	0.05	0.10	0.03
	14667.14	Q10	Existing	653	687.94	691.18	2.02	20.42	32	15.9	0.10	0.05	0.10	0.05
	14667.14	Q10	Proposed	653	687.94	691.54	2.31	17.66	37	16.2		0.05	0.10	0.05
	14667.14	Q1.5	Existing	219	687.94	689.96	1.28	14.58	15	11.7		0.05		0.05
	14667.14	Q1.5	Proposed	219	687.94	689.97	1.30	14.46	15	11.7		0.05		0.05
	14650	Q100	Existing	1145	687.66	692.34	3.02	19.82	63	20.9	0.10	0.05	0.10	0.05
	14650	Q100	Proposed	1145	687.66	692.48	1.48	16.95	97	65.8	0.10	0.05	0.10	0.04
	14650	Q10	Existing	653	687.66	691.44	2.46	15.02	45	18.4	0.10	0.05	0.10	0.05
	14650	Q10	Proposed	653	687.66	691.62	1.52	13.51	54	35.9	0.10	0.05	0.10	0.04
	14650	Q1.5	Existing	219	687.66	690.38	1.76	8.03	27	15.6	0.00	0.05	0.10	0.05
	14650	Q1.5	Proposed	219	687.66	690.38	1.74	7.95	28	15.9		0.05	0.10	0.05
	14600	Q100	Existing	1145	685.80	691.86	3.48	11.94	159	45.7	0.10	0.05	0.10	0.06
	14600	Q100	Proposed	1145	685.80	689.95	1.65	16.82	125	75.6	0.10	0.05	0.10	0.06
	14600	Q10	Existing	653	685.80	690.29	2.72	10.21	97	35.6	0.10	0.05	0.10	0.06
	14600	Q10	Proposed	653	685.80	689.36	1.25	13.2	82	65.5	0.10	0.05	0.10	0.05
	14600	Q1.5	Existing	219	685.80	688.73	1.57	6.59	46	29.4	0.10	0.05	0.10	0.06
	14600	Q1.5	Proposed	219	685.80	688.68	1.18	6.59	46	38.8	0.10	0.05	0.10	0.05

TABLE T1. HEC-RAS OUTPUT FOR CHANNEL WIDENING AND ROCK PILE AREAS, EXISTING AND PROPOSED CONDITIONS
PERMANENTE CREEK RESTORATION PLAN

Culvert	RiverSta	Profile	Plan	QTotal (cfs)	MinChEl (ft)	W.S.Elev (ft)	HydrDepth (ft)	VelChnl (ft/s)	FlowArea (sqft)	TopWidth (ft)	Manning LOB --	Manning Chan --	Manning ROB --	Manning avg --
	14550	Q100	Existing	1145	684.39	691.39	4.25	10.22	172	40.4	0.10	0.05	0.10	0.06
	14550	Q100	Proposed	1145	684.39	690.73	3.37	7.92	257	76.4	0.10	0.05	0.10	0.07
	14550	Q10	Existing	653	684.39	689.50	2.94	9.19	101	34.5	0.10	0.05	0.10	0.06
	14550	Q10	Proposed	653	684.39	689.30	2.35	7.35	156	66.5	0.10	0.05	0.10	0.07
	14550	Q1.5	Existing	219	684.39	687.38	1.22	7.45	34	28.1	0.10	0.05	0.10	0.04
	14550	Q1.5	Proposed	219	684.39	687.51	0.88	6.73	44	50.1	0.10	0.05	0.10	0.04
	14500	Q100	Existing	1145	682.99	689.58	3.82	12.58	118	30.8	0.10	0.05	0.10	0.05
	14500	Q100	Proposed	1145	682.99	689.05	3.04	11.41	158	52.0	0.10	0.05	0.10	0.06
	14500	Q10	Existing	653	682.99	687.95	2.89	10.67	72	24.9	0.10	0.05	0.10	0.05
	14500	Q10	Proposed	653	682.99	687.76	2.31	9.85	97	42.2	0.10	0.05	0.10	0.05
	14500	Q1.5	Existing	219	682.99	686.52	2.04	5.83	40	19.7	0.10	0.05	0.10	0.05
	14500	Q1.5	Proposed	219	682.99	686.16	1.22	6.84	38	31.3	0.10	0.05	0.10	0.04
	14450	Q100	Existing	1145	681.13	687.19	2.63	11	145	54.9	0.04	0.05	0.10	0.04
	14450	Q100	Proposed	1145	681.13	686.91	2.36	14.53	121	51.3	0.09	0.07	0.10	0.07
	14450	Q10	Existing	653	681.13	687.75	3.09	4.95	176	57.1	0.04	0.05	0.10	0.04
	14450	Q10	Proposed	653	681.13	686.19	2.22	11.31	88	39.8	0.10	0.07	0.10	0.07
	14450	Q1.5	Existing	219	681.13	684.96	2.04	9.59	34	16.5	0.10	0.05	0.10	0.05
	14450	Q1.5	Proposed	219	681.13	684.70	1.43	7.77	40	27.7	0.10	0.07	0.10	0.06
	14412.75	Q100	Existing	1145	679.63	686.06	2.97	10.82	158	53.0	0.04	0.05	0.10	0.04
	14412.75	Q100	Proposed	1145	679.63	685.33	2.90	13.78	135	46.6	0.10	0.06	0.10	0.07
	14412.75	Q10	Existing	653	679.63	685.68	3.50	13.01	87	24.7	0.10	0.05	0.10	0.06
	14412.75	Q10	Proposed	653	679.63	683.84	2.42	13.13	78	32.5	0.10	0.06	0.10	0.07
	14412.75	Q1.5	Existing	219	679.63	682.22	1.67	13.17	22	12.9	0.10	0.05	0.10	0.05
	14412.75	Q1.5	Proposed	219	679.63	682.18	1.20	10.22	30	25.2	0.10	0.06	0.10	0.06
	14388.99	Q100	Existing	1145	674.81	682.95	4.47	16.31	101	22.5	0.10	0.05	0.10	0.05
	14388.99	Q100	Proposed	1145	674.81	681.09	2.80	18.24	84	29.9	0.10	0.07	0.10	0.06
	14388.99	Q10	Existing	653	674.81	679.24	2.60	21.62	35	13.4	0.10	0.05	0.10	0.05
	14388.99	Q10	Proposed	653	674.81	679.76	1.97	16.2	48	24.2	0.10	0.07	0.10	0.06
	14388.99	Q1.5	Existing	219	674.81	677.31	1.44	17.25	13	9.1	0.10	0.05		0.05
	14388.99	Q1.5	Proposed	219	674.81	677.58	1.64	14.11	16	9.5		0.06		0.06

TABLE T1. HEC-RAS OUTPUT FOR CHANNEL WIDENING AND ROCK PILE AREAS, EXISTING AND PROPOSED CONDITIONS
PERMANENTE CREEK RESTORATION PLAN

Culvert	RiverSta	Profile	Plan	QTotal (cfs)	MinChEl (ft)	W.S.Elev (ft)	HydrDepth (ft)	VelChnl (ft/s)	FlowArea (sqft)	TopWidth (ft)	Manning LOB --	Manning Chan --	Manning ROB --	Manning avg --
	14350	Q100	Existing	1145	672.28	677.77	3.62	21.76	65	18.1	0.10	0.05	0.10	0.05
	14350	Q100	Proposed	1145	672.28	677.86	2.85	17.75	89	31.3	0.10	0.06	0.10	0.06
	14350	Q10	Existing	653	672.28	676.18	2.63	19.09	39	14.9	0.10	0.05	0.10	0.05
	14350	Q10	Proposed	653	672.28	676.74	2.09	14.58	56	26.9	0.10	0.06	0.10	0.05
	14350	Q1.5	Existing	219	672.28	674.80	1.68	11.31	20	12.2	0.10	0.05	0.10	0.05
	14350	Q1.5	Proposed	219	672.28	675.17	1.98	9.19	25	12.7		0.06	0.10	0.06
	14300	Q100	Existing	1145	667.57	673.70	3.91	23.95	71	18.2	0.10	0.05	0.10	0.06
	14300	Q100	Proposed	1145	667.57	673.41	2.82	16.65	85	30.2	0.10	0.08	0.10	0.07
	14300	Q10	Existing	653	667.57	672.35	2.86	19.27	48	16.6	0.10	0.05	0.10	0.05
	14300	Q10	Proposed	653	667.57	672.39	2.08	13.67	56	27.0	0.10	0.08	0.10	0.07
	14300	Q1.5	Existing	219	667.57	670.50	1.56	13.21	20	12.6	0.10	0.05	0.10	0.05
	14300	Q1.5	Proposed	219	667.57	670.71	1.69	10.26	22	12.9		0.07	0.10	0.07
	14250	Q100	Existing	1145	664.33	667.97	2.42	23.4	64	26.4	0.10	0.05	0.10	0.05
	14250	Q100	Proposed	1145	664.33	668.56	2.01	14.07	100	49.6	0.10	0.07	0.10	0.06
	14250	Q10	Existing	653	664.33	667.17	1.79	18.78	44	24.4	0.10	0.05	0.10	0.05
	14250	Q10	Proposed	653	664.33	667.82	1.45	11.21	64	44.2	0.10	0.07	0.10	0.05
	14250	Q1.5	Existing	219	664.33	666.21	0.98	11.74	21	22.0	0.10	0.05	0.10	0.05
	14250	Q1.5	Proposed	219	664.33	667.24	1.84	4.98	45	24.7		0.07	0.10	0.07
	14192.69	Q100	Existing	1145	662.17	667.79	3.76	12.41	108	28.6	0.10	0.06	0.10	0.06
	14192.69	Q100	Proposed	1145	662.17	667.52	2.84	10.76	145	50.9	0.10	0.07	0.10	0.07
	14192.69	Q10	Existing	653	662.17	666.50	2.78	10.08	72	26.0	0.10	0.06	0.10	0.06
	14192.69	Q10	Proposed	653	662.17	666.51	1.98	8.9	95	48.0	0.10	0.07	0.10	0.06
	14192.69	Q1.5	Existing	219	662.17	664.78	1.42	7.24	31	21.7	0.10	0.06	0.10	0.06
	14192.69	Q1.5	Proposed	219	662.17	664.80	1.42	7.14	31	21.9		0.06	0.10	0.06
	14150	Q100	Existing	1145	660.23	664.78	2.89	14.67	88	30.3	0.10	0.05	0.10	0.05
	14150	Q100	Proposed	1145	660.23	664.76	2.18	13.09	115	52.8	0.10	0.06	0.10	0.06
	14150	Q10	Existing	653	660.23	663.76	2.17	11.99	58	27.0	0.10	0.05	0.10	0.05
	14150	Q10	Proposed	653	660.23	663.85	1.40	11.14	68	48.8	0.10	0.06	0.10	0.05
	14150	Q1.5	Existing	219	660.23	662.64	1.30	7.39	30	23.3	0.00	0.05	0.10	0.05
	14150	Q1.5	Proposed	219	660.23	662.68	1.33	7.16	31	23.6		0.06	0.10	0.05

TABLE T1. HEC-RAS OUTPUT FOR CHANNEL WIDENING AND ROCK PILE AREAS, EXISTING AND PROPOSED CONDITIONS
PERMANENTE CREEK RESTORATION PLAN

Culvert	RiverSta	Profile	Plan	QTotal (cfs)	MinChEl (ft)	W.S.Elev (ft)	HydrDepth (ft)	VelChnl (ft/s)	FlowArea (sqft)	TopWidth (ft)	Manning LOB --	Manning Chan --	Manning ROB --	Manning avg --
	14096.7	Q100	Existing	1145	658.49	664.23	4.07	11.08	178	43.8	0.10	0.05	0.10	0.07
	14096.7	Q100	Proposed	1145	658.49	663.75	3.04	7.9	195	64.1	0.10	0.07	0.10	0.07
	14096.7	Q10	Existing	653	658.49	662.61	2.64	10.04	109	41.4	0.10	0.05	0.10	0.07
	14096.7	Q10	Proposed	653	658.49	662.59	2.03	6.91	122	60.3	0.10	0.07	0.10	0.06
	14096.7	Q1.5	Existing	219	658.49	661.04	1.20	7.41	46	38.6	0.10	0.05	0.10	0.06
	14096.7	Q1.5	Proposed	219	658.49	660.93	1.10	5.98	42	38.3		0.06	0.10	0.06
	14081.95	Q100	Existing	1145	657.82	663.13	3.51	13.48	143	40.7	0.10	0.05	0.10	0.07
	14081.95	Q100	Proposed	1145	657.82	662.74	2.56	10.44	151	59.0	0.10	0.06	0.10	0.06
	14081.95	Q10	Existing	653	657.82	661.97	2.61	10.8	98	37.5	0.10	0.05	0.10	0.06
	14081.95	Q10	Proposed	653	657.82	661.70	1.84	8.95	93	50.3	0.10	0.06	0.10	0.06
	14081.95	Q1.5	Existing	219	657.82	660.29	1.07	8.46	37	34.8	0.10	0.05	0.10	0.05
	14081.95	Q1.5	Proposed	219	657.82	660.34	1.12	6.49	39	34.9		0.06	0.10	0.05
	14050	Q100	Existing	1145	657.20	662.81	4.09	7.31	170	41.6	0.10	0.08	0.10	0.07
	14050	Q100	Proposed	1145	657.20	662.24	2.94	7.47	182	61.8	0.10	0.08	0.10	0.07
	14050	Q10	Existing	653	657.20	661.30	2.94	6.22	111	37.6	0.10	0.08	0.10	0.07
	14050	Q10	Proposed	653	657.20	661.20	2.06	6.14	119	57.9	0.10	0.08	0.10	0.06
	14050	Q1.5	Existing	219	657.20	659.59	1.52	4.42	50	33.0	0.10	0.08	0.10	0.07
	14050	Q1.5	Proposed	219	657.20	659.54	1.48	4.56	48	32.7		0.08	0.10	0.07
	14000	Q100	Existing	1145	655.73	661.50	3.88	9.27	149	38.5	0.10	0.06	0.10	0.06
	14000	Q100	Proposed	1145	655.73	660.53	2.50	9.91	160	64.0	0.10	0.06	0.10	0.06
	14000	Q10	Existing	653	655.73	659.93	2.88	7.91	93	32.4	0.10	0.06	0.10	0.06
	14000	Q10	Proposed	653	655.73	659.49	1.61	8.46	96	59.3	0.10	0.06	0.10	0.05
	14000	Q1.5	Existing	219	655.73	658.15	1.63	5.5	42	25.6	0.10	0.06	0.10	0.06
	14000	Q1.5	Proposed	219	655.73	658.10	1.60	5.52	41	25.8		0.06	0.10	0.06
	13950	Q100	Existing	1145	653.77	659.47	3.79	11.89	108	28.5	0.10	0.06	0.10	0.06
	13950	Q100	Proposed	1145	653.77	659.13	2.83	10.79	152	53.7	0.10	0.06	0.10	0.06
	13950	Q10	Existing	653	653.77	658.04	2.80	9.99	70	24.9	0.10	0.06	0.10	0.06
	13950	Q10	Proposed	653	653.77	657.98	1.88	9.33	93	49.2	0.10	0.06	0.10	0.05
	13950	Q1.5	Existing	219	653.77	656.29	1.56	7.24	31	19.6		0.06	0.10	0.05
	13950	Q1.5	Proposed	219	653.77	656.28	1.56	7.3	30	19.4		0.06	0.10	0.05

TABLE T1. HEC-RAS OUTPUT FOR CHANNEL WIDENING AND ROCK PILE AREAS, EXISTING AND PROPOSED CONDITIONS
PERMANENTE CREEK RESTORATION PLAN

Culvert	RiverSta	Profile	Plan	QTotal (cfs)	MinChEl (ft)	W.S.Elev (ft)	HydrDepth (ft)	VelChnl (ft/s)	FlowArea (sqft)	TopWidth (ft)	Manning LOB --	Manning Chan --	Manning ROB --	Manning avg --
	13900	Q100	Existing	1145	650.13	655.72	3.39	15.92	80	23.5	0.10	0.05	0.10	0.05
	13900	Q100	Proposed	1145	650.13	655.95	2.27	14.24	110	48.6	0.10	0.06	0.10	0.05
	13900	Q10	Existing	653	650.13	654.30	2.60	13.75	49	19.0	0.10	0.05	0.10	0.05
	13900	Q10	Proposed	653	650.13	654.77	1.80	12.41	58	32.3	0.10	0.06	0.10	0.05
	13900	Q1.5	Existing	219	650.13	652.64	1.44	10.31	21	14.9		0.05	0.10	0.05
	13900	Q1.5	Proposed	219	650.13	653.66	2.25	6.27	36	16.0		0.06	0.10	0.06
	13850	Q100	Existing	1145	649.64	654.70	3.27	13.44	101	30.8	0.10	0.05	0.10	0.05
	13850	Q100	Proposed	1145	649.64	654.19	2.19	12.04	133	60.7	0.10	0.06	0.10	0.06
	13850	Q10	Existing	653	649.64	653.75	2.68	10.06	73	27.1	0.10	0.05	0.10	0.05
	13850	Q10	Proposed	653	649.64	653.59	1.70	8.87	98	57.4	0.10	0.06	0.10	0.05
	13850	Q1.5	Existing	219	649.64	651.99	1.51	7.2	31	20.5	0.10	0.05	0.10	0.05
	13850	Q1.5	Proposed	219	649.64	652.00	1.46	7.03	32	21.7		0.06	0.10	0.05
	13800	Q100	Existing	1145	647.10	654.19	4.54	7.15	176	38.8		0.08	0.10	0.07
	13800	Q100	Proposed	1145	647.10	652.77	2.53	9.54	160	63.0	0.10	0.07	0.10	0.07
	13800	Q10	Existing	653	647.10	652.47	3.36	6.18	114	33.8		0.07	0.10	0.07
	13800	Q10	Proposed	653	647.10	651.82	1.82	7.77	103	56.5	0.10	0.07	0.10	0.06
	13800	Q1.5	Existing	219	647.10	650.47	1.86	4.33	52	27.9		0.07	0.10	0.07
	13800	Q1.5	Proposed	219	647.10	650.48	1.78	4.8	47	26.5		0.07	0.10	0.06
	13750	Q100	Existing	1145	646.00	651.86	3.74	12.4	127	34.0	0.10	0.05	0.10	0.06
	13750	Q100	Proposed	1145	646.00	651.41	2.50	10.62	181	72.2	0.10	0.06	0.10	0.07
	13750	Q10	Existing	653	646.00	650.54	2.66	10.23	84	31.6	0.10	0.05	0.10	0.05
	13750	Q10	Proposed	653	646.00	650.49	1.78	8.82	117	65.7	0.10	0.06	0.10	0.06
	13750	Q1.5	Existing	219	646.00	648.91	1.23	7.14	35	28.3	0.10	0.05	0.10	0.04
	13750	Q1.5	Proposed	219	646.00	648.98	1.30	6.75	37	28.5		0.05	0.10	0.05
	13700	Q100	Existing	1145	644.74	649.39	2.81	13.89	102	36.4	0.10	0.06	0.10	0.07
	13700	Q100	Proposed	1145	644.74	650.41	2.64	7.53	222	83.9	0.10	0.07	0.10	0.07
	13700	Q10	Existing	653	644.74	649.00	2.50	9.08	88	35.1	0.10	0.06	0.10	0.07
	13700	Q10	Proposed	653	644.74	649.37	1.86	6.51	139	74.7	0.10	0.07	0.10	0.07
	13700	Q1.5	Existing	219	644.74	647.58	1.36	6.02	41	30.5	0.10	0.06	0.10	0.06
	13700	Q1.5	Proposed	219	644.74	647.68	1.44	5.52	45	31.0		0.07	0.10	0.07

TABLE T1. HEC-RAS OUTPUT FOR CHANNEL WIDENING AND ROCK PILE AREAS, EXISTING AND PROPOSED CONDITIONS
PERMANENTE CREEK RESTORATION PLAN

Culvert	RiverSta	Profile	Plan	QTotal (cfs)	MinChEl (ft)	W.S.Elev (ft)	HydrDepth (ft)	VelChnl (ft/s)	FlowArea (sqft)	TopWidth (ft)	Manning LOB --	Manning Chan --	Manning ROB --	Manning avg --
	13657.14	Q100	Existing	1145	644.12	648.73	3.13	10.53	117	37.5	0.10	0.06	0.10	0.06
	13657.14	Q100	Proposed	1145	644.12	648.76	2.14	9.37	154	72.2	0.10	0.06	0.10	0.06
	13657.14	Q10	Existing	653	644.12	648.14	2.69	7.22	96	35.6	0.10	0.06	0.10	0.06
	13657.14	Q10	Proposed	653	644.12	647.71	1.45	8.28	85	58.9	0.10	0.06	0.10	0.04
	13657.14	Q1.5	Existing	219	644.12	646.50	1.40	5.32	42	29.9		0.06	0.10	0.05
	13657.14	Q1.5	Proposed	219	644.12	646.46	1.37	5.5	40	29.5		0.06	0.10	0.05
	13594.58	Q100	Existing	1145	642.80	648.34	4.31	6.38	228	53.0	0.10	0.06	0.10	0.06
	13594.58	Q100	Proposed	1145	642.80	646.47	2.25	10.91	132	58.8	0.10	0.05	0.10	0.05
	13594.58	Q10	Existing	653	642.80	648.23	4.20	3.73	223	52.9	0.10	0.06	0.10	0.06
	13594.58	Q10	Proposed	653	642.80	645.64	1.88	8.92	90	47.9		0.05	0.10	0.06
	13594.58	Q1.5	Existing	219	642.80	644.60	1.00	5.99	43	42.4		0.05	0.10	0.06
	13594.58	Q1.5	Proposed	219	642.80	644.60	1.00	6.04	43	42.4		0.05	0.10	0.05
	13560.62	Q100	Existing	1145	641.52	648.25	5.27	6.45	298	56.6	0.10	0.05	0.10	0.07
	13560.62	Q100	Proposed	1145	641.52	646.15	2.30	6.64	206	89.6	0.10	0.07	0.10	0.06
	13560.62	Q10	Existing	653	641.52	648.21	5.23	3.71	295	56.4	0.10	0.05	0.10	0.07
	13560.62	Q10	Proposed	653	641.52	645.35	2.00	5.06	142	70.8	0.10	0.07	0.10	0.06
	13560.62	Q1.5	Existing	219	641.52	644.01	1.58	4.53	76	48.4	0.10	0.05	0.10	0.07
	13560.62	Q1.5	Proposed	219	641.52	643.97	1.55	3.28	70	45.1		0.07	0.10	0.07
	13500	Q100	Existing	1145	640.53	648.09	5.28	5.9	338	64.0	0.10	0.05	0.10	0.07
	13500	Q100	Proposed	1145	640.53	645.20	2.10	7.24	253	120.5	0.09	0.06	0.10	0.07
	13500	Q10	Existing	653	640.53	648.15	5.33	3.33	342	64.2	0.10	0.05	0.10	0.07
	13500	Q10	Proposed	653	640.53	644.33	1.46	6.39	155	106.1	0.10	0.06	0.10	0.06
	13500	Q1.5	Existing	219	640.53	642.73	1.13	6.75	49	43.1	0.10	0.05	0.10	0.06
	13500	Q1.5	Proposed	219	640.53	643.07	1.41	4.51	66	46.7		0.06	0.10	0.07
	13450	Q100	Existing	1145	638.15	648.18	3.79	3.27	566	149.5	0.03	0.05	0.10	0.05
	13450	Q100	Proposed	1145	638.15	643.90	1.95	9.23	211	108.3	0.09	0.05	0.10	0.05
	13450	Q10	Existing	653	638.15	648.18	3.79	1.86	567	149.5	0.03	0.05	0.10	0.05
	13450	Q10	Proposed	653	638.15	643.01	1.50	8.08	127	84.5	0.10	0.05	0.10	0.05
	13450	Q1.5	Existing	219	638.15	640.88	1.53	7.6	29	19.2	0.10	0.05	0.10	0.05
	13450	Q1.5	Proposed	219	638.15	641.28	1.55	7.18	31	19.7		0.05		0.05

TABLE T1. HEC-RAS OUTPUT FOR CHANNEL WIDENING AND ROCK PILE AREAS, EXISTING AND PROPOSED CONDITIONS
PERMANENTE CREEK RESTORATION PLAN

Culvert	RiverSta	Profile	Plan	QTotal (cfs)	MinChEl (ft)	W.S.Elev (ft)	HydrDepth (ft)	VelChnl (ft/s)	FlowArea (sqft)	TopWidth (ft)	Manning LOB --	Manning Chan --	Manning ROB --	Manning avg --
	13426.44	Q100	Existing	1145	637.86	648.20	4.62	2.26	651	140.7	0.03	0.06	0.10	0.05
	13426.44	Q100	Proposed	1145	637.86	641.93	1.82	13.21	132	72.3	0.10	0.06	0.10	0.06
	13426.44	Q10	Existing	653	637.86	648.19	4.62	1.29	650	140.7	0.03	0.06	0.10	0.05
	13426.44	Q10	Proposed	653	637.86	641.11	1.16	11.74	75	64.6	0.10	0.06	0.10	0.05
	13426.44	Q1.5	Existing	219	637.86	640.44	1.55	6.17	38	24.7		0.06	0.10	0.06
	13426.44	Q1.5	Proposed	219	637.86	639.97	1.24	8.13	27	22.1		0.06	0.10	0.05
	13400	Q100	Existing	1145	635.37	648.21	6.39	1.93	925	144.7	0.04	0.05	0.10	0.05
	13400	Q100	Proposed	1145	635.37	641.71	2.77	6.44	279	100.6	0.10	0.07	0.10	0.07
	13400	Q10	Existing	653	635.37	648.19	6.38	1.1	922	144.7	0.04	0.05	0.10	0.05
	13400	Q10	Proposed	653	635.37	640.49	1.74	6.07	160	92.3	0.10	0.07	0.10	0.06
	13400	Q1.5	Existing	219	635.37	640.73	2.37	2.22	152	63.9	0.05	0.05	0.10	0.05
	13400	Q1.5	Proposed	219	635.37	639.16	1.31	3.93	64	48.6	0.10	0.07	0.10	0.05
	13350	Q100	Existing	1145	634.00	648.19	5.92	2.45	841	142.1	0.04	0.05	0.10	0.06
	13350	Q100	Proposed	1145	635.68	641.10	3.14	6.73	250	79.6	0.10	0.06	0.10	0.07
	13350	Q10	Existing	653	634.00	648.18	5.92	1.4	841	142.1	0.04	0.05	0.10	0.06
	13350	Q10	Proposed	653	635.68	639.73	2.05	6.28	147	72.0	0.10	0.06	0.10	0.07
	13350	Q1.5	Existing	219	634.00	640.71	3.98	2.1	178	44.9	0.10	0.05	0.10	0.07
	13350	Q1.5	Proposed	219	635.68	638.31	1.04	4.89	53	50.9	0.10	0.06	0.10	0.05
CULVERT #8	13335.55	Q100	Existing	1145	634.01	647.84	5.15	6.27	326	63.3	0.10	0.05	0.10	0.07
	13335.55	Q100	Proposed	1145	635.28	640.89	3.17	6.55	229	72.3	0.10	0.06	0.10	0.06
	13335.55	Q10	Existing	653	634.01	648.09	5.31	3.42	342	64.3	0.10	0.05	0.10	0.08
	13335.55	Q10	Proposed	653	635.28	639.49	2.09	6.05	134	64.3	0.10	0.06	0.10	0.06
	13335.55	Q1.5	Existing	219	634.01	640.07	3.26	6.21	36	11.1	0.10	0.05	0.10	0.04
	13335.55	Q1.5	Proposed	219	635.28	637.93	1.07	4.98	45	41.8	0.10	0.06	0.10	0.05
	13300			Culvert										
	13300	Q100	Proposed	1145	634.82	640.28	3.40	7.51	195	57.4	0.10	0.06	0.10	0.06
	13300	Q100	Proposed	653	634.82	638.83	2.36	6.63	117	49.9	0.10	0.06	0.10	0.06
	13300	Q1.5	Proposed	219	634.82	637.09	1.57	4.94	44	28.2	0.10	0.06	0.10	0.06

TABLE T1. HEC-RAS OUTPUT FOR CHANNEL WIDENING AND ROCK PILE AREAS, EXISTING AND PROPOSED CONDITIONS
PERMANENTE CREEK RESTORATION PLAN

Culvert	RiverSta	Profile	Plan	QTotal (cfs)	MinChEl (ft)	W.S.Elev (ft)	HydrDepth (ft)	VelChnl (ft/s)	FlowArea (sqft)	TopWidth (ft)	Manning LOB --	Manning Chan --	Manning ROB --	Manning avg --
CULVERT #8	13238.93	Q100	Existing	1276	632.54	641.63	4.89	15	131	26.8	0.10	0.05	0.10	0.05
	13238.93	Q100	Proposed	1276	633.00	638.79	3.27	9.55	164	50.2	0.10	0.06	0.10	0.06
	13238.93	Q10	Existing	728	632.54	639.39	3.78	12.8	78	20.6	0.10	0.05	0.10	0.05
	13238.93	Q10	Proposed	728	633.00	637.89	2.73	6.98	121	44.5	0.10	0.06	0.10	0.06
	13238.93	Q1.5	Existing	244	632.54	636.43	2.28	9.41	29	12.6	0.10	0.05	0.10	0.05
	13238.93	Q1.5	Proposed	244	633.00	636.50	1.96	3.86	65	33.3	0.10	0.06	0.10	0.05
	13208.08	Q100	Existing	1276	631.15	636.50	3.15	21.83	81	25.7	0.10	0.05	0.10	0.06
	13208.08	Q100	Proposed	1276	631.43	637.81	2.87	12.07	161	56.2	0.10	0.06	0.10	0.08
	13208.08	Q10	Existing	728	631.15	635.26	2.37	18.54	51	21.7	0.10	0.05	0.10	0.06
	13208.08	Q10	Proposed	728	631.43	636.87	2.15	10.03	111	51.6	0.10	0.06	0.10	0.08
	13208.08	Q1.5	Existing	244	631.15	633.86	1.36	12.55	24	17.6	0.10	0.05		0.05
	13208.08	Q1.5	Proposed	244	631.43	635.71	1.17	6.87	54	46.0	0.10	0.06		0.06
	13200	Q100	Existing	1276	630.29	635.23	2.87	22.86	82	28.4	0.10	0.05	0.10	0.06
	13200	Q100	Proposed	1276	630.29	636.21	2.56	14.41	136	53.2	0.10	0.05	0.10	0.06
	13200	Q10	Existing	728	630.29	634.18	2.11	18.9	53	25.3	0.10	0.05	0.10	0.06
	13200	Q10	Proposed	728	630.29	635.05	1.65	12.94	78	47.3	0.10	0.05	0.10	0.05
	13200	Q1.5	Existing	244	630.29	632.85	1.07	12.78	22	20.9	0.10	0.05	0.10	0.04
	13200	Q1.5	Proposed	244	630.29	632.78	1.57	13.41	18	11.6		0.05		0.05
	13171.14	Q100	Existing	1276	627.89	635.77	4.93	8.9	229	46.4	0.10	0.05	0.10	0.07
	13171.14	Q100	Proposed	1276	627.89	635.57	3.95	7.89	244	61.8	0.08	0.05	0.10	0.06
	13171.14	Q10	Existing	728	627.89	633.76	3.27	8.03	139	42.6	0.10	0.05	0.10	0.06
	13171.14	Q10	Proposed	728	627.89	634.00	2.82	7.3	153	54.5	0.09	0.05	0.10	0.06
	13171.14	Q1.5	Existing	244	627.89	630.68	1.72	10.89	22	13.0		0.05		0.05
	13171.14	Q1.5	Proposed	244	627.89	630.76	1.40	10.45	23	16.7	0.10	0.05		0.04
	13150	Q100	Existing	1276	627.52	635.51	5.24	9.24	217	41.5	0.10	0.05	0.06	0.06
	13150	Q100	Proposed	1276	627.52	634.27	3.22	12	185	57.4	0.10	0.05	0.10	0.06
	13150	Q10	Existing	728	627.52	633.57	3.71	7.87	140	37.9	0.10	0.05	0.05	0.06
	13150	Q10	Proposed	728	627.52	633.06	2.28	9.89	119	52.1	0.10	0.05	0.10	0.05
	13150	Q1.5	Existing	244	627.52	631.00	1.48	6.64	49	33.2	0.10	0.05	0.05	0.05
	13150	Q1.5	Proposed	244	627.52	630.75	1.56	7.88	35	22.5	0.10	0.05	0.10	0.04

TABLE T1. HEC-RAS OUTPUT FOR CHANNEL WIDENING AND ROCK PILE AREAS, EXISTING AND PROPOSED CONDITIONS
PERMANENTE CREEK RESTORATION PLAN

Culvert	RiverSta	Profile	Plan	QTotal (cfs)	MinChEl (ft)	W.S.Elev (ft)	HydrDepth (ft)	VelChnl (ft/s)	FlowArea (sqft)	TopWidth (ft)	Manning LOB --	Manning Chan --	Manning ROB --	Manning avg --
	13112.96	Q100	Existing	1276	626.28	633.66	4.13	14.05	151	36.6	0.10	0.05	0.10	0.06
	13112.96	Q100	Proposed	1276	626.28	632.49	2.63	14.68	151	57.4	0.10	0.05	0.10	0.06
	13112.96	Q10	Existing	728	626.28	632.05	3.09	11.69	96	31.2	0.10	0.05	0.10	0.06
	13112.96	Q10	Proposed	728	626.28	631.27	1.98	12.74	88	44.4	0.10	0.05	0.10	0.05
	13112.96	Q1.5	Existing	244	626.28	629.79	1.69	8.58	35	20.9	0.09	0.05	0.10	0.05
	13112.96	Q1.5	Proposed	244	626.28	629.76	1.47	8.06	36	24.6	0.10	0.05	0.10	0.05
	13087	Q100	Existing	1276	624.08	630.09	3.06	17.96	88	28.6	0.10	0.05	0.10	0.05
	13087	Q100	Proposed	1276	624.08	630.31	2.77	16.32	112	40.5	0.10	0.05	0.10	0.05
	13087	Q10	Existing	728	624.08	628.62	2.10	15.98	49	23.4	0.10	0.05	0.10	0.04
	13087	Q10	Proposed	728	624.08	628.91	1.83	14.64	60	32.9	0.10	0.05	0.10	0.04
	13087	Q1.5	Existing	244	624.08	626.50	1.70	13.71	18	10.5		0.05		0.05
	13087	Q1.5	Proposed	244	624.08	626.58	1.76	13.13	19	10.6		0.05		0.05
	13050	Q100	Existing	1276	622.58	628.12	3.11	17.88	92	29.7	0.10	0.05	0.10	0.05
	13050	Q100	Proposed	1276	622.58	628.37	3.26	16.62	100	30.5	0.10	0.05	0.06	0.05
	13050	Q10	Existing	728	622.58	627.09	2.38	14.06	63	26.5	0.10	0.05	0.10	0.05
	13050	Q10	Proposed	728	622.58	627.03	2.34	14.31	62	26.4	0.10	0.05	0.05	0.05
	13050	Q1.5	Existing	244	622.58	625.81	1.69	8.08	33	19.5	0.10	0.05		0.05
	13050	Q1.5	Proposed	244	622.58	625.82	1.69	8.06	33	19.6	0.10	0.05		0.05
	13000	Q100	Existing	1276	619.73	627.46	4.16	14.19	118	28.3	0.10	0.05	0.10	0.05
	13000	Q100	Proposed	1276	619.73	627.61	4.23	13.62	122	28.9	0.10	0.06	0.10	0.06
	13000	Q10	Existing	728	619.73	625.53	3.05	12.48	69	22.5	0.10	0.05	0.10	0.05
	13000	Q10	Proposed	728	619.73	625.80	3.19	11.55	75	23.5	0.10	0.06	0.10	0.05
	13000	Q1.5	Existing	244	619.73	623.11	1.91	10.11	24	12.7	0.00	0.05		0.05
	13000	Q1.5	Proposed	244	619.73	623.18	1.93	9.73	25	13.0	0.10	0.06		0.05
	12950	Q100	Existing	1276	616.64	622.93	2.88	19.71	91	31.6	0.10	0.05	0.10	0.05
	12950	Q100	Proposed	1276	616.64	622.97	2.92	18.32	92	31.7	0.10	0.06	0.10	0.05
	12950	Q10	Existing	728	616.64	621.72	2.13	16.17	55	25.8	0.10	0.05	0.10	0.04
	12950	Q10	Proposed	728	616.64	621.80	2.15	15.08	57	26.6	0.10	0.06	0.10	0.05
	12950	Q1.5	Existing	244	616.64	619.83	2.11	10.8	23	10.7	0.00	0.05		0.05
	12950	Q1.5	Proposed	244	616.64	620.00	2.15	9.99	24	11.4		0.06	0.10	0.05

TABLE T1. HEC-RAS OUTPUT FOR CHANNEL WIDENING AND ROCK PILE AREAS, EXISTING AND PROPOSED CONDITIONS
PERMANENTE CREEK RESTORATION PLAN

Culvert	RiverSta	Profile	Plan	QTotal (cfs)	MinChEl (ft)	W.S.Elev (ft)	HydrDepth (ft)	VelChnl (ft/s)	FlowArea (sqft)	TopWidth (ft)	Manning LOB --	Manning Chan --	Manning ROB --	Manning avg --
	12900	Q100	Existing	1276	614.95	621.19	3.13	16.54	98	31.3	0.10	0.05	0.10	0.05
	12900	Q100	Proposed	1276	614.95	622.29	3.94	12.67	134	33.9	0.10	0.06	0.10	0.06
	12900	Q10	Existing	728	614.95	619.97	2.20	13.37	62	27.9	0.10	0.05	0.10	0.04
	12900	Q10	Proposed	728	614.95	620.61	2.70	10.96	80	29.6	0.10	0.06	0.10	0.05
	12900	Q1.5	Existing	244	614.95	618.18	2.25	8.47	29	12.8		0.05		0.05
	12900	Q1.5	Proposed	244	614.95	618.17	2.24	8.54	29	12.8		0.06		0.06
	12850	Q100	Existing	1276	613.16	621.61	4.69	10.06	162	34.6	0.10	0.07	0.10	0.07
	12850	Q100	Proposed	1276	613.16	620.04	3.30	14.04	115	35.0	0.09	0.06	0.10	0.05
	12850	Q10	Existing	728	613.16	619.73	3.50	8.5	102	29.2	0.10	0.07	0.10	0.06
	12850	Q10	Proposed	728	613.16	619.01	2.82	10.32	82	29.1	0.09	0.06	0.10	0.05
	12850	Q1.5	Existing	244	613.16	617.37	2.61	5.52	45	17.2	0.10	0.07	0.10	0.06
	12850	Q1.5	Proposed	244	613.16	617.19	2.62	5.86	42	16.0	0.09	0.06	0.10	0.05
	12800	Q100	Existing	1276	612.41	619.51	4.00	12.99	132	33.1	0.10	0.05	0.10	0.05
	12800	Q100	Proposed	1276	612.41	619.16	3.40	12.42	144	42.2	0.09	0.06	0.10	0.06
	12800	Q10	Existing	728	612.41	617.79	3.01	11	81	26.9	0.10	0.05	0.10	0.05
	12800	Q10	Proposed	728	612.41	617.72	2.59	10.51	89	34.3	0.09	0.06	0.10	0.06
	12800	Q1.5	Existing	244	612.41	615.39	2.23	8.43	29	13.0		0.05		0.05
	12800	Q1.5	Proposed	244	612.41	615.36	2.21	8.49	29	13.0		0.06		0.06
	12750	Q100	Existing	1276	610.30	615.61	2.85	17	88	30.8	0.10	0.05	0.10	0.05
	12750	Q100	Proposed	1276	610.30	615.98	2.41	14.87	111	46.3	0.10	0.06	0.10	0.05
	12750	Q10	Existing	728	610.30	614.35	2.48	14.31	53	21.2		0.05	0.10	0.05
	12750	Q10	Proposed	728	610.30	614.73	2.29	12.64	62	26.9	0.08	0.06	0.10	0.05
	12750	Q1.5	Existing	244	610.30	613.62	2.27	6.32	39	17.0		0.05	0.10	0.05
	12750	Q1.5	Proposed	244	610.30	613.84	2.33	5.79	42	18.3		0.06	0.10	0.05
	12700	Q100	Existing	1276	608.75	616.22	3.94	12.78	143	36.3	0.10	0.05	0.10	0.05
	12700	Q100	Proposed	1276	608.75	615.29	3.07	11.91	163	53.3	0.10	0.06	0.10	0.06
	12700	Q10	Existing	728	608.75	614.45	2.65	11.13	82	31.0	0.10	0.05	0.10	0.04
	12700	Q10	Proposed	728	608.75	614.17	2.26	9.72	107	47.2	0.10	0.06	0.10	0.06
	12700	Q1.5	Existing	244	608.75	612.00	2.02	8.34	30	14.7	0.10	0.05	0.10	0.05
	12700	Q1.5	Proposed	244	608.75	612.05	2.05	8.23	30	14.4		0.06		0.06

TABLE T1. HEC-RAS OUTPUT FOR CHANNEL WIDENING AND ROCK PILE AREAS, EXISTING AND PROPOSED CONDITIONS
PERMANENTE CREEK RESTORATION PLAN

Culvert	RiverSta	Profile	Plan	QTotal (cfs)	MinChEl (ft)	W.S.Elev (ft)	HydrDepth (ft)	VelChnl (ft/s)	FlowArea (sqft)	TopWidth (ft)	Manning LOB --	Manning Chan --	Manning ROB --	Manning avg --
	12650	Q100	Existing	1276	606.96	612.25	2.73	17.21	85	31.1	0.10	0.05	0.10	0.04
	12650	Q100	Proposed	1276	606.96	612.60	2.60	14.11	124	47.5	0.10	0.06	0.10	0.05
	12650	Q10	Existing	728	606.96	610.97	2.40	14.76	50	20.7	0.10	0.05	0.10	0.05
	12650	Q10	Proposed	728	606.96	611.40	1.71	12.32	70	41.1	0.10	0.06	0.10	0.04
	12650	Q1.5	Existing	244	606.96	610.52	2.48	5.87	42	16.8		0.05		0.05
	12650	Q1.5	Proposed	244	606.96	610.45	2.23	6.03	41	18.2	0.10	0.06		0.05
	12600	Q100	Existing	1276	605.60	612.46	3.75	9.61	170	45.4	0.10	0.08	0.10	0.08
	12600	Q100	Proposed	1276	605.60	611.63	2.88	11.66	162	56.4	0.10	0.06	0.10	0.06
	12600	Q10	Existing	728	605.60	610.82	2.49	9.01	100	40.3	0.10	0.08	0.10	0.08
	12600	Q10	Proposed	728	605.60	610.68	2.11	9.26	111	52.4	0.10	0.06	0.10	0.06
	12600	Q1.5	Existing	244	605.60	608.92	1.80	7.19	34	19.0	0.10	0.08	0.10	0.08
	12600	Q1.5	Proposed	244	605.60	608.83	1.87	7.63	32	17.1		0.06		0.06
	12590.0*	Q100	Proposed	1276	605.24	611.10	2.79	12.52	154	55.1	0.09	0.06	0.10	0.06
	12590.0*	Q10	Proposed	728	605.24	610.01	1.94	10.62	97	49.9	0.09	0.06	0.10	0.05
	12590.0*	Q1.5	Proposed	244	605.24	608.44	1.37	7.67	33	24.0	0.09	0.06	0.10	0.05
	12580.0*	Q100	Proposed	1276	604.88	610.32	2.51	13.32	133	52.8	0.09	0.06	0.10	0.07
	12580.0*	Q10	Proposed	728	604.88	609.37	1.79	11.21	85	47.4	0.09	0.06	0.10	0.06
	12580.0*	Q1.5	Proposed	244	604.88	607.96	1.32	7.86	33	25.2		0.06	0.10	0.05
	12570.0*	Q100	Proposed	1276	604.52	610.51	2.97	11.32	164	55.1	0.10	0.07	0.10	0.07
	12570.0*	Q10	Proposed	728	604.52	609.34	2.09	9.85	103	49.2	0.10	0.07	0.10	0.07
	12570.0*	Q1.5	Proposed	244	604.52	607.60	1.46	7.61	36	25.0		0.06	0.10	0.06
	12560.0*	Q100	Proposed	1276	604.16	610.00	2.90	12.06	157	54.2	0.10	0.07	0.10	0.07
	12560.0*	Q10	Proposed	728	604.16	609.00	2.13	9.94	106	49.5	0.10	0.07	0.10	0.07
	12560.0*	Q1.5	Proposed	244	604.16	607.22	1.62	7.47	39	24.0		0.07	0.10	0.07

TABLE T1. HEC-RAS OUTPUT FOR CHANNEL WIDENING AND ROCK PILE AREAS, EXISTING AND PROPOSED CONDITIONS
PERMANENTE CREEK RESTORATION PLAN

Culvert	RiverSta	Profile	Plan	QTotal (cfs)	MinChEl (ft)	W.S.Elev (ft)	HydrDepth (ft)	VelChnl (ft/s)	FlowArea (sqft)	TopWidth (ft)	Manning LOB --	Manning Chan --	Manning ROB --	Manning avg --
	12550	Q100	Existing	1276	603.80	610.45	3.77	13.87	180	47.6	0.10	0.05	0.10	0.07
	12550	Q100	Proposed	1276	603.80	609.79	3.06	11.56	168	54.8	0.10	0.07	0.10	0.08
	12550	Q10	Existing	728	603.80	609.14	2.77	11.41	120	43.3	0.10	0.05	0.10	0.06
	12550	Q10	Proposed	728	603.80	607.73	1.57	14.16	65	41.6	0.10	0.07	0.10	0.06
	12550	Q1.5	Existing	244	603.80	606.86	1.81	8.67	41	22.9	0.10	0.05	0.10	0.06
	12550	Q1.5	Proposed	244	603.80	606.87	1.81	7.18	42	23.0		0.07	0.10	0.07
	12540.4*	Q100	Proposed	1276	603.47	609.47	3.08	11.12	169	54.9	0.10	0.07	0.10	0.08
	12540.4*	Q10	Proposed	728	603.47	607.34	2.03	13.83	65	32.1	0.10	0.07	0.10	0.07
	12540.4*	Q1.5	Proposed	244	603.47	606.44	1.77	7.28	41	23.0		0.07	0.10	0.07
	12530.8*	Q100	Proposed	1276	603.13	608.99	3.00	11.42	162	54.2	0.10	0.07	0.10	0.07
	12530.8*	Q10	Proposed	728	603.13	607.94	2.23	9.52	109	48.7	0.10	0.07	0.10	0.07
	12530.8*	Q1.5	Proposed	244	603.13	606.04	1.74	7.2	41	23.2		0.07	0.10	0.07
	12521.2*	Q100	Proposed	1276	602.80	608.61	2.98	11.33	161	54.1	0.10	0.07	0.10	0.07
	12521.2*	Q10	Proposed	728	602.80	607.39	2.15	10.01	100	46.6	0.10	0.07	0.10	0.07
	12521.2*	Q1.5	Proposed	244	602.80	605.65	1.73	7.11	40	23.4		0.07	0.10	0.07
	12511.6*	Q100	Proposed	1276	602.47	608.15	2.93	11.49	157	53.5	0.10	0.07	0.10	0.07
	12511.6*	Q10	Proposed	728	602.47	607.01	2.20	9.76	100	45.5	0.10	0.07	0.10	0.07
	12511.6*	Q1.5	Proposed	244	602.47	605.25	1.71	7.03	40	23.5		0.07	0.10	0.07
	12502.0*	Q100	Proposed	1276	602.13	607.81	2.95	11.2	159	53.8	0.10	0.07	0.10	0.07
	12502.0*	Q10	Proposed	728	602.13	606.52	2.17	9.96	96	44.2	0.10	0.07	0.10	0.07
	12502.0*	Q1.5	Proposed	244	602.13	604.87	1.71	6.9	40	23.6		0.07	0.10	0.07
	12492.4*	Q100	Proposed	1276	601.80	607.25	2.88	11.64	150	52.0	0.10	0.07	0.10	0.07
	12492.4*	Q10	Proposed	728	601.80	606.15	2.20	9.69	97	44.3	0.10	0.07	0.10	0.07
	12492.4*	Q1.5	Proposed	244	601.80	604.50	1.72	6.71	41	23.9		0.07	0.10	0.07
	12482.8*	Q100	Proposed	1276	601.47	606.92	2.92	11.24	153	52.4	0.10	0.07	0.10	0.07
	12482.8*	Q10	Proposed	728	601.47	605.63	2.18	9.95	92	42.1	0.10	0.07	0.10	0.07
	12482.8*	Q1.5	Proposed	244	601.47	604.00	1.63	7.04	39	23.6		0.07	0.10	0.07

TABLE T1. HEC-RAS OUTPUT FOR CHANNEL WIDENING AND ROCK PILE AREAS, EXISTING AND PROPOSED CONDITIONS
PERMANENTE CREEK RESTORATION PLAN

Culvert	RiverSta	Profile	Plan	QTotal (cfs)	MinChEl (ft)	W.S.Elev (ft)	HydrDepth (ft)	VelChnl (ft/s)	FlowArea (sqft)	TopWidth (ft)	Manning LOB --	Manning Chan --	Manning ROB --	Manning avg --
	12473.2*	Q100	Proposed	1276	601.13	606.61	2.96	10.05	158	53.4	0.06	0.06	0.10	0.06
	12473.2*	Q10	Proposed	728	601.13	605.35	2.25	8.85	97	43.1	0.06	0.06	0.10	0.06
	12473.2*	Q1.5	Proposed	244	601.13	603.71	1.69	6.3	41	24.3		0.06	0.10	0.06
	12463.7	Q100	Existing	1276	600.80	605.38	2.81	17.51	104	36.9	0.10	0.05	0.10	0.05
	12463.7	Q100	Proposed	1276	600.80	606.16	2.95	10.84	155	52.7	0.10	0.07	0.10	0.07
	12463.7	Q10	Existing	728	600.80	603.97	2.10	15.88	59	27.8	0.10	0.05	0.10	0.05
	12463.7	Q10	Proposed	728	600.80	604.85	2.21	9.56	93	42.3	0.10	0.07	0.10	0.07
	12463.7	Q1.5	Existing	244	600.80	602.66	1.17	10.74	26	22.2	0.10	0.05	0.10	0.05
	12463.7	Q1.5	Proposed	244	600.80	603.41	1.74	6.12	43	25.0		0.07	0.10	0.07
	12411.83	Q100	Existing	1276	598.95	604.30	3.32	14.99	133	40.1	0.10	0.05	0.10	0.06
	12411.83	Q100	Proposed	1276	598.95	603.86	2.54	11.59	142	55.9	0.10	0.06	0.10	0.06
	12411.83	Q10	Existing	728	598.95	603.29	2.64	11.37	95	35.9	0.10	0.05	0.10	0.06
	12411.83	Q10	Proposed	728	598.95	603.18	2.20	8.45	107	48.7	0.10	0.06	0.10	0.06
	12411.83	Q1.5	Existing	244	598.95	601.47	1.54	7.91	40	25.6	0.10	0.05	0.10	0.05
	12411.83	Q1.5	Proposed	244	598.95	601.39	1.49	6.74	37	25.1		0.06	0.10	0.06
	12356.27	Q100	Existing	1276	596.53	603.15	3.54	13.18	140	39.4	0.10	0.05	0.10	0.05
	12356.27	Q100	Proposed	1276	596.53	602.84	2.67	9.83	172	64.4	0.08	0.07	0.10	0.06
	12356.27	Q10	Existing	728	596.53	601.82	2.83	10.52	91	32.3	0.10	0.05	0.10	0.05
	12356.27	Q10	Proposed	728	596.53	601.71	2.30	8.6	108	47.1	0.10	0.07	0.10	0.06
	12356.27	Q1.5	Existing	244	596.53	599.85	2.16	6.53	42	19.5	0.10	0.05	0.10	0.05
	12356.27	Q1.5	Proposed	244	596.53	600.24	1.57	5.15	52	33.2	0.10	0.07	0.10	0.05
	12301.23	Q100	Existing	1276	595.07	603.06	3.33	4.77	251	75.5	0.03	0.09	0.10	0.06
	12301.23	Q100	Proposed	1276	595.07	600.66	2.47	11.31	156	62.9	0.10	0.08	0.10	0.07
	12301.23	Q10	Existing	728	595.07	600.00	2.84	9.92	79	27.9		0.08	0.10	0.08
	12301.23	Q10	Proposed	728	595.07	599.68	2.23	9.51	103	46.4	0.10	0.08	0.10	0.08
	12301.23	Q1.5	Existing	244	595.07	598.09	1.83	7.43	34	18.8		0.08	0.10	0.08
	12301.23	Q1.5	Proposed	244	595.07	597.99	1.36	7.72	33	24.6	0.10	0.08	0.10	0.06

TABLE T1. HEC-RAS OUTPUT FOR CHANNEL WIDENING AND ROCK PILE AREAS, EXISTING AND PROPOSED CONDITIONS
PERMANENTE CREEK RESTORATION PLAN

Culvert	RiverSta	Profile	Plan	QTotal (cfs)	MinChEl (ft)	W.S.Elev (ft)	HydrDepth (ft)	VelChnl (ft/s)	FlowArea (sqft)	TopWidth (ft)	Manning LOB --	Manning Chan --	Manning ROB --	Manning avg --
	12250.48	Q100	Existing	1276	592.67	603.15	5.33	2.53	458	86.1	0.04	0.08	0.10	0.06
	12250.48	Q100	Proposed	1276	593.40	598.95	2.94	9.75	168	57.0	0.10	0.06	0.10	0.05
	12250.48	Q10	Existing	728	592.67	599.77	2.49	4.37	187	75.1	0.04	0.08	0.10	0.06
	12250.48	Q10	Proposed	728	593.40	597.73	2.59	7.88	111	42.7	0.10	0.06	0.10	0.05
	12250.48	Q1.5	Existing	244	592.67	596.04	1.94	5.65	44	23.0		0.08	0.10	0.07
	12250.48	Q1.5	Proposed	244	593.40	595.99	1.85	5.41	45	24.4	0.10	0.06		0.05
	12225.03	Q100	Existing	1276	591.00	599.28	7.10	15.27	86	16.6	0.10	0.05		0.05
	12225.03	Q100	Proposed	1276	592.20	598.28	2.60	10.88	160	61.4	0.09	0.06	0.10	0.05
	12225.03	Q10	Existing	728	591.00	596.98	4.80	12.68	58	14.4	0.10	0.05		0.05
	12225.03	Q10	Proposed	728	592.20	596.77	2.41	9.75	93	38.5	0.09	0.06	0.10	0.05
	12225.03	Q1.5	Existing	244	591.00	594.27	2.47	8.97	27	11.5		0.05		0.05
	12225.03	Q1.5	Proposed	244	592.20	594.82	1.75	7.72	32	18.1	0.06	0.06		0.05
CULVERT #7														
	12200			Culvert										
	12191.69	Q100	Existing	1276	590.60	600.48	2.18	8.27	174	80.1	0.03	0.05	0.10	0.04
	12191.69	Q100	Proposed	1276	591.00	595.72	2.84	14.61	107	37.6	0.10	0.06	0.06	0.05
	12191.69	Q10	Existing	728	590.60	596.02	5.03	12.72	57	13.9		0.05		0.05
	12191.69	Q10	Proposed	728	591.00	594.68	2.01	12.24	69	34.5	0.10	0.06	0.06	0.05
	12191.69	Q1.5	Existing	244	590.60	593.52	2.60	8.41	29	12.1		0.05		0.05
	12191.69	Q1.5	Proposed	244	591.00	593.64	1.40	6.95	36	26.0	0.10	0.06	0.06	0.05
	12141.98	Q100	Existing	1276	589.06	593.20	2.67	21.32	81	30.1	0.10	0.06	0.10	0.07
	12141.98	Q100	Proposed	1276	589.51	594.63	3.15	12.77	158	50.1	0.10	0.06	0.10	0.07
	12141.98	Q10	Existing	728	589.06	592.57	2.14	15.64	62	28.9	0.10	0.06	0.10	0.07
	12141.98	Q10	Proposed	728	589.51	593.54	2.28	10.45	105	46.1	0.10	0.06	0.10	0.07
	12141.98	Q1.5	Existing	244	589.06	591.86	1.52	7.67	42	27.5	0.10	0.06	0.10	0.07
	12141.98	Q1.5	Proposed	244	589.51	591.98	1.53	7.45	44	28.5		0.06	0.10	0.07

TABLE T1. HEC-RAS OUTPUT FOR CHANNEL WIDENING AND ROCK PILE AREAS, EXISTING AND PROPOSED CONDITIONS
PERMANENTE CREEK RESTORATION PLAN

Culvert	RiverSta	Profile	Plan	QTotal (cfs)	MinChEl (ft)	W.S.Elev (ft)	HydrDepth (ft)	VelChnl (ft/s)	FlowArea (sqft)	TopWidth (ft)	Manning LOB --	Manning Chan --	Manning ROB --	Manning avg --
	12092.64	Q100	Existing	1276	587.42	592.96	3.42	13.43	161	47.0	0.10	0.05	0.10	0.07
	12092.64	Q100	Proposed	1276	587.42	592.11	2.41	14.8	154	63.8	0.10	0.06	0.10	0.07
	12092.64	Q10	Existing	728	587.42	591.80	2.56	10.88	109	42.7	0.10	0.05	0.10	0.06
	12092.64	Q10	Proposed	728	587.42	591.37	1.77	11.79	108	60.9	0.10	0.06	0.10	0.06
	12092.64	Q1.5	Existing	244	587.42	590.28	1.33	7.39	49	36.6	0.10	0.05	0.10	0.05
	12092.64	Q1.5	Proposed	244	587.42	590.22	1.27	7.54	47	36.8	0.10	0.06	0.10	0.06
	12033.91	Q100	Existing	1276	584.73	589.70	2.99	15.51	118	39.4	0.10	0.05	0.10	0.06
	12033.91	Q100	Proposed	1276	584.73	589.73	2.56	10.74	142	55.7	0.10	0.07	0.10	0.06
	12033.91	Q10	Existing	728	584.73	589.56	2.88	9.23	112	39.0	0.10	0.05	0.10	0.06
	12033.91	Q10	Proposed	728	584.73	589.33	2.23	7.14	120	53.9	0.10	0.07	0.10	0.06
	12033.91	Q1.5	Existing	244	584.73	587.10	1.08	10.31	27	25.5	0.10	0.05		0.05
	12033.91	Q1.5	Proposed	244	584.73	587.18	1.13	8.56	29	25.3		0.06		0.05
	11982.07	Q100	Existing	1276	581.86	588.60	5.38	0.82	640	119.1	0.03	0.07	0.10	0.03
	11982.07	Q100	Proposed	1276	581.86	588.50	5.55	1.01	660	118.8	0.03	0.06	0.10	0.03
	11982.07	Q10	Existing	728	581.86	587.20	3.40	10.81	70	20.5		0.07	0.10	0.07
	11982.07	Q10	Proposed	728	581.86	587.16	2.68	10.29	86	32.0	0.10	0.06	0.10	0.06
	11982.07	Q1.5	Existing	244	581.86	585.05	1.97	7.91	31	15.7		0.06		0.06
	11982.07	Q1.5	Proposed	244	581.86	585.05	1.92	7.92	31	16.0	0.00	0.06		0.06
	11932.45	Q100	Existing	1276	579.56	585.64	3.01	14.47	126	41.8	0.10	0.05	0.10	0.05
	11932.45	Q100	Proposed	1276	579.56	584.61	2.41	17.01	111	46.0	0.10	0.06	0.10	0.06
	11932.45	Q10	Existing	728	579.56	584.22	2.01	12.77	71	35.3	0.10	0.05	0.10	0.05
	11932.45	Q10	Proposed	728	579.56	583.70	1.68	14.08	71	42.0	0.10	0.06	0.10	0.05
	11932.45	Q1.5	Existing	244	579.56	582.42	1.84	8.81	28	15.1		0.05	0.10	0.05
	11932.45	Q1.5	Proposed	244	579.56	582.42	1.84	8.8	28	15.1		0.06	0.10	0.05
	11881.79	Q100	Existing	1276	576.99	582.87	3.08	15.22	104	33.7	0.10	0.06	0.10	0.06
	11881.79	Q100	Proposed	1276	576.99	582.87	3.05	13.11	134	43.8	0.10	0.06	0.10	0.06
	11881.79	Q10	Existing	728	576.99	581.67	2.29	12.96	67	29.1	0.10	0.05		0.05
	11881.79	Q10	Proposed	728	576.99	581.72	2.28	11.14	87	38.2	0.10	0.06		0.06
	11881.79	Q1.5	Existing	244	576.99	580.17	1.80	8.87	28	15.3		0.05		0.05
	11881.79	Q1.5	Proposed	244	576.99	580.30	1.10	7.88	36	33.3	0.10	0.06		0.05

TABLE T1. HEC-RAS OUTPUT FOR CHANNEL WIDENING AND ROCK PILE AREAS, EXISTING AND PROPOSED CONDITIONS
PERMANENTE CREEK RESTORATION PLAN

Culvert	RiverSta	Profile	Plan	QTotal (cfs)	MinChEl (ft)	W.S.Elev (ft)	HydrDepth (ft)	VelChnl (ft/s)	FlowArea (sqft)	TopWidth (ft)	Manning LOB --	Manning Chan --	Manning ROB --	Manning avg --
	11827.76	Q100	Existing	1276	573.31	581.72	5.04	7.17	204.72	40.58	0.10	0.08	0.10	0.07
	11827.76	Q100	Proposed	1276	573.31	578.82	2.63	15.08	109.65	41.71	0.10	0.07	0.10	0.07
	11827.76	Q10	Existing	728	573.31	580.44	4.22	5.22	155.2	36.81	0.10	0.08	0.10	0.07
	11827.76	Q10	Proposed	728	573.31	577.8	1.94	12.68	69.6	35.88	0.10	0.07	0.10	0.06
	11827.76	Q1.5	Existing	244	573.31	578.14	2.62	3.24	78.47	29.92	0.10	0.08	0.10	0.07
	11827.76	Q1.5	Proposed	244	573.31	576.19	1.2	9.86	26.51	22.09	0.10	0.07		0.06
	11774.33	Q100	Existing	1276	571.58	581.25	5.65	6.59	210.95	37.32	0.10	0.07	0.10	0.07
	11774.33	Q100	Proposed	1276	571.58	580.09	4.88	5.86	285.11	58.37	0.10	0.07	0.10	0.08
	11774.33	Q10	Existing	728	571.58	580.19	5.25	4.42	173.62	33.08	0.10	0.07	0.10	0.07
	11774.33	Q10	Proposed	728	571.58	578.85	4.13	4.31	216.49	52.4	0.10	0.07	0.10	0.08
	11774.33	Q1.5	Existing	244	571.58	578.03	4.47	2.2	111.3	24.89	0.10	0.07		0.07
	11774.33	Q1.5	Proposed	244	571.58	575.01	2.62	5.18	47.11	17.99	0.00	0.06		0.06
	11724.31	Q100	Existing	1276	570.29	581.33	6.54	4.8	353.22	54	0.10	0.06	0.10	0.06
	11724.31	Q100	Proposed	1276	570.29	580.05	5.79	4.15	434.04	74.97	0.10	0.07	0.10	0.08
	11724.31	Q10	Existing	728	570.29	580.21	5.9	3.17	295.42	50.06	0.10	0.06	0.10	0.06
	11724.31	Q10	Proposed	728	570.29	578.82	4.95	2.93	345.14	69.73	0.10	0.07	0.10	0.08
	11724.31	Q1.5	Existing	244	570.29	578.03	4.59	1.51	194.5	42.39	0.10	0.06	0.10	0.05
	11724.31	Q1.5	Proposed	244	570.29	574.77	1.93	3.12	98.79	51.17	0.10	0.07	0.10	0.07
	11678.1	Q100	Existing	1276	568.65	581.39	7.64	3.09	509.41	66.64	0.10	0.08	0.10	0.08
	11678.1	Q100	Proposed	1276	568.65	580.01	5.53	3.14	534.83	96.69	0.10	0.08	0.10	0.08
	11678.1	Q10	Existing	728	568.65	580.24	6.81	2.06	434.29	63.79	0.10	0.08	0.10	0.08
	11678.1	Q10	Proposed	728	568.65	578.79	5.41	2.18	431.78	79.84	0.10	0.08	0.10	0.08
	11678.1	Q1.5	Existing	244	568.65	578.03	5.3	0.97	300.47	56.69	0.10	0.08	0.10	0.08
	11678.1	Q1.5	Proposed	244	568.65	574.71	2.89	1.82	156.22	54.1	0.10	0.08	0.10	0.08

TABLE T1. HEC-RAS OUTPUT FOR CHANNEL WIDENING AND ROCK PILE AREAS, EXISTING AND PROPOSED CONDITIONS
PERMANENTE CREEK RESTORATION PLAN

Culvert	RiverSta	Profile	Plan	QTotal (cfs)	MinChEl (ft)	W.S.Elev (ft)	HydrDepth (ft)	VelChnl (ft/s)	FlowArea (sqft)	TopWidth (ft)	Manning LOB --	Manning Chan --	Manning ROB --	Manning avg --
CULVERT #6	11620.76	Q100	Existing	1276	567.07	580.48	4.63	7.86	222.97	48.14	0.10	0.05	0.10	0.05
	11620.76	Q100	Proposed	1276	567.07	579.73	4.34	4.53	377.54	87.02	0.07	0.06	0.10	0.05
	11620.76	Q10	Existing	728	567.07	579.85	4.25	5.06	193.21	45.41	0.10	0.05	0.10	0.05
	11620.76	Q10	Proposed	728	567.07	578.63	4.15	3.18	287.12	69.27	0.10	0.06	0.10	0.04
	11620.76	Q1.5	Existing	244	567.07	577.91	2.96	2.66	112.32	37.98	0.10	0.05	0.10	0.05
	11620.76	Q1.5	Proposed	244	567.07	574.59	4.04	2.14	115.9	28.69	0.10	0.06	0.10	0.05
	11550			Culvert										
	11527.04	Q100	Existing	1276	565.75	575.25	3.17	9.37	130	41.0	0.10	0.07	0.03	0.06
	11527.04	Q100	Proposed	1276	565.75	575.35	3.22	9.96	134	41.5	0.10	0.07	0.03	0.06
	11527.04	Q10	Existing	728	565.75	573.94	2.40	9.02	81	33.6	0.10	0.07	0.03	0.06
	11527.04	Q10	Proposed	728	565.75	574.08	2.49	9.33	86	34.4	0.10	0.07	0.03	0.06
	11527.04	Q1.5	Existing	244	565.75	569.71	3.70	10.91	22	14.6		0.07		0.07
	11527.04	Q1.5	Proposed	244	565.75	569.71	3.70	10.91	22	14.6		0.07		0.07
	11476.78	Q100	Existing	1276	564.68	568.48	2.78	16.51	77	27.8		0.07	0.03	0.07
	11476.78	Q100	Proposed	1276	564.68	568.29	2.62	17.74	72	27.5		0.07	0.03	0.07
	11476.78	Q10	Existing	728	564.68	567.63	2.09	13.43	54	25.9		0.07		0.07
	11476.78	Q10	Proposed	728	564.68	567.40	1.91	15.04	48	25.3		0.07		0.07
	11476.78	Q1.5	Existing	244	564.68	566.64	1.29	8.14	30	23.3		0.07		0.07
	11476.78	Q1.5	Proposed	244	564.68	566.60	1.25	8.42	29	23.2		0.07		0.07
	11412.87	Q100	Existing	1276	561.20	569.31	4.98	6.79	190	38.2	0.10	0.07	0.03	0.06
	11412.87	Q100	Proposed	1276	561.20	569.29	4.97	7.27	190	38.2	0.10	0.07	0.03	0.06
	11412.87	Q10	Existing	728	561.20	568.31	4.13	4.82	153	36.9	0.10	0.07	0.03	0.06
	11412.87	Q10	Proposed	728	561.20	568.25	4.08	5.19	151	36.9	0.10	0.07	0.03	0.06
	11412.87	Q1.5	Existing	244	561.20	566.34	3.03	2.89	84	27.8	0.00	0.07		0.07
	11412.87	Q1.5	Proposed	244	561.20	566.34	3.03	2.98	84	27.8	0.10	0.07		0.06

HEC-RAS RESULTS FOR STATIONS 9739 TO 11363 NOT SHOWN ~ PROPOSED CONDITIONS SIMILAR TO EXISTING CONDITIONS

TABLE T2. HEC-RAS OUTPUT FOR MATERIAL REMOVAL AREA, EXISTING AND PROPOSED CONDITIONS
PERMANENTE CREEK RESTORATION PLAN

RiverSta	Profile	Plan	QTotal (cfs)	MinChEl (ft)	W.S.Elev (ft)	HydrDepth (ft)	CritW.S. (ft)	VelChnl (ft/s)	FlowArea (sqft)	TopWidth (ft)	Manning LOB --	Manning Chan --	Manning ROB --	Manning avg --
UPSTREAM BOUNDARY CONDITION = NORMAL DEPTH, SLOPE 0.01														
DOWNSTREAM BOUNDARY CONDITION = NORMAL DEPTH, SLOPE 0.025														
3300	Q100	Existing	858	1258.76	1262.41	2.64	1262.07	8.13	112.84	42.66	0.1	0.06	0.1	0.058
3300	Q10	Existing	489	1258.76	1261.66	2.11	1261.21	6.22	82.25	39.01	0.1	0.06		0.059
3300	Q1.5	Existing	164	1258.76	1260.76	1.41	1260.18	3.42	48.85	34.64	0.1	0.06		0.059
3250	Q100	Existing	858	1258.88	1262.29	2.87		4.42	198.84	69.36	0.1	0.06	0.1	0.058
3250	Q10	Existing	489	1258.88	1261.18	1.91		3.96	124.34	65.17	0.1	0.06		0.059
3250	Q1.5	Existing	164	1258.88	1260	0.85		3.26	50.29	59.3		0.06		0.06
3200	Q100	Existing	858	1257.70	1262.18	3.41		3.19	281.91	82.77	0.1	0.06	0.1	0.059
3200	Q10	Existing	489	1257.70	1261	2.4		2.68	187.3	78.05	0.1	0.06	0.1	0.059
3200	Q1.5	Existing	164	1257.70	1259.48	1.08		2.23	74.22	68.58		0.06	0.1	0.06
3150	Q100	Existing	858	1257.43	1262.03	3.79		3.18	270.13	71.33		0.06		0.06
3150	Q10	Existing	489	1257.43	1260.85	2.86		2.58	189.18	66.08		0.06		0.06
3150	Q1.5	Existing	164	1257.43	1259.28	1.54		1.81	90.83	59.09		0.06		0.06
3100	Q100	Existing	858	1257.05	1261.75	3.81		4	214.71	56.3		0.06	0.1	0.059
3100	Q10	Existing	489	1257.05	1260.63	3.01		3.16	154.78	51.35		0.06		0.06
3100	Q1.5	Existing	164	1257.05	1259.11	1.78		2.02	81.1	45.49		0.06		0.06
3050	Q100	Existing	858	1256.61	1261.64	3.8		3.13	274.38	72.16	0.1	0.06	0.1	0.06
3050	Q10	Existing	489	1256.61	1260.52	3.02		2.48	197.27	65.41		0.06		0.06
3050	Q1.5	Existing	164	1256.61	1259.01	1.87		1.56	105.33	56.28		0.06		0.06
3000	Q100	Existing	858	1256.56	1261.48	3.42		3.27	262.25	76.65		0.06		0.06
3000	Q10	Existing	489	1256.56	1260.37	2.68		2.68	182.19	68		0.06		0.06
3000	Q1.5	Existing	164	1256.56	1258.89	1.59		1.82	89.96	56.4		0.06		0.06

TABLE T2. HEC-RAS OUTPUT FOR MATERIAL REMOVAL AREA, EXISTING AND PROPOSED CONDITIONS
PERMANENTE CREEK RESTORATION PLAN

RiverSta	Profile	Plan	QTotal (cfs)	MinChEl (ft)	W.S.Elev (ft)	HydrDepth (ft)	CritW.S. (ft)	VelChnl (ft/s)	FlowArea (sqft)	TopWidth (ft)	Manning LOB --	Manning Chan --	Manning ROB --	Manning avg --
2950	Q100	Existing	858	1256.22	1261.29	3.18		3.38	256.61	80.78	0.1	0.06	0.1	0.057
2950	Q10	Existing	489	1256.22	1260.17	2.43		2.85	171.72	70.61		0.06	0.1	0.06
2950	Q1.5	Existing	164	1256.22	1258.71	1.55		2.01	81.49	52.68		0.06		0.06
2900	Q100	Existing	858	1255.59	1260.89	2.7		4.44	194.8	72.24	0.1	0.06		0.057
2900	Q10	Existing	489	1255.59	1259.71	2.08		4.12	118.63	56.91		0.06		0.06
2900	Q1.5	Existing	164	1255.59	1258.31	1.38		3.13	52.39	37.96		0.06		0.06
2850	Q100	Existing	858	1254.37	1260.09	2.56		6.62	169.17	66.15	0.1	0.06	0.1	0.057
2850	Q10	Existing	489	1254.37	1258.64	1.87		6.39	87.14	46.66	0.1	0.06	0.1	0.054
2850	Q1.5	Existing	164	1254.37	1257.1	1.2		5.25	31.25	26.05		0.06	0.001	0.06
2800	Q100	Existing	858	1253.42	1259.88	3.22		5.1	206.69	64.18	0.1	0.06	0.1	0.055
2800	Q10	Existing	489	1253.42	1258.34	2.54		4.46	120.56	47.42	0.1	0.06	0.1	0.053
2800	Q1.5	Existing	164	1253.42	1256.39	1.67		3.46	47.42	28.38		0.06	0.1	0.06
2750	Q100	Existing	858	1252.81	1259.67	3.5		4.81	215.05	61.38	0.1	0.06	0.1	0.056
2750	Q10	Existing	489	1252.81	1258.07	2.76		4.18	128.51	46.59	0.1	0.06		0.056
2750	Q1.5	Existing	164	1252.81	1255.96	1.87		3.23	50.83	27.19		0.06		0.06
2700	Q100	Existing	858	1252.52	1259.25	4.06		5.44	159.62	39.27	0.1	0.06	0.1	0.057
2700	Q10	Existing	489	1252.52	1257.61	3.16		4.84	101.07	31.98		0.06		0.06
2700	Q1.5	Existing	164	1252.52	1255.4	1.91		3.93	41.77	21.85		0.06		0.06
2650	Q100	Existing	858	1251.56	1258.3	4.35		7.49	115.02	26.47		0.06	0.1	0.058
2650	Q10	Existing	489	1251.56	1256.76	3.45		6.31	77.51	22.49		0.06		0.06
2650	Q1.5	Existing	164	1251.56	1254.62	2.01		4.7	34.86	17.38		0.06		0.06
2600	Q100	Existing	858	1250.65	1256.05	3.63	1256.05	10.88	78.85	21.74		0.06		0.06
2600	Q10	Existing	489	1250.65	1254.68	2.8	1254.68	9.54	51.26	18.33		0.06		0.06
2600	Q1.5	Existing	164	1250.65	1253.06	1.73	1252.9	6.6	24.85	14.33		0.06		0.06

TABLE T2. HEC-RAS OUTPUT FOR MATERIAL REMOVAL AREA, EXISTING AND PROPOSED CONDITIONS
PERMANENTE CREEK RESTORATION PLAN

RiverSta	Profile	Plan	QTotal (cfs)	MinChEl (ft)	W.S.Elev (ft)	HydrDepth (ft)	CritW.S. (ft)	VelChnl (ft/s)	FlowArea (sqft)	TopWidth (ft)	Manning LOB --	Manning Chan --	Manning ROB --	Manning avg --
2550	Q100	Existing	858	1248.71	1253.43	3.44	1253.7	11.66	73.58	21.4		0.06		0.06
2550	Q10	Existing	489	1248.71	1252.29	2.64	1252.37	9.68	50.52	19.11		0.06		0.06
2550	Q1.5	Existing	164	1248.71	1250.76	1.47	1250.76	6.95	23.61	16.04		0.06		0.06
2500	Q100	Existing	858	1243.85	1248.15	2.89	1249.25	15.25	56.26	19.48		0.06		0.06
2500	Q10	Existing	489	1243.85	1247.02	2.14	1247.91	13.61	35.94	16.78		0.06		0.06
2500	Q1.5	Existing	164	1243.85	1245.71	1.17	1246.21	10.28	15.95	13.61		0.06		0.06
2450	Q100	Existing	858	1238.99	1243.59	2.94	1244.61	15.23	59.66	20.3	0.1	0.06	0.1	0.055
2450	Q10	Existing	489	1238.99	1242.61	2.31	1243.18	12.13	41.08	17.77	0.1	0.06	0.1	0.056
2450	Q1.5	Existing	164	1238.99	1241.37	1.45	1241.51	7.79	21.07	14.58		0.06		0.06
2400	Q100	Existing	858	1230.99	1235.58	2.93	1237.3	19.06	45.01	15.34		0.06		0.06
2400	Q10	Existing	489	1230.99	1234.45	2.23	1235.8	16.9	28.94	12.96		0.06		0.06
2400	Q1.5	Existing	164	1230.99	1232.93	1.19	1233.82	14.09	11.64	9.78		0.06		0.06
2372.58	Q100	Existing	858	1225.04	1228.16	1.82	1229.94	20.43	42.04	23.04	0.1	0.06		0.059
2372.58	Q10	Existing	489	1225.04	1227.56	1.39	1228.77	16.99	28.78	20.72		0.06		0.06
2372.58	Q1.5	Existing	164	1225.04	1226.82	0.97	1227.39	11.06	14.83	15.3		0.06		0.06
2350	Q100	Existing	858	1216.16	1219.13	1.71	1220.94	21.65	39.63	23.16		0.06		0.06
2350	Q10	Existing	489	1216.16	1218.57	1.26	1219.85	18.12	26.99	21.47		0.06		0.06
2350	Q1.5	Existing	164	1216.16	1217.77	0.73	1218.52	14.58	11.25	15.34		0.06		0.06
2300	Q100	Existing	858	1208.34	1212.01	2.23	1212.99	14.16	60.59	27.16		0.06		0.06
2300	Q10	Existing	489	1208.34	1211.34	1.74	1211.92	11.36	43.05	24.8		0.06		0.06
2300	Q1.5	Existing	164	1208.34	1210.4	1.07	1210.62	7.58	21.63	20.22		0.06		0.06
2250	Q100	Existing	858	1204.37	1207.1	1.85	1207.66	12.19	81.82	44.12		0.06	0.1	0.067
2250	Q10	Existing	489	1204.37	1206.5	1.41	1206.83	9.88	56.61	40.23		0.06	0.1	0.067
2250	Q1.5	Existing	164	1204.37	1205.74	0.79	1205.84	6.47	27.92	35.28		0.06	0.1	0.069

TABLE T2. HEC-RAS OUTPUT FOR MATERIAL REMOVAL AREA, EXISTING AND PROPOSED CONDITIONS
PERMANENTE CREEK RESTORATION PLAN

RiverSta	Profile	Plan	QTotal (cfs)	MinChEl (ft)	W.S.Elev (ft)	HydrDepth (ft)	CritW.S. (ft)	VelChnl (ft/s)	FlowArea (sqft)	TopWidth (ft)	Manning LOB --	Manning Chan --	Manning ROB --	Manning avg --
2200	Q100	Existing	858	1197.08	1198.55	1.34	1199.19	11.18	74.07	55.34		0.06	0.1	0.084
2200	Q10	Existing	489	1197.08	1198.08	1.06	1198.55	8.17	50.54	47.69		0.06	0.1	0.086
2200	Q1.5	Existing	164	1197.08	1197.4	0.77	1197.63	3.82	23.48	30.63		0.06	0.1	0.093
2150	Q100	Existing	858	1187.44	1191.56	1.5	1192.35	12.38	79.95	53.27	0.1	0.06	0.1	0.048
2150	Q10	Existing	489	1187.44	1190.67	1.69	1191.22	10.85	47.61	28.09		0.06	0.1	0.056
2150	Q1.5	Existing	164	1187.44	1189.35	1.2	1189.64	8.52	19.25	16		0.06		0.06
2100	Q100	Existing	858	1183.52	1186.38	1.28	1187.15	13.44	77.51	60.49	0.1	0.06	0.1	0.056
2100	Q10	Existing	489	1183.52	1185.92	1.08	1186.45	10.68	51.88	48	0.1	0.06		0.056
2100	Q1.5	Existing	164	1183.52	1185.32	0.84	1185.43	6.38	25.73	30.62	0.1	0.06		0.058
2050	Q100	Existing	858	1178.31	1181.28	1.98	1181.88	11.76	73.06	36.99		0.06	0.1	0.059
2050	Q10	Existing	489	1178.31	1180.6	1.43	1181.01	9.89	49.43	34.49		0.06		0.06
2050	Q1.5	Existing	164	1178.31	1179.75	0.73	1180.01	7.62	21.52	29.48		0.06		0.06
2000	Q100	Existing	858	1170.64	1174.61	2.6	1175.69	15.03	57.1	21.93		0.06		0.06
2000	Q10	Existing	489	1170.64	1173.68	1.91	1174.47	12.98	37.67	19.72		0.06		0.06
2000	Q1.5	Existing	164	1170.64	1172.64	1.07	1172.98	8.88	18.48	17.25		0.06		0.06
1950	Q100	Existing	858	1159.83	1163.56	2.18	1165.32	19.7	43.55	19.94		0.06		0.06
1950	Q10	Existing	489	1159.83	1162.73	1.74	1164.09	17.14	28.52	16.43		0.06		0.06
1950	Q1.5	Existing	164	1159.83	1161.55	1.06	1162.39	13.58	12.08	11.41		0.06		0.06
1900	Q100	Existing	858	1151.21	1154.62	2.34	1156.21	18.28	48.93	20.91	0.1	0.06	0.1	0.055
1900	Q10	Existing	489	1151.21	1153.83	1.85	1154.86	14.74	33.43	18.11	0.1	0.06	0.1	0.057
1900	Q1.5	Existing	164	1151.21	1152.81	1.16	1153.26	9.73	16.85	14.53		0.06		0.06
1850	Q100	Existing	858	1145.20	1149.59	2.38	1150.58	15.73	68.11	28.63	0.1	0.06	0.1	0.064
1850	Q10	Existing	489	1145.20	1148.87	1.8	1149.47	12.27	48.32	26.79	0.1	0.06	0.1	0.061
1850	Q1.5	Existing	164	1145.20	1147.76	1.07	1148.05	8.35	20.69	19.37	0.1	0.06		0.054

TABLE T2. HEC-RAS OUTPUT FOR MATERIAL REMOVAL AREA, EXISTING AND PROPOSED CONDITIONS
PERMANENTE CREEK RESTORATION PLAN

RiverSta	Profile	Plan	QTotal (cfs)	MinChEl (ft)	W.S.Elev (ft)	HydrDepth (ft)	CritW.S. (ft)	VelChnl (ft/s)	FlowArea (sqft)	TopWidth (ft)	Manning LOB --	Manning Chan --	Manning ROB --	Manning avg --
1800	Q100	Existing	858	1141.77	1146.45	2.7	1146.96	13.16	81.87	30.37	0.1	0.06	0.1	0.062
1800	Q10	Existing	489	1141.77	1145.47	1.97	1145.82	10.94	53.58	27.21	0.1	0.06	0.1	0.061
1800	Q1.5	Existing	164	1141.77	1144.32	1.04	1144.45	7.37	24.41	23.51	0.1	0.06	0.1	0.055
1750	Q100	Existing	858	1137.61	1141.97	2.51	1142.93	14.81	64.68	25.8	0.1	0.06	0.1	0.059
1750	Q10	Existing	489	1137.61	1141.04	1.88	1141.73	12.44	42.44	22.64	0.1	0.06		0.057
1750	Q1.5	Existing	164	1137.61	1139.72	1.3	1140.11	9.32	17.6	13.59		0.06		0.06
1685.16	Q100	Existing	858	1129.12	1132.69	2.34	1134.12	17.53	49.57	21.21	0.1	0.06	0.1	0.057
1685.16	Q10	Existing	489	1129.12	1131.91	1.76	1132.89	14.51	33.69	19.15		0.06		0.06
1685.16	Q1.5	Existing	164	1129.12	1130.84	1.11	1131.36	10.33	15.87	14.27		0.06		0.06
1631.51	Q100	Existing	858	1123.59	1127.42	1.53	1128.1	15.19	96.4	62.86	0.1	0.06	0.1	0.073
1631.51	Q10	Existing	489	1123.59	1126.96	1.27	1127.36	11.67	69.52	54.9	0.1	0.06	0.1	0.069
1631.51	Q1.5	Existing	164	1123.59	1126.15	0.77	1126.38	7.99	31.03	40.14	0.1	0.06	0.1	0.059
1558.62	Q100	Existing	858	1114.84	1120.21	2.6	1120.62	14.6	68.44	26.34	0.1	0.06	0.1	0.05
1558.62	Q10	Existing	489	1114.84	1118.46	2.92	1119.35	13.73	35.66	12.23	0.1	0.06	0.1	0.058
1558.62	Q1.5	Existing	164	1114.84	1116.38	1.36	1117.12	12.5	13.12	9.67		0.06		0.06
1514	Q100	Existing	858	1110.83	1115.72	1.78	1117.05	15.55	59.08	33.17	0.1	0.06		0.049
1514	Q10	Existing	489	1110.83	1115.07	2.54	1115.72	11.38	42.99	16.94		0.06		0.06
1514	Q1.5	Existing	164	1110.83	1113.67	1.69	1113.67	7.47	21.96	12.96		0.06		0.06
1485.63	Q100	Existing	858	1106.93	1110.66	2.33	1112.03	16.99	50.5	21.64		0.06		0.06
1485.63	Q10	Existing	489	1106.93	1109.79	1.59	1110.85	15.19	32.2	20.2		0.06		0.06
1485.63	Q1.5	Existing	164	1106.93	1108.5	1.14	1109.44	13.39	12.25	10.73		0.06		0.06
1451.92	Q100	Existing	858	1104.87	1109.36	2.38	1109.81	11.76	85.48	35.91		0.06	0.1	0.059
1451.92	Q10	Existing	489	1104.87	1108.65	1.74	1108.8	9.07	60.36	34.71		0.06	0.1	0.052
1451.92	Q1.5	Existing	164	1104.87	1107.17	1.41	1107.17	6.81	24.08	17.05		0.06		0.06

TABLE T2. HEC-RAS OUTPUT FOR MATERIAL REMOVAL AREA, EXISTING AND PROPOSED CONDITIONS
PERMANENTE CREEK RESTORATION PLAN

RiverSta	Profile	Plan	QTotal (cfs)	MinChEl (ft)	W.S.Elev (ft)	HydrDepth (ft)	CritW.S. (ft)	VelChnl (ft/s)	FlowArea (sqft)	TopWidth (ft)	Manning LOB --	Manning Chan --	Manning ROB --	Manning avg --
1418.62	Q100	Existing	858	1102.17	1105.89	1.85	1106.79	13.78	65.04	35.23		0.06	0.1	0.053
1418.62	Q10	Existing	489	1102.17	1104.96	1.7	1105.75	12.62	38.75	22.85		0.06		0.06
1418.62	Q1.5	Existing	164	1102.17	1103.89	1.08	1104.3	9.27	17.7	16.39		0.06		0.06
1362.71	Q100	Existing	858	1097.54	1101.8	2.45	1102.32	11.52	74.46	30.4		0.06		0.06
1362.71	Q10	Existing	489	1097.54	1101.05	2	1101.27	9.2	53.15	26.51		0.06		0.06
1362.71	Q1.5	Existing	164	1097.54	1099.83	1.26	1099.86	6.61	24.82	19.63		0.06		0.06
1308.81	Q100	Existing	858	1094.21	1098.37	2.04	1099.03	12.35	86.75	42.61	0.1	0.06	0.1	0.056
1308.81	Q10	Existing	489	1094.21	1097.47	1.6	1097.87	10.49	53.48	33.49	0.1	0.06	0.1	0.054
1308.81	Q1.5	Existing	164	1094.21	1096.35	1.08	1096.49	7.19	22.96	21.35	0.1	0.06	0.1	0.057
1243.78	Q100	Existing	858	1090.38	1094.43	2.43	1094.92	11.75	74.51	30.63	0.1	0.06	0.1	0.057
1243.78	Q10	Existing	489	1090.38	1093.74	1.88	1093.93	9.12	53.92	28.72	0.001	0.06	0.1	0.059
1243.78	Q1.5	Existing	164	1090.38	1092.66	1.18	1092.66	6.25	26.24	22.27		0.06		0.06
1172.3	Q100	Existing	858	1082.54	1087.59	2.84	1088.92	14.59	58.92	20.72	0.1	0.06		0.057
1172.3	Q10	Existing	489	1082.54	1086.22	2.4	1087.14	13.68	35.76	14.87		0.06		0.06
1172.3	Q1.5	Existing	164	1082.54	1084.48	1.34	1085.17	11.83	13.86	10.32		0.06		0.06
1126.39	Q100	Existing	858	1076.73	1080.07	2.3	1081.49	17.54	48.91	21.23		0.06		0.06
1126.39	Q10	Existing	489	1076.73	1079.36	1.68	1080.32	14.33	34.13	20.29		0.06		0.06
1126.39	Q1.5	Existing	164	1076.73	1078.53	1.1	1078.88	8.84	18.55	16.94		0.06		0.06
1063.6	Q100	Existing	858	1073.21	1078.42	2.94	1078.42	10.92	92.8	31.59	0.1	0.06	0.1	0.055
1063.6	Q10	Existing	489	1073.21	1077.11	2.3	1077.11	9.38	56.17	24.43	0.1	0.06	0.1	0.054
1063.6	Q1.5	Existing	164	1073.21	1075.47	1.51	1075.47	7.04	23.3	15.4		0.06		0.06
992.88	Q100	Existing	858	1069.14	1072.5	1.72	1073.46	14.5	59.57	34.73	0.1	0.06	0.1	0.058
992.88	Q10	Existing	489	1069.14	1072.05	1.39	1072.59	10.99	44.49	32.03		0.06		0.06
992.88	Q1.5	Existing	164	1069.14	1071.39	1.01	1071.47	6.44	25.48	25.16		0.06		0.06

TABLE T2. HEC-RAS OUTPUT FOR MATERIAL REMOVAL AREA, EXISTING AND PROPOSED CONDITIONS
PERMANENTE CREEK RESTORATION PLAN

RiverSta	Profile	Plan	QTotal (cfs)	MinChEl (ft)	W.S.Elev (ft)	HydrDepth (ft)	CritW.S. (ft)	VelChnl (ft/s)	FlowArea (sqft)	TopWidth (ft)	Manning LOB --	Manning Chan --	Manning ROB --	Manning avg --
965.98	Q100	Existing	858	1067.81	1072.71	2.48	1072.71	9.87	121.43	48.96	0.1	0.06	0.1	0.061
965.98	Q10	Existing	489	1067.81	1071.68	1.74	1071.68	8.5	73.54	42.28	0.1	0.06	0.1	0.055
965.98	Q1.5	Existing	164	1067.81	1070.18	1.61	1070.04	6.38	25.69	15.95		0.06		0.06
896.36	Q100	Existing	858	1065.69	1070.42	3.27	1069.71	8.01	120.03	36.7	0.1	0.06	0.1	0.058
896.36	Q10	Existing	489	1065.69	1068.53	1.79	1068.73	9.13	55.1	30.85	0.1	0.06	0.1	0.055
896.36	Q1.5	Existing	164	1065.69	1067.52	1.3	1067.4	5.76	28.49	21.89		0.06		0.06
863.1	Q100	Existing	858	1063.94	1070.05	4.28		8.47	149.47	34.93	0.1	0.06	0.1	0.07
863.1	Q10	Existing	489	1063.94	1068.02	2.86	1067.36	8.07	84.22	29.42	0.1	0.06	0.1	0.069
863.1	Q1.5	Existing	164	1063.94	1065.99	1.25	1065.99	7.03	30.01	24.07	0.1	0.06	0.1	0.064
828.53	Q100	Existing	858	1061.14	1067.83	3.5	1067.83	13.64	96.69	27.66	0.1	0.06	0.1	0.061
828.53	Q10	Existing	489	1061.14	1066.1	3	1066.1	11.53	57.82	19.26	0.1	0.06	0.1	0.061
828.53	Q1.5	Existing	164	1061.14	1063.94	1.65	1064.04	8.67	22.8	13.85	0.1	0.06	0.1	0.058
826.84	Q100	Existing	858	1060.76	1065.18	2.97	1066.62	17.16	51.18	17.23	0.1	0.06	0.1	0.055
826.84	Q10	Existing	489	1060.76	1063.92	2.35	1065.01	15.17	32.23	13.7		0.06		0.06
826.84	Q1.5	Existing	164	1060.76	1062.44	1.18	1063.12	12.12	13.54	11.44		0.06		0.06
803.52	Q100	Existing	858	1055.18	1059.39	3	1061.57	21.35	43.46	14.47	0.1	0.06	0.1	0.053
803.52	Q10	Existing	489	1055.18	1058.21	2.25	1059.74	18.16	27.63	12.26	0.1	0.06	0.1	0.055
803.52	Q1.5	Existing	164	1055.18	1056.86	1.31	1057.62	12.8	12.81	9.77		0.06		0.06
788.49	Q100	Existing	858	1052.86	1056.12	2.37	1058.14	21.75	41.1	17.33	0.1	0.06	0.1	0.056
788.49	Q10	Existing	489	1052.86	1055.39	1.78	1056.71	17.31	28.76	16.2	0.1	0.06	0.1	0.057
788.49	Q1.5	Existing	164	1052.86	1054.56	1.08	1055.04	10.3	15.93	14.75		0.06	0.1	0.06
752.92	Q100	Existing	858	1042.81	1046.27	1.89	1048.21	23.5	43.7	23.15	0.1	0.06		0.06
752.92	Q10	Existing	489	1042.81	1045.56	1.49	1047.09	19.36	28.64	19.25	0.1	0.06		0.057
752.92	Q1.5	Existing	164	1042.81	1044.45	0.97	1045.36	14.49	11.41	11.71	0.1	0.06		0.057

TABLE T2. HEC-RAS OUTPUT FOR MATERIAL REMOVAL AREA, EXISTING AND PROPOSED CONDITIONS
PERMANENTE CREEK RESTORATION PLAN

RiverSta	Profile	Plan	QTotal (cfs)	MinChEl (ft)	W.S.Elev (ft)	HydrDepth (ft)	CritW.S. (ft)	VelChnl (ft/s)	FlowArea (sqft)	TopWidth (ft)	Manning LOB --	Manning Chan --	Manning ROB --	Manning avg --
740.16	Q100	Existing	858	1041.85	1046.1	2.35	1047.54	17.98	55.96	23.82	0.1	0.06	0.1	0.057
740.16	Q10	Existing	489	1041.85	1045.37	1.83	1046.25	13.86	39.41	21.49	0.1	0.06	0.1	0.055
740.16	Q1.5	Existing	164	1041.85	1044.44	1.28	1044.6	7.87	21.25	16.6	0.1	0.06	0.1	0.055
709.95	Q100	Existing	858	1038.62	1044.11	2.77	1045.02	14.59	62.93	22.69	0.1	0.06	0.1	0.052
709.95	Q10	Existing	489	1038.62	1042.93	2.83	1043.48	12.09	40.45	14.27		0.06		0.06
709.95	Q1.5	Existing	164	1038.62	1040.92	1.5	1041.42	10.48	15.64	10.42		0.06		0.06
659.75	Q100	Existing	858	1036.65	1042.11	3.38	1042.22	11.68	76.31	22.58	0.1	0.06	0.1	0.054
659.75	Q10	Existing	489	1036.65	1040.84	2.79	1040.84	9.64	50.84	18.25	0.1	0.06	0.1	0.058
659.75	Q1.5	Existing	164	1036.65	1039.05	1.65	1039.05	7.35	22.31	13.53		0.06		0.06
597.67	Q100	Existing	858	1033.94	1038.55	3.36	1039.05	13.03	67.19	19.97	0.1	0.06	0.1	0.056
597.67	Q10	Existing	489	1033.94	1037.53	2.58	1037.72	10.31	47.57	18.42	0.1	0.06	0	0.059
597.67	Q1.5	Existing	164	1033.94	1036.13	1.64	1036.04	6.75	24.31	14.84		0.06		0.06
552.31	Q100	Existing	858	1032.03	1036.48	3.07	1036.85	12.21	74.45	24.26	0.1	0.06	0.1	0.055
552.31	Q10	Existing	489	1032.03	1035.48	2.44	1035.56	9.64	51.77	21.24	0.1	0.06	0.1	0.056
552.31	Q1.5	Existing	164	1032.03	1033.95	1.53	1033.95	7.03	23.33	15.28		0.06		0.06
500	Q100	Existing	858	1028.47	1033.33	3.07	1033.96	13.38	68.21	22.21	0.1	0.06	0.1	0.053
500	Q10	Existing	489	1028.47	1032.06	2.53	1032.45	11.37	43.37	17.14	0.1	0.06	0	0.058
500	Q1.5	Existing	164	1028.47	1030.49	1.51	1030.67	8.25	19.89	13.14		0.06		0.06
450	Q100	Existing	858	1026.39	1031.14	2.67	1031.65	11.75	77.1	28.86	0.1	0.06	0	0.054
450	Q10	Existing	489	1026.39	1030.2	2.45	1030.2	9.22	53.28	21.73	0.1	0.06		0.057
450	Q1.5	Existing	164	1026.39	1028.49	1.56	1028.49	7.14	22.96	14.71		0.06		0.06
400	Q100	Existing	858	1024.77	1028.21	2.06	1028.76	12.22	83.15	40.38	0.1	0.06	0.1	0.06
400	Q10	Existing	489	1024.77	1028.15	2.01	1027.89	7.15	80.82	40.25	0.1	0.06	0.1	0.06
400	Q1.5	Existing	164	1024.77	1027	1.09	1026.74	4.79	36.71	33.79	0.1	0.06	0	0.055

TABLE T2. HEC-RAS OUTPUT FOR MATERIAL REMOVAL AREA, EXISTING AND PROPOSED CONDITIONS
PERMANENTE CREEK RESTORATION PLAN

RiverSta	Profile	Plan	QTotal (cfs)	MinChEl (ft)	W.S.Elev (ft)	HydrDepth (ft)	CritW.S. (ft)	VelChnl (ft/s)	FlowArea (sqft)	TopWidth (ft)	Manning LOB --	Manning Chan --	Manning ROB --	Manning avg --
3300	Q100	Proposed	858	1258.76	1262.38	2.62	1262.10	8.57	111	42.5	0.10	0.06	0.10	0.06
3300	Q10	Proposed	489	1258.76	1261.63	2.08	1261.22	6.52	81	38.8	0.10	0.06	0.10	0.06
3300	Q1.5	Proposed	164	1258.76	1260.75	1.40	1260.18	3.51	48	34.6	0.10	0.06	0.10	0.06
3250	Q100	Proposed	858	1258.88	1262.32	2.90		4.45	201	69.5	0.10	0.06	0.10	0.06
3250	Q10	Proposed	489	1258.88	1261.15	1.88		4.08	122	65.1	0.10	0.06	0.10	0.06
3250	Q1.5	Proposed	164	1258.88	1260.00	0.85		3.27	50	59.3		0.06	0.10	0.06
3200	Q100	Proposed	858	1257.70	1262.22	3.44		3.15	286	83.0	0.10	0.06	0.10	0.06
3200	Q10	Proposed	489	1257.70	1260.96	2.37		2.72	184	77.9	0.10	0.06	0.10	0.06
3200	Q1.5	Proposed	164	1257.70	1259.43	1.05		2.35	71	67.5		0.06	0.10	0.06
3150	Q100	Proposed	858	1257.43	1262.05	3.81		3.48	272	71.5	0.10	0.06	0.10	0.06
3150	Q10	Proposed	489	1257.43	1260.80	2.82		2.82	186	65.9	0.10	0.06	0.10	0.06
3150	Q1.5	Proposed	164	1257.43	1259.19	1.46		1.98	86	58.7	0.10	0.06	0.10	0.06
3100	Q100	Proposed	858	1257.05	1261.75	3.81		4.54	215	56.3	0.10	0.06	0.10	0.06
3100	Q10	Proposed	489	1257.05	1260.55	2.95		3.57	151	51.1	0.10	0.06	0.10	0.06
3100	Q1.5	Proposed	164	1257.05	1258.98	1.67		2.29	75	45.0	0.10	0.06	0.10	0.06
3050	Q100	Proposed	858	1256.61	1261.66	3.81		3.59	276	72.3	0.10	0.06	0.10	0.06
3050	Q10	Proposed	489	1256.61	1260.45	2.96		2.82	192	65.0	0.10	0.06	0.10	0.06
3050	Q1.5	Proposed	164	1256.61	1258.86	1.75		1.77	97	55.4	0.10	0.06	0.10	0.06
3000	Q100	Proposed	858	1256.56	1261.49	3.43		3.78	263	76.7	0.10	0.06	0.10	0.06
3000	Q10	Proposed	489	1256.56	1260.28	2.62		3.07	176	67.3	0.10	0.06	0.10	0.06
3000	Q1.5	Proposed	164	1256.56	1258.70	1.45		2.14	79	54.9	0.10	0.06	0.10	0.06
2950	Q100	Proposed	858	1256.22	1261.35	3.22		3.32	262	81.3	0.10	0.06	0.10	0.06
2950	Q10	Proposed	489	1256.22	1260.10	2.39		2.94	166	69.6		0.06	0.10	0.06
2950	Q1.5	Proposed	164	1256.22	1258.42	1.36		2.46	67	49.1		0.06		0.06

TABLE T2. HEC-RAS OUTPUT FOR MATERIAL REMOVAL AREA, EXISTING AND PROPOSED CONDITIONS
PERMANENTE CREEK RESTORATION PLAN

RiverSta	Profile	Plan	QTotal (cfs)	MinChEl (ft)	W.S.Elev (ft)	HydrDepth (ft)	CritW.S. (ft)	VelChnl (ft/s)	FlowArea (sqft)	TopWidth (ft)	Manning LOB --	Manning Chan --	Manning ROB --	Manning avg --
2900	Q100	Proposed	858	1255.40	1260.41	2.52		7.89	168	66.6	0.10	0.06	0.10	0.06
2900	Q10	Proposed	489	1255.40	1259.06	1.90	1258.66	7.26	91	47.8	0.10	0.06	0.10	0.06
2900	Q1.5	Proposed	164	1255.40	1257.52	1.29		5.21	34	26.2	0.10	0.06	0.10	0.05
2850	Q100	Proposed	858	1253.92	1258.70	2.69	1258.70	10.49	110	40.8	0.10	0.06	0.10	0.06
2850	Q10	Proposed	489	1253.92	1257.84	2.16	1257.59	8.04	77	35.8	0.10	0.06	0.10	0.06
2850	Q1.5	Proposed	164	1253.92	1256.59	1.31		4.95	37	28.3	0.10	0.06	0.10	0.05
2800	Q100	Proposed	858	1253.07	1258.02	2.72	1257.50	8.36	156	57.3	0.10	0.06	0.10	0.07
2800	Q10	Proposed	489	1253.07	1256.98	1.95		7.11	99	51.0	0.10	0.06	0.10	0.06
2800	Q1.5	Proposed	164	1253.07	1255.73	0.97		4.88	40	41.5	0.10	0.06	0.10	0.05
2750	Q100	Proposed	858	1252.22	1257.52	3.01		7.01	192	63.7	0.10	0.06	0.10	0.07
2750	Q10	Proposed	489	1252.22	1256.37	2.09		6.1	122	58.1	0.10	0.06	0.10	0.07
2750	Q1.5	Proposed	164	1252.22	1254.89	0.88	1254.41	4.86	41	46.8	0.10	0.06	0.10	0.04
2700	Q100	Proposed	858	1251.38	1256.47	2.97		8.48	147	49.3	0.10	0.06	0.10	0.07
2700	Q10	Proposed	489	1251.38	1255.42	2.12		7.03	97	45.7	0.10	0.06	0.10	0.06
2700	Q1.5	Proposed	164	1251.38	1254.06	1.11		4.82	40	36.0	0.10	0.06	0.10	0.05
2650	Q100	Proposed	858	1250.58	1255.80	3.11		7.82	163	52.3	0.10	0.06	0.10	0.07
2650	Q10	Proposed	489	1250.58	1254.73	2.21		6.48	109	49.0	0.10	0.06	0.10	0.07
2650	Q1.5	Proposed	164	1250.58	1253.40	1.11		4.38	47	42.3	0.10	0.06	0.10	0.05
2600	Q100	Proposed	858	1249.76	1254.13	2.53	1254.13	10.31	119	46.9	0.10	0.06	0.10	0.07
2600	Q10	Proposed	489	1249.76	1253.27	1.80	1253.27	8.47	80	44.3	0.10	0.06	0.10	0.06
2600	Q1.5	Proposed	164	1249.76	1252.04	0.87	1252.04	6.32	28	32.8	0.10	0.06	0.10	0.05
2550	Q100	Proposed	858	1247.32	1251.43	2.28	1251.86	12.19	96	42.2	0.10	0.06	0.10	0.06
2550	Q10	Proposed	489	1247.32	1250.54	1.51	1250.95	10.49	60	39.7	0.10	0.06	0.10	0.06
2550	Q1.5	Proposed	164	1247.32	1249.40	1.35	1249.54	7.32	22	16.6	0.00	0.06		0.06

TABLE T2. HEC-RAS OUTPUT FOR MATERIAL REMOVAL AREA, EXISTING AND PROPOSED CONDITIONS
PERMANENTE CREEK RESTORATION PLAN

RiverSta	Profile	Plan	QTotal (cfs)	MinChEl (ft)	W.S.Elev (ft)	HydrDepth (ft)	CritW.S. (ft)	VelChnl (ft/s)	FlowArea (sqft)	TopWidth (ft)	Manning LOB --	Manning Chan --	Manning ROB --	Manning avg --
2500	Q100	Proposed	858	1243.63	1247.22	1.92	1248.05	14.54	80	41.6	0.10	0.06	0.10	0.06
2500	Q10	Proposed	489	1243.63	1246.53	1.33	1247.15	12.03	52	39.1	0.10	0.06	0.10	0.06
2500	Q1.5	Proposed	164	1243.63	1245.55	1.13	1245.88	8.27	20	17.6	0.10	0.06		0.06
2450	Q100	Proposed	858	1234.43	1237.46	1.34	1238.89	19.89	56	41.4	0.10	0.06	0.10	0.06
2450	Q10	Proposed	489	1234.43	1236.83	1.01	1238.00	17.16	32	31.5	0.10	0.06	0.10	0.05
2450	Q1.5	Proposed	164	1234.43	1235.81	0.91	1236.67	13.62	12	13.2		0.06		0.06
2400	Q100	Proposed	858	1223.18	1226.18	1.35	1227.59	19.94	56	41.4	0.10	0.06	0.10	0.06
2400	Q10	Proposed	489	1223.18	1225.66	0.93	1226.71	16.15	35	37.7	0.10	0.06	0.10	0.05
2400	Q1.5	Proposed	164	1223.18	1224.81	1.09	1225.42	10.5	16	14.4		0.06		0.06
2372.58	Q100	Proposed	858	1217.59	1220.73	1.23	1222.11	19.4	59	48.0	0.10	0.06	0.10	0.05
2372.58	Q10	Proposed	489	1217.59	1220.08	1.12	1221.29	16.2	34	30.0	0.10	0.06	0.10	0.05
2372.58	Q1.5	Proposed	164	1217.59	1219.09	1.00	1219.73	11.57	14	14.1		0.06		0.06
2350	Q100	Proposed	858	1213.54	1216.14	1.02	1217.32	19.4	64	62.7	0.10	0.06	0.10	0.06
2350	Q10	Proposed	489	1213.54	1215.74	0.82	1216.63	15.64	41	50.2	0.10	0.06	0.10	0.05
2350	Q1.5	Proposed	164	1213.54	1215.10	1.00	1215.64	9.95	16	16.5		0.06		0.06
2300	Q100	Proposed	858	1203.29	1206.52	1.30	1207.73	17.55	67	51.2	0.10	0.06	0.10	0.06
2300	Q10	Proposed	489	1203.29	1205.87	1.13	1206.88	14.94	39	34.3		0.06	0.10	0.05
2300	Q1.5	Proposed	164	1203.29	1204.81	1.00	1205.49	11.56	14	14.2		0.06		0.06
2250	Q100	Proposed	858	1193.29	1196.26	0.90	1197.40	19.43	67	74.5	0.10	0.06	0.10	0.05
2250	Q10	Proposed	489	1193.29	1195.78	0.73	1196.83	16.07	37	50.2	0.10	0.06	0.10	0.04
2250	Q1.5	Proposed	164	1193.29	1194.90	1.07	1195.50	10.76	15	14.3		0.06		0.06
2200	Q100	Proposed	858	1184.02	1187.10	1.04	1188.24	17.77	72	68.7	0.10	0.06	0.10	0.05
2200	Q10	Proposed	489	1184.02	1186.55	0.89	1187.53	15.01	40	44.7	0.10	0.06	0.10	0.05
2200	Q1.5	Proposed	164	1184.02	1185.59	1.04	1186.24	10.85	15	14.5		0.06		0.06

TABLE T2. HEC-RAS OUTPUT FOR MATERIAL REMOVAL AREA, EXISTING AND PROPOSED CONDITIONS
PERMANENTE CREEK RESTORATION PLAN

RiverSta	Profile	Plan	QTotal (cfs)	MinChEl (ft)	W.S.Elev (ft)	HydrDepth (ft)	CritW.S. (ft)	VelChnl (ft/s)	FlowArea (sqft)	TopWidth (ft)	Manning LOB --	Manning Chan --	Manning ROB --	Manning avg --
2150	Q100	Proposed	858	1177.80	1181.22	1.16	1182.09	15.28	89	76.5	0.10	0.06	0.10	0.06
2150	Q10	Proposed	489	1177.80	1180.65	0.93	1181.47	12.71	51	55.2	0.10	0.06	0.10	0.05
2150	Q1.5	Proposed	164	1177.80	1179.68	1.25	1180.00	8.5	19	15.5		0.06		0.06
2100	Q100	Proposed	858	1172.74	1175.88	1.17	1176.70	14.62	88	75.2	0.10	0.06	0.10	0.06
2100	Q10	Proposed	489	1172.74	1175.34	0.86	1176.05	12.39	51	58.5	0.10	0.06	0.10	0.05
2100	Q1.5	Proposed	164	1172.74	1174.39	1.08	1174.78	8.83	19	17.1		0.06		0.06
2050	Q100	Proposed	858	1168.07	1171.44	1.51	1172.07	13.45	99	65.6	0.10	0.06	0.10	0.06
2050	Q10	Proposed	489	1168.07	1170.88	0.97	1171.41	11.37	62	64.2	0.10	0.06	0.10	0.05
2050	Q1.5	Proposed	164	1168.07	1170.01	1.01	1170.34	7.78	21	21.1	0.10	0.06		0.05
2000	Q100	Proposed	858	1163.49	1167.21	1.79	1167.91	13.62	90	50.4	0.10	0.06	0.10	0.06
2000	Q10	Proposed	489	1163.49	1166.47	1.14	1167.09	11.79	54	47.6	0.10	0.06	0.10	0.05
2000	Q1.5	Proposed	164	1163.49	1165.32	1.20	1165.67	8.91	18	15.3		0.06		0.06
1950	Q100	Proposed	858	1158.77	1162.03	1.38	1162.91	15.36	85	61.6	0.10	0.06	0.10	0.06
1950	Q10	Proposed	489	1158.77	1161.49	0.98	1162.15	12.76	53	54.2	0.10	0.06	0.10	0.05
1950	Q1.5	Proposed	164	1158.77	1160.69	1.26	1161.10	8.22	20	15.9		0.06		0.06
1900	Q100	Proposed	858	1153.17	1156.53	1.52	1157.39	14.94	83	54.7	0.10	0.06	0.10	0.06
1900	Q10	Proposed	489	1153.17	1155.91	1.03	1156.62	12.72	50	48.8	0.10	0.06	0.10	0.05
1900	Q1.5	Proposed	164	1153.17	1154.87	1.12	1155.43	9.71	17	15.1		0.06		0.06
1850	Q100	Proposed	858	1147.50	1150.88	1.42	1151.77	15.4	82	58.0	0.10	0.06	0.10	0.06
1850	Q10	Proposed	489	1147.50	1150.31	0.91	1151.04	12.93	50	54.8	0.10	0.06	0.10	0.05
1850	Q1.5	Proposed	164	1147.50	1149.37	1.23	1149.68	8.58	19	15.6		0.06		0.06
1800	Q100	Proposed	858	1141.76	1145.13	1.51	1146.07	15.6	79	52.3	0.10	0.06	0.10	0.06
1800	Q10	Proposed	489	1141.76	1144.52	0.96	1145.29	13.28	48	49.5	0.10	0.06	0.10	0.05
1800	Q1.5	Proposed	164	1141.76	1143.50	1.15	1144.00	9.58	17	14.9		0.06		0.06

TABLE T2. HEC-RAS OUTPUT FOR MATERIAL REMOVAL AREA, EXISTING AND PROPOSED CONDITIONS
PERMANENTE CREEK RESTORATION PLAN

RiverSta	Profile	Plan	QTotal (cfs)	MinChEl (ft)	W.S.Elev (ft)	HydrDepth (ft)	CritW.S. (ft)	VelChnl (ft/s)	FlowArea (sqft)	TopWidth (ft)	Manning LOB --	Manning Chan --	Manning ROB --	Manning avg --
1750	Q100	Proposed	858	1135.99	1139.36	1.52	1140.33	15.66	78	51.5	0.10	0.06	0.10	0.06
1750	Q10	Proposed	489	1135.99	1138.75	1.02	1139.49	13.16	48	47.0	0.10	0.06	0.10	0.05
1750	Q1.5	Proposed	164	1135.99	1137.81	1.21	1138.20	8.89	18	15.3		0.06		0.06
1685.16	Q100	Proposed	858	1128.19	1131.58	1.58	1132.59	16.02	74	47.1	0.10	0.06	0.10	0.06
1685.16	Q10	Proposed	489	1128.19	1130.92	1.13	1131.76	13.5	45	39.9	0.10	0.06	0.10	0.05
1685.16	Q1.5	Proposed	164	1128.19	1129.89	1.14	1130.40	9.66	17	14.8		0.06		0.06
1631.51	Q100	Proposed	858	1122.32	1125.56	1.33	1126.45	15.32	82	61.8	0.10	0.06	0.10	0.06
1631.51	Q10	Proposed	489	1122.32	1125.04	0.97	1125.72	12.59	51	52.7	0.10	0.06	0.10	0.05
1631.51	Q1.5	Proposed	164	1122.32	1124.13	1.03	1124.49	8.46	19	18.9	0.10	0.06		0.06
1558.62	Q100	Proposed	858	1114.01	1117.50	1.70	1118.41	15.2	78	46.1	0.10	0.06	0.10	0.06
1558.62	Q10	Proposed	489	1114.01	1116.82	1.12	1117.55	13	48	42.8	0.10	0.06	0.10	0.05
1558.62	Q1.5	Proposed	164	1114.01	1115.76	1.15	1116.21	9.56	17	14.9		0.06		0.06
1514	Q100	Proposed	858	1109.32	1112.91	1.71	1113.88	15.07	74	43.3	0.10	0.06	0.10	0.06
1514	Q10	Proposed	489	1109.32	1112.18	1.31	1112.94	12.59	45	34.6	0.10	0.06	0.10	0.05
1514	Q1.5	Proposed	164	1109.32	1111.18	1.23	1111.48	8.36	20	16.0		0.06		0.06
1485.63	Q100	Proposed	858	1106.89	1110.30	1.70	1111.18	14.68	77	45.3	0.10	0.06	0.10	0.06
1485.63	Q10	Proposed	489	1106.89	1109.68	1.24	1110.32	11.84	50	40.5	0.10	0.06	0.10	0.05
1485.63	Q1.5	Proposed	164	1106.89	1108.70	1.20	1109.00	8.09	20	16.9		0.06		0.06
1451.92	Q100	Proposed	858	1104.73	1108.63	1.80	1109.10	12.05	104	57.7	0.10	0.06	0.10	0.06
1451.92	Q10	Proposed	489	1104.73	1108.00	1.23	1108.36	9.76	68	55.6	0.10	0.06	0.10	0.05
1451.92	Q1.5	Proposed	164	1104.73	1106.88	1.31	1106.88	6.73	24	18.6	0.00	0.06	0.10	0.06
1418.62	Q100	Proposed	858	1102.38	1106.14	1.53	1106.82	13.34	98	64.4	0.10	0.06	0.10	0.06
1418.62	Q10	Proposed	489	1102.38	1105.46	1.08	1106.07	11.42	57	53.0	0.10	0.06	0.10	0.05
1418.62	Q1.5	Proposed	164	1102.38	1104.32	1.26	1104.58	8.26	20	15.8		0.06		0.06

TABLE T2. HEC-RAS OUTPUT FOR MATERIAL REMOVAL AREA, EXISTING AND PROPOSED CONDITIONS
PERMANENTE CREEK RESTORATION PLAN

RiverSta	Profile	Plan	QTotal (cfs)	MinChEl (ft)	W.S.Elev (ft)	HydrDepth (ft)	CritW.S. (ft)	VelChnl (ft/s)	FlowArea (sqft)	TopWidth (ft)	Manning LOB --	Manning Chan --	Manning ROB --	Manning avg --
1362.71	Q100	Proposed	858	1098.39	1101.88	1.61	1102.55	13.54	94	58.0	0.10	0.06	0.10	0.06
1362.71	Q10	Proposed	489	1098.39	1101.26	1.11	1101.80	11.37	59	53.3	0.10	0.06	0.10	0.05
1362.71	Q1.5	Proposed	164	1098.39	1100.43	1.08	1100.63	7.28	23	21.0	0.10	0.06		0.05
1308.81	Q100	Proposed	858	1094.26	1097.98	1.59	1098.64	13.08	101	63.5	0.10	0.06	0.10	0.06
1308.81	Q10	Proposed	489	1094.26	1097.33	1.07	1097.86	11.07	61	57.7	0.10	0.06	0.10	0.05
1308.81	Q1.5	Proposed	164	1094.26	1096.17	1.25	1096.46	8.37	20	15.6		0.06		0.06
1243.78	Q100	Proposed	858	1090.31	1094.19	1.90	1094.65	12.16	104	54.9	0.10	0.06	0.10	0.06
1243.78	Q10	Proposed	489	1090.31	1093.44	1.34	1093.88	10.36	65	48.5	0.10	0.06	0.10	0.06
1243.78	Q1.5	Proposed	164	1090.31	1092.53	0.82	1092.58	6.58	26	31.9	0.10	0.06	0.10	0.04
1172.3	Q100	Proposed	858	1082.95	1086.32	1.69	1087.43	16.58	68	40.4	0.10	0.06	0.10	0.06
1172.3	Q10	Proposed	489	1082.95	1085.64	1.10	1086.52	14.18	41	37.5	0.10	0.06	0.10	0.05
1172.3	Q1.5	Proposed	164	1082.95	1084.44	0.98	1085.20	12.18	13	13.7		0.06		0.06
1126.39	Q100	Proposed	858	1079.82	1082.07	1.84	1082.73	12.26	72	39.2	0.10	0.06	0.10	0.06
1126.39	Q10	Proposed	489	1079.82	1081.55	1.38	1081.91	9.54	52	37.8	0.10	0.06	0.10	0.06
1126.39	Q1.5	Proposed	164	1079.82	1080.93	0.88	1080.95	5.55	30	33.7		0.06		0.06
1063.6	Q100	Proposed	858	1073.21	1077.95	2.64	1078.43	12.45	80	30.1	0.10	0.06	0.10	0.05
1063.6	Q10	Proposed	489	1073.21	1076.78	2.11	1077.13	10.66	48	22.9	0.10	0.06	0.10	0.05
1063.6	Q1.5	Proposed	164	1073.21	1075.11	1.28	1075.47	9.11	18	14.1		0.06		0.06
992.88	Q100	Proposed	858	1069.14	1072.71	1.89	1073.46	12.96	67	35.4	0.10	0.06	0.10	0.06
992.88	Q10	Proposed	489	1069.14	1072.99	2.12	1072.59	6.46	77	36.3	0.10	0.06	0.10	0.06
992.88	Q1.5	Proposed	164	1069.14	1071.52	1.09	1071.48	5.68	29	26.5		0.06		0.06
965.98	Q100	Proposed	858	1067.81	1072.86	2.51	1072.86	9.99	116	46.3	0.10	0.06	0.10	0.06
965.98	Q10	Proposed	489	1067.81	1071.80	1.75	1071.80	8.58	69	39.6	0.10	0.06	0.10	0.05
965.98	Q1.5	Proposed	164	1067.81	1070.17	1.60	1070.04	6.45	25	15.9		0.06		0.06

TABLE T2. HEC-RAS OUTPUT FOR MATERIAL REMOVAL AREA, EXISTING AND PROPOSED CONDITIONS
PERMANENTE CREEK RESTORATION PLAN

RiverSta	Profile	Plan	QTotal (cfs)	MinChEl (ft)	W.S.Elev (ft)	HydrDepth (ft)	CritW.S. (ft)	VelChnl (ft/s)	FlowArea (sqft)	TopWidth (ft)	Manning LOB --	Manning Chan --	Manning ROB --	Manning avg --
896.36	Q100	Proposed	858	1065.69	1070.43	3.31	1069.68	7.91	121	36.7	0.10	0.06	0.10	0.06
896.36	Q10	Proposed	489	1065.69	1068.37	1.75	1068.67	9.68	52	29.5	0.10	0.06	0.10	0.06
896.36	Q1.5	Proposed	164	1065.69	1067.52	1.28	1067.39	5.6	29	22.9		0.06		0.06
863.1	Q100	Proposed	858	1063.94	1070.05	4.28		8.47	149	34.9	0.10	0.06	0.10	0.07
863.1	Q10	Proposed	489	1063.94	1068.02	2.86	1067.36	8.07	84	29.4	0.10	0.06	0.10	0.07
863.1	Q1.5	Proposed	164	1063.94	1065.99	1.25	1065.99	7.03	30	24.1	0.10	0.06	0.10	0.06
828.53	Q100	Proposed	858	1061.14	1067.82	3.49	1067.82	13.64	97	27.7	0.10	0.06	0.10	0.06
828.53	Q10	Proposed	489	1061.14	1066.10	3.00	1066.10	11.53	58	19.3	0.10	0.06	0.10	0.06
828.53	Q1.5	Proposed	164	1061.14	1063.93	1.64	1064.04	8.69	23	13.8	0.10	0.06	0.10	0.06
826.84	Q100	Proposed	858	1060.76	1065.18	2.97	1066.62	17.16	51	17.2	0.10	0.06	0.10	0.06
826.84	Q10	Proposed	489	1060.76	1063.93	2.35	1065.01	15.17	32	13.7		0.06		0.06
826.84	Q1.5	Proposed	164	1060.76	1062.44	1.18	1063.12	12.12	14	11.4		0.06		0.06
803.52	Q100	Proposed	858	1055.18	1059.39	3.00	1061.57	21.35	43	14.5	0.10	0.06	0.10	0.05
803.52	Q10	Proposed	489	1055.18	1058.21	2.25	1059.74	18.16	28	12.3	0.10	0.06	0.10	0.06
803.52	Q1.5	Proposed	164	1055.18	1056.86	1.31	1057.62	12.8	13	9.8		0.06		0.06
788.49	Q100	Proposed	858	1052.86	1056.13	2.37	1058.17	21.73	41	17.3	0.10	0.06	0.10	0.06
788.49	Q10	Proposed	489	1052.86	1055.40	1.78	1056.73	17.26	29	16.2	0.10	0.06	0.10	0.06
788.49	Q1.5	Proposed	164	1052.86	1054.57	1.09	1055.05	10.25	16	14.7		0.06		0.06
752.92	Q100	Proposed	858	1042.81	1046.27	1.89	1048.21	23.47	44	23.2	0.10	0.06		0.06
752.92	Q10	Proposed	489	1042.81	1045.56	1.49	1047.09	19.34	29	19.3	0.10	0.06		0.06
752.92	Q1.5	Proposed	164	1042.81	1044.45	0.97	1045.36	14.49	11	11.7	0.10	0.06		0.06
740.16	Q100	Proposed	858	1041.85	1046.09	2.35	1047.54	17.96	56	23.8	0.10	0.06	0.10	0.06
740.16	Q10	Proposed	489	1041.85	1045.36	1.84	1046.24	13.86	39	21.4	0.10	0.06	0.10	0.06
740.16	Q1.5	Proposed	164	1041.85	1044.43	1.28	1044.59	7.88	21	16.6	0.10	0.06	0.10	0.06

TABLE T2. HEC-RAS OUTPUT FOR MATERIAL REMOVAL AREA, EXISTING AND PROPOSED CONDITIONS
PERMANENTE CREEK RESTORATION PLAN

RiverSta	Profile	Plan	QTotal (cfs)	MinChEl (ft)	W.S.Elev (ft)	HydrDepth (ft)	CritW.S. (ft)	VelChnl (ft/s)	FlowArea (sqft)	TopWidth (ft)	Manning LOB --	Manning Chan --	Manning ROB --	Manning avg --
709.95	Q100	Proposed	858	1038.62	1044.52	3.14	1045.49	16.2	73	23.1	0.10	0.06	0.10	0.05
709.95	Q10	Proposed	489	1038.62	1043.03	2.89	1044.09	13.89	42	14.5	0.10	0.06	0.10	0.05
709.95	Q1.5	Proposed	164	1038.62	1040.94	1.51	1041.46	10.98	16	10.5	0.10	0.06	0.00	0.06
659.75	Q100	Proposed	858	1036.65	1041.33	3.07	1042.21	14.45	60	19.6	0.10	0.06	0.10	0.06
659.75	Q10	Proposed	489	1036.65	1040.57	2.62	1040.84	10.62	46	17.6	0.00	0.06	0.00	0.06
659.75	Q1.5	Proposed	164	1036.65	1039.05	1.65	1039.05	7.35	22	13.5		0.06		0.06
597.67	Q100	Proposed	858	1033.94	1039.05	3.73	1039.05	11.44	77	20.7	0.10	0.06	0.10	0.06
597.67	Q10	Proposed	489	1033.94	1037.72	2.73	1037.72	9.61	51	18.7	0.10	0.06	0.10	0.06
597.67	Q1.5	Proposed	164	1033.94	1036.13	1.64	1036.04	6.75	24	14.8		0.06		0.06
552.31	Q100	Proposed	858	1032.03	1036.19	2.90	1036.85	13.26	68	23.3	0.10	0.06	0.10	0.06
552.31	Q10	Proposed	489	1032.03	1035.31	2.32	1035.56	10.29	48	20.8	0.10	0.06	0.10	0.06
552.31	Q1.5	Proposed	164	1032.03	1033.95	1.53	1033.95	7.03	23	15.3		0.06		0.06
500	Q100	Proposed	858	1028.47	1033.48	3.13	1033.96	12.86	72	22.9	0.10	0.06	0.10	0.05
500	Q10	Proposed	489	1028.47	1032.18	2.60	1032.45	10.87	46	17.5	0.10	0.06	0.10	0.06
500	Q1.5	Proposed	164	1028.47	1030.49	1.51	1030.67	8.25	20	13.1		0.06		0.06
450	Q100	Proposed	858	1026.39	1031.01	2.63	1031.65	12.26	73	27.8	0.10	0.06		0.05
450	Q10	Proposed	489	1026.39	1030.20	2.45	1030.20	9.22	53	21.7	0.10	0.06		0.06
450	Q1.5	Proposed	164	1026.39	1028.49	1.56	1028.49	7.14	23	14.7		0.06		0.06
400	Q100	Proposed	858	1024.77	1028.14	2.00	1028.58	10.89	81	40.2	0.10	0.06	0.10	0.06
400	Q10	Proposed	489	1024.77	1028.11	1.97	1027.79	6.31	79	40.2	0.10	0.06	0.10	0.06
400	Q1.5	Proposed	164	1024.77	1027.07	1.12	1026.76	4.23	39	34.9		0.06	0.10	0.06

Project: Permanente Creek Restoration Project
Project #: 13-016
Date: 10/28/19
By: D.R.
Checked by: B.M.Z.
Location: Channel Widening Area

Table T3
Overtopping Flow Evaluation along Angular Rock Vehicle Barrier

Purpose: Evaluate areas where the 100-year flood overtops the bank adjacent to the access road and determine if the proposed 4 to 8 inch angular rock vehicle barrier will remain stable.

HEC-RAS Station	Road Edge Elevation (ft)	100-yr WSE (ft)	Depth at Road Edge (ft)	Velocity at Road Edge (ft/s)	Energy Slope (ft/ft)	Shear Stress (calculated) (lbs/sf)	Notes
145+50 and upstream	691.0	690.6	--	--	--	--	road above 100-yr WSE
145+00	688.0	689.1	1.1	2.2	0.019	1.3	
144+50	685.7	686.9	1.2	5.0	0.060	4.5	Maximum shear
144+12.75	684.4	685.3	0.9	4.3	0.039	2.2	
143+88.99 to 135+94	--	--	--	--			road above 100-yr WSE
135+60.62	645.7	646.2	0.5	1.1	0.017	0.5	
135+00	644.2	645.2	1.0	4.4	0.017	1.1	
134+50	642.5	643.9	1.4	4.9	0.016	1.4	
134+26 to 124+82.8	--	--	--	--	--	--	road above 100-yr WSE
124+63.7	605.9	606.2	0.3	2.4	0.037	0.7	shallow
124+11.83	--	--	--	--	--	--	road above 100-yr WSE
123+56.27	601.2	602.8	1.6	3.5	0.025	2.5	
123+01.23	600	600.3	0.3	3.4	0.047	0.9	shallow
122+50.48 to 117+24.31	--	--	--	--	--	--	road above 100-yr WSE
116+78.1	579.7	580.0	0.3	0.3	0.001	0.0	shallow
116+20.76	578.3	579.8	1.5	0.8	0.005	0.4	Just upstream of culvert

Notes:

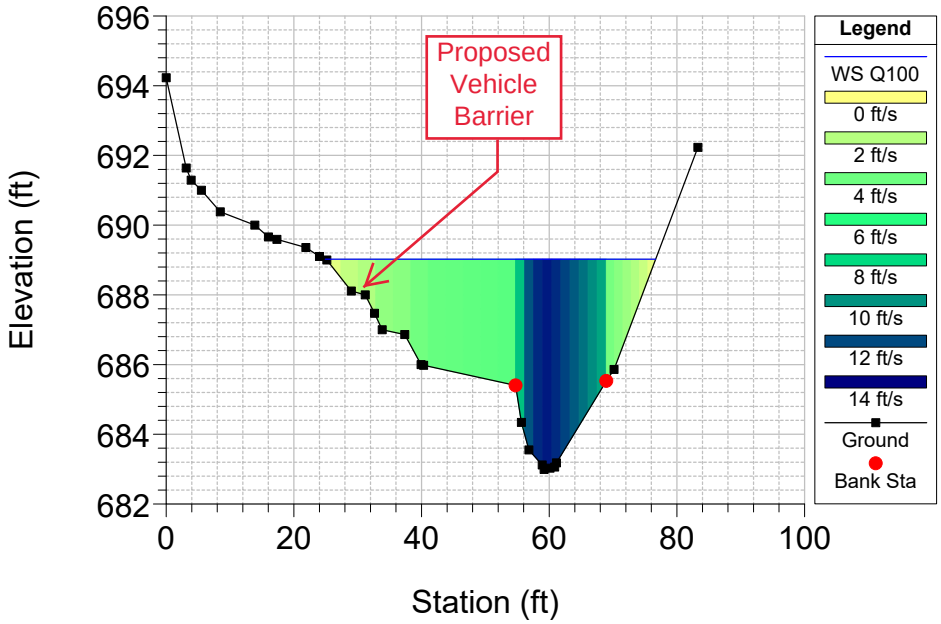
*The maximum permissible velocity of a 6-inch diameter rock is 10 ft/s and the maximum permissible shear stress is 2.5 lb/ft^2

*The maximum permissible velocity of a 12-inch diameter rock is 13 ft/s and the maximum permissible shear stress is 5.1 lb/ft^2

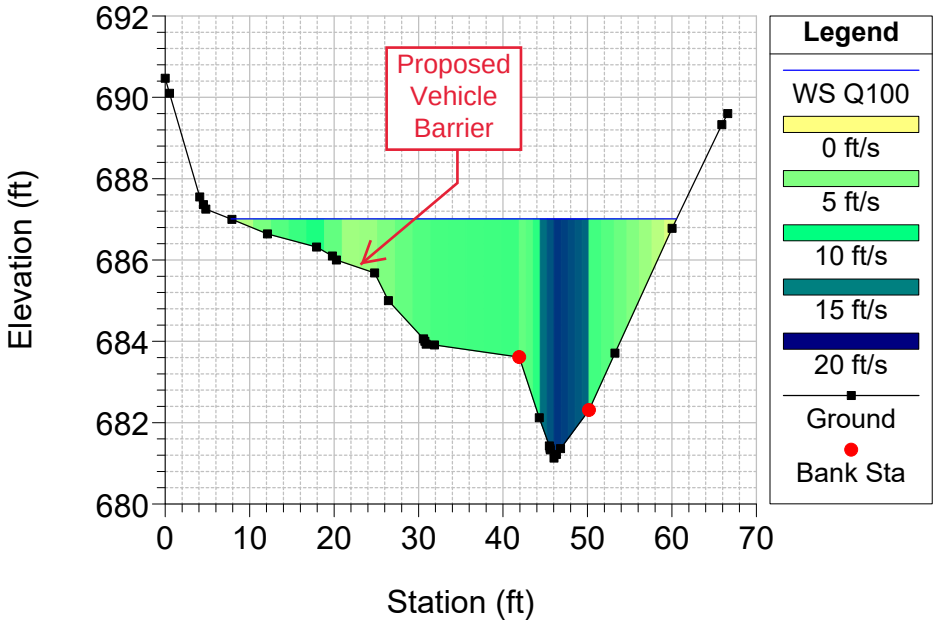
Use 10 to 16-inch diameter rock to constructe the vehicle barrier from Sta. 144+25 to 144+75.

*Source: Fischenich, Craig. May 2001. Stability Thresholds for Stream Restoration Materials. USAE Research and Development Center, Environmental Laboratory. Vicksburg Mississippi.

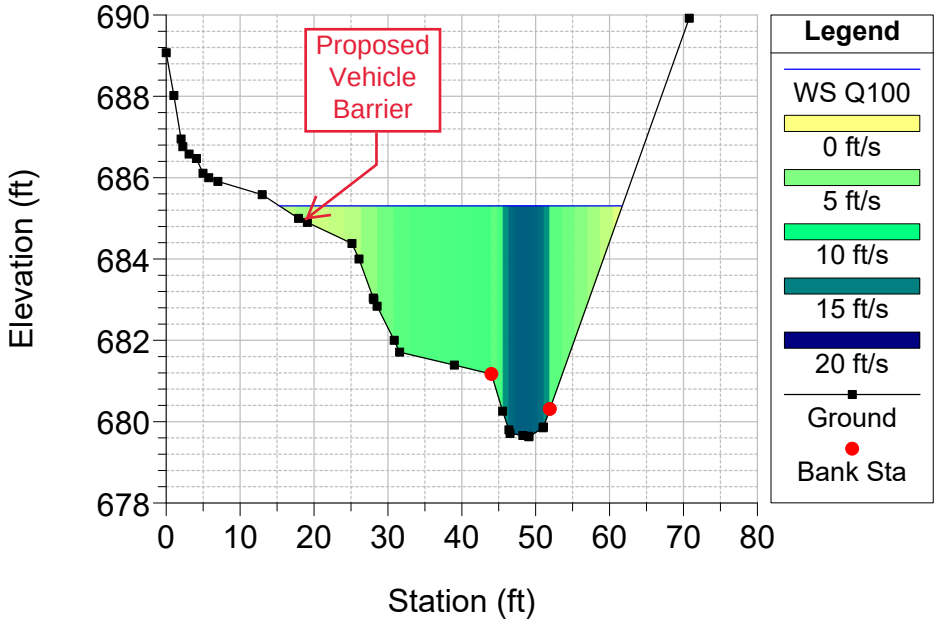
River = Permanente Creek Reach = HEC-RAS ALIGN_4- RS = 14500



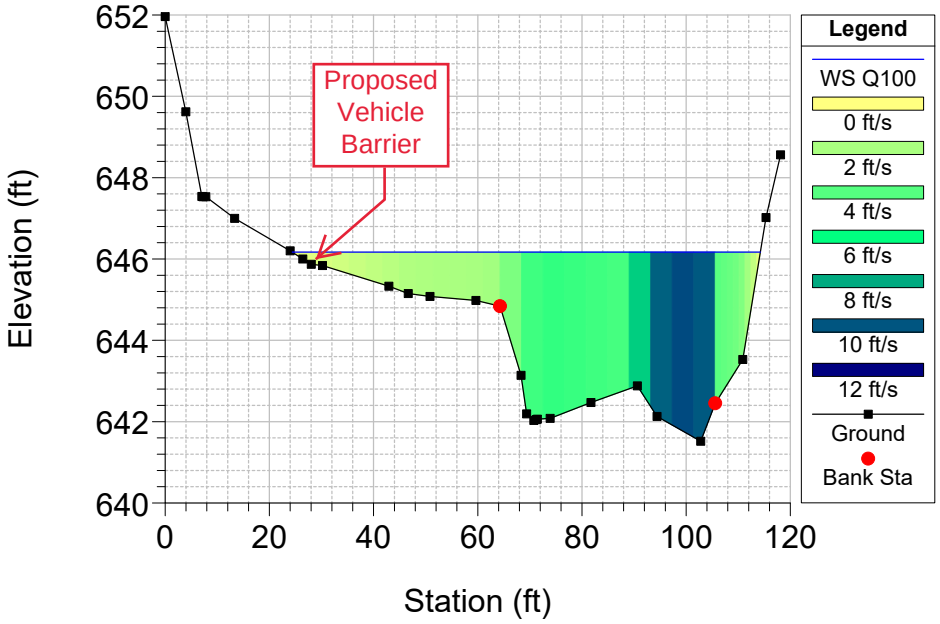
River = Permanente Creek Reach = HEC-RAS ALIGN_4- RS = 14450



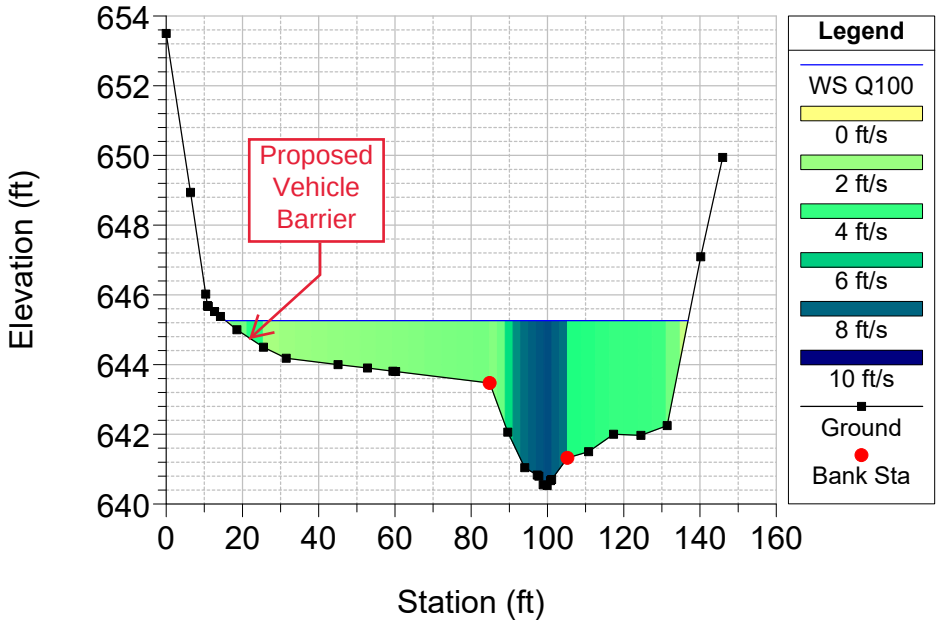
River = Permanente Creek Reach = HEC-RAS ALIGN_4- RS = 14412.75



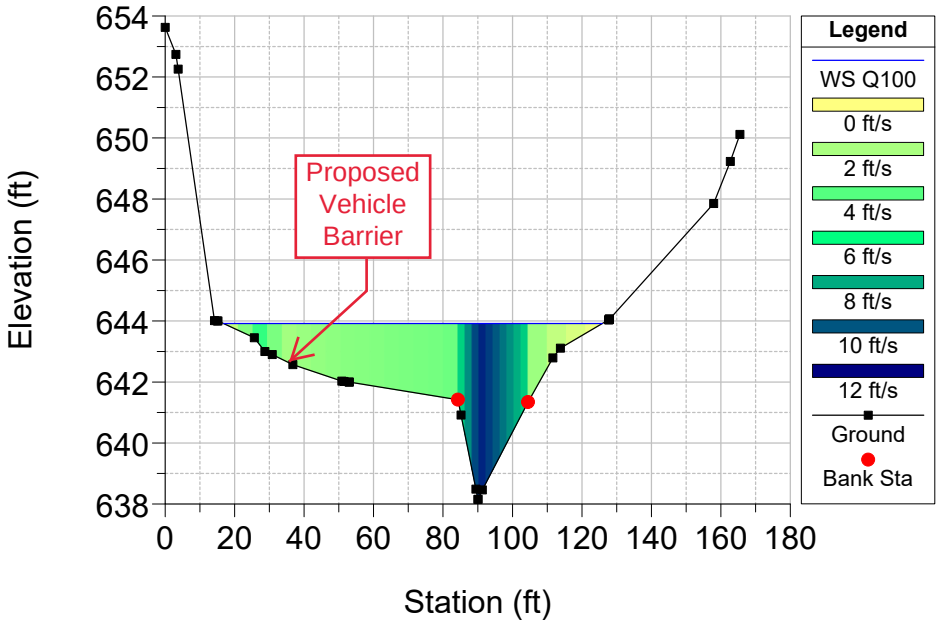
River = Permanente Creek Reach = HEC-RAS ALIGN_4- RS = 13560.62



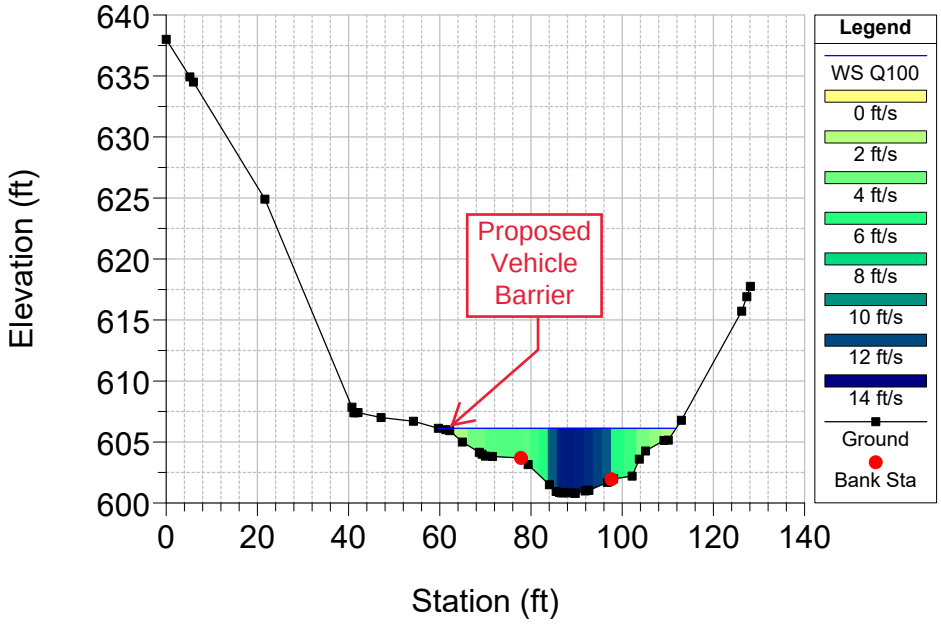
River = Permanente Creek Reach = HEC-RAS ALIGN_4- RS = 13500



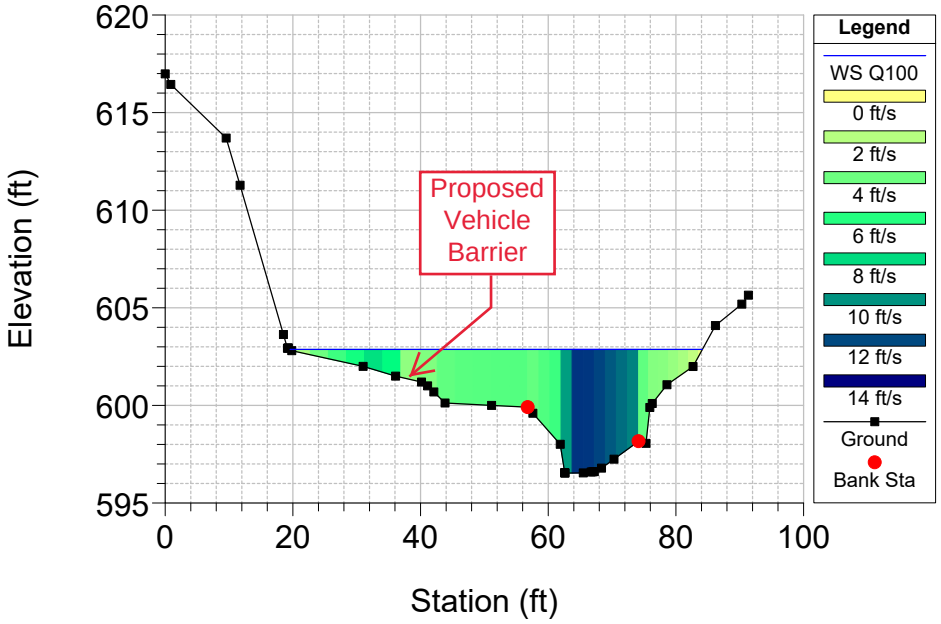
River = Permanente Creek Reach = HEC-RAS ALIGN_4- RS = 13450



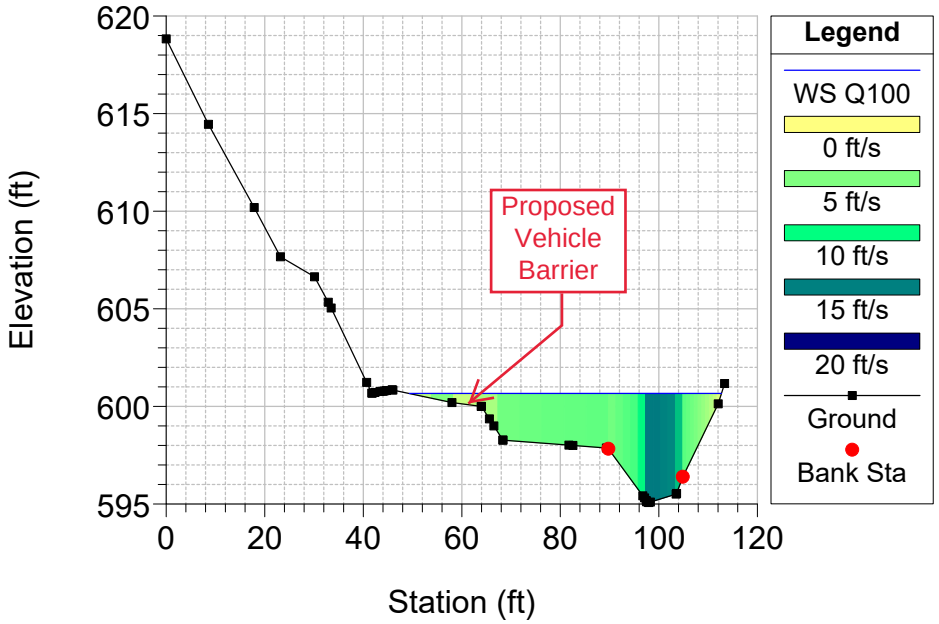
River = Permanente Creek Reach = HEC-RAS ALIGN_4- RS = 12463.7



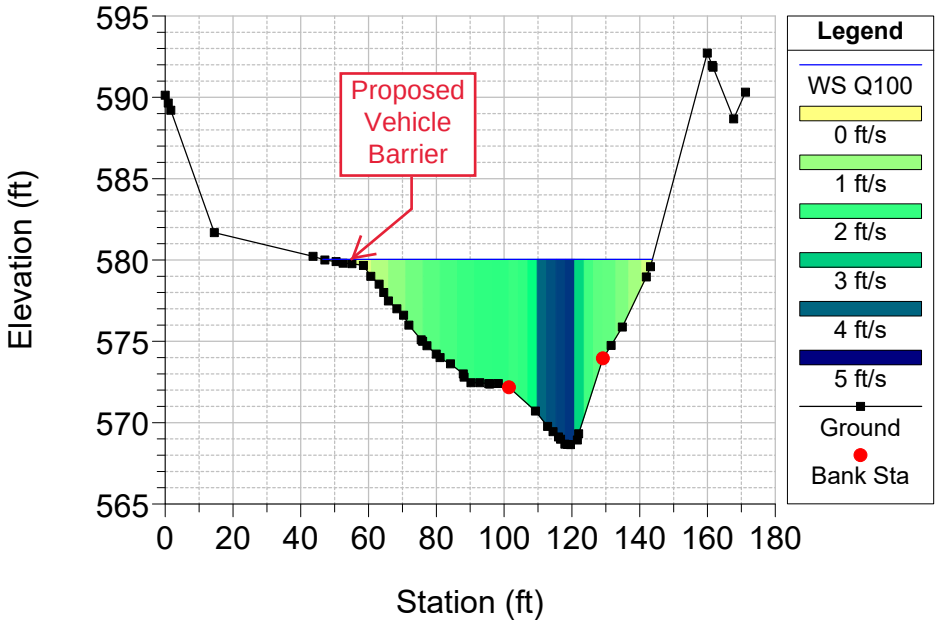
River = Permanente Creek Reach = HEC-RAS ALIGN_4- RS = 12356.27



River = Permanente Creek Reach = HEC-RAS ALIGN_4- RS = 12301.23



River = Permanente Creek Reach = HEC-RAS ALIGN_4- RS = 11678.1



River = Permanente Creek Reach = HEC-RAS ALIGN_4- RS = 11620.76

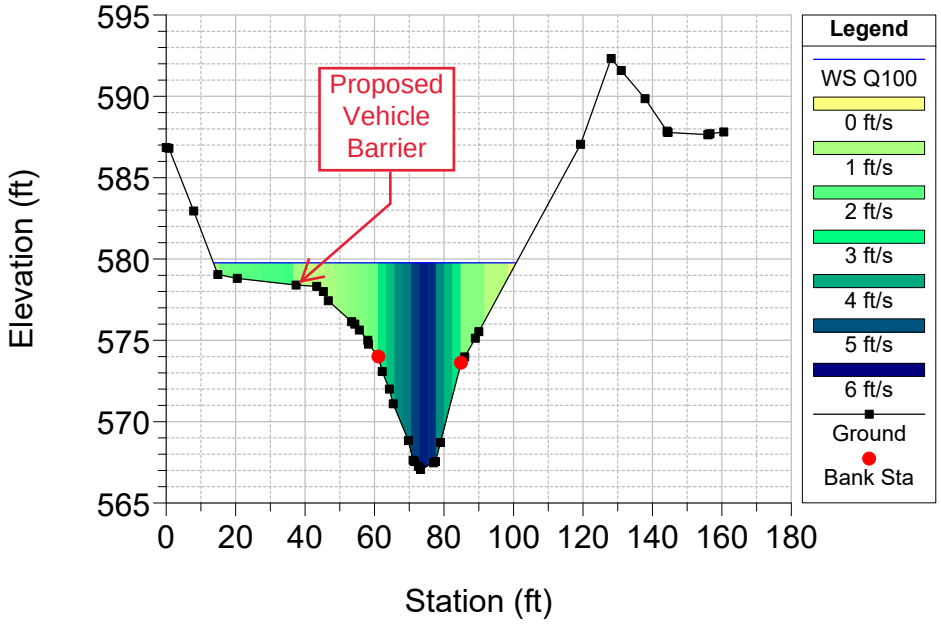


TABLE T4. SENSITIVITY ANALYSIS: COMPARISONS OF WATER SURFACE ELEVATIONS FROM HEC-RAS BY RAISING AND LOWERING CHANNEL ROUGHNESS DESIGN VALUES BY 10%
PERMANENTE CREEK RESTORATION PLAN

HEC-RAS	Water Surface Elevations 1.5-YR Proposed Conditions			Water Surface Elevations 10-YR Proposed Conditions			Water Surface Elevations 100-YR Proposed Conditions			Differences between Sensitivity Trial and Design *					
										1.5-YR Water Surface		10-YR Water Surface		100-YR Water Surface	
STATION	DESIGN	n + 10%	n - 10%	DESIGN	n + 10%	n - 10%	DESIGN	n + 10%	n - 10%	n + 10%	n - 10%	n + 10%	n - 10%	n + 10%	n - 10%
16350.0	815.0	815.1	815.0	816.4	816.5	816.2	817.5	817.7	817.3	0.07	-0.06	0.14	-0.15	0.20	-0.21
16307.7	813.5	813.6	813.4	814.9	815.1	814.8	816.1	816.3	815.9	0.11	-0.12	0.17	-0.16	0.21	-0.21
16250.0	811.8	811.8	811.7	813.3	813.4	813.1	814.4	814.5	814.2	0.05	-0.03	0.06	-0.18	0.11	-0.22
16200.0	809.7	809.8	809.5	810.5	810.8	810.5	811.4	811.6	811.4	0.14	-0.15	0.23	0.01	0.21	0.00
16150.0	806.3	806.3	806.3	808.0	808.0	807.8	808.9	808.9	808.7	0.00	0.00	0.02	-0.17	0.05	-0.17
16100.0	802.1	802.3	802.0	803.3	803.4	803.2	804.1	804.1	804.1	0.16	-0.15	0.09	-0.03	0.06	-0.02
16050.0	798.6	798.6	798.5	799.7	799.8	799.5	800.4	800.6	800.2	0.06	-0.08	0.13	-0.16	0.17	-0.19
16000.0	794.3	794.4	794.2	795.6	795.6	795.4	796.5	796.6	796.3	0.11	-0.09	0.09	-0.11	0.12	-0.15
15982.4	793.3	793.4	793.2	794.4	794.5	794.2	795.2	795.3	795.0	0.10	-0.15	0.13	-0.14	0.15	-0.15
15950.0	790.2	790.3	790.2	791.5	791.6	791.4	792.3	792.4	792.2	0.05	-0.04	0.09	-0.11	0.11	-0.12
15917.7	787.8	787.9	787.6	788.8	788.9	788.7	789.6	789.7	789.4	0.13	-0.14	0.12	-0.12	0.13	-0.14
15900.0	786.5	786.6	786.4	787.7	787.8	787.6	788.5	788.7	788.3	0.06	-0.09	0.13	-0.14	0.17	-0.17
15878.5	784.7	784.8	784.6	785.9	786.0	785.8	786.7	786.9	786.6	0.10	-0.10	0.09	-0.12	0.12	-0.15
15850.0	782.5	782.6	782.4	783.6	783.7	783.5	784.4	784.5	784.3	0.09	-0.10	0.10	-0.12	0.12	-0.14
15800.0	778.5	778.6	778.4	779.6	779.7	779.5	780.5	780.6	780.3	0.09	-0.10	0.11	-0.12	0.14	-0.15
15750.0	774.3	774.4	774.2	775.5	775.6	775.4	776.3	776.4	776.1	0.09	-0.10	0.10	-0.12	0.13	-0.13
15700.0	770.0	770.1	769.9	771.1	771.3	771.0	772.0	772.1	771.8	0.08	-0.09	0.13	-0.14	0.14	-0.16
15650.0	766.1	766.2	766.0	767.2	767.2	767.1	767.8	767.9	767.7	0.09	-0.10	0.08	-0.10	0.10	-0.11
15600.0	762.0	762.1	761.9	763.2	763.3	763.1	763.9	764.0	763.8	0.10	-0.08	0.09	-0.11	0.11	-0.12
15550.0	758.2	758.3	758.1	759.2	759.3	759.1	759.8	759.8	759.7	0.10	-0.11	0.08	-0.09	0.07	-0.08
15500.0	754.2	754.3	754.2	755.3	755.4	755.2	756.0	756.1	755.9	0.07	-0.08	0.09	-0.10	0.11	-0.13
15450.0	750.6	750.7	750.4	751.6	751.7	751.5	752.4	752.5	752.3	0.10	-0.11	0.10	-0.11	0.11	-0.13
15400.0	746.6	746.7	746.5	747.9	748.0	747.8	748.8	748.9	748.6	0.07	-0.08	0.10	-0.12	0.11	-0.12
15350.0	742.6	742.7	742.5	743.7	743.8	743.6	744.5	744.6	744.4	0.11	-0.12	0.09	-0.11	0.10	-0.10
15300.0	738.6	738.7	738.5	739.8	739.9	739.6	740.5	740.6	740.4	0.08	-0.09	0.11	-0.13	0.13	-0.14
15250.0	734.6	734.7	734.5	735.7	735.8	735.6	736.6	736.7	736.4	0.10	-0.11	0.10	-0.11	0.12	-0.14
15200.0	730.6	730.7	730.5	731.8	731.9	731.7	732.7	732.8	732.5	0.08	-0.10	0.12	-0.12	0.14	-0.16
15150.0	726.6	726.7	726.5	727.8	727.9	727.7	728.6	728.7	728.5	0.10	-0.10	0.11	-0.12	0.13	-0.14
15100.0	722.7	722.7	722.6	723.8	723.9	723.7	724.6	724.8	724.5	0.08	-0.10	0.12	-0.12	0.14	-0.15
15050.0	718.7	718.8	718.6	719.8	719.9	719.7	720.6	720.7	720.5	0.10	-0.10	0.11	-0.12	0.12	-0.15
15000.0	714.7	714.8	714.6	715.9	716.0	715.8	716.6	716.8	716.5	0.08	-0.11	0.11	-0.11	0.13	-0.14
14950.0	710.7	710.8	710.6	711.8	711.9	711.7	712.6	712.8	712.5	0.10	-0.10	0.11	-0.12	0.13	-0.14
14923.5	708.4	708.5	708.3	709.7	709.8	709.5	710.5	710.7	710.4	0.08	-0.10	0.13	-0.14	0.13	-0.15
14900.0	706.4	706.5	706.4	707.4	707.5	707.3	708.3	708.4	708.1	0.07	-0.08	0.10	-0.11	0.12	-0.14
14850.0	704.2	704.3	704.1	705.5	705.7	705.3	706.4	706.6	706.2	0.12	-0.14	0.16	-0.18	0.19	-0.21
14802.6	703.3	703.3	703.4	704.2	704.2	704.1	704.9	704.9	704.8	-0.01	0.02	0.01	-0.05	0.00	-0.05
14794.1	700.5	700.5	700.4	702.4	702.4	702.4	703.0	703.0	703.0	0.03	-0.04	0.01	-0.03	-0.01	-0.01
14750.0	699.6	699.7	699.4	700.4	700.6	700.3	701.2	701.3	701.0	0.13	-0.16	0.11	-0.10	0.14	-0.12
14700.0	695.3	695.3	695.3	696.8	696.8	696.7	697.5	697.5	697.4	0.01	-0.03	0.04	-0.07	0.02	-0.05
14667.2	690.0	690.1	689.9	691.5	691.7	691.4	693.1	693.2	692.9	0.11	-0.09	0.15	-0.15	0.14	-0.17
14650.0	690.4	690.4	690.1	691.6	691.9	691.4	692.5	692.6	692.3	0.06	-0.28	0.26	-0.25	0.15	-0.17
14600.0	688.7	688.8	688.3	689.4	689.4	689.3	690.0	691.2	689.9	0.13	-0.37	0.02	-0.05	1.25	-0.10

TABLE T4. SENSITIVITY ANALYSIS: COMPARISONS OF WATER SURFACE ELEVATIONS FROM HEC-RAS BY RAISING AND LOWERING CHANNEL ROUGHNESS DESIGN VALUES BY 10%
PERMANENTE CREEK RESTORATION PLAN

HEC-RAS	Water Surface Elevations 1.5-YR Proposed Conditions			Water Surface Elevations 10-YR Proposed Conditions			Water Surface Elevations 100-YR Proposed Conditions			Differences between Sensitivity Trial and Design *					
										1.5-YR Water Surface		10-YR Water Surface		100-YR Water Surface	
STATION	DESIGN	n + 10%	n - 10%	DESIGN	n + 10%	n - 10%	DESIGN	n + 10%	n - 10%	n + 10%	n - 10%	n + 10%	n - 10%	n + 10%	n - 10%
14550.0	687.5	687.5	687.5	689.3	689.4	689.2	690.7	690.8	690.7	0.01	-0.01	0.07	-0.11	0.03	-0.02
14500.0	686.2	686.3	685.8	687.8	687.8	687.8	689.1	689.0	689.1	0.12	-0.34	0.03	0.03	-0.06	0.05
14450.0	684.7	684.7	684.7	686.2	686.4	686.0	686.9	687.1	686.8	-0.01	0.01	0.19	-0.16	0.14	-0.12
14412.8	682.2	682.2	682.1	683.8	683.8	683.9	685.3	685.3	685.3	0.05	-0.05	-0.06	0.01	-0.02	-0.04
14389.0	677.6	677.6	677.5	679.8	679.8	679.7	681.1	681.1	681.1	0.04	-0.05	0.08	-0.06	0.04	-0.03
14350.0	675.2	675.3	675.0	676.7	676.9	676.6	677.9	678.0	677.7	0.17	-0.15	0.11	-0.12	0.12	-0.12
14300.0	670.7	670.7	670.7	672.4	672.5	672.3	673.4	673.5	673.3	-0.01	-0.01	0.06	-0.06	0.09	-0.11
14250.0	667.2	667.3	667.2	667.8	667.9	667.8	668.6	668.6	668.5	0.07	-0.07	0.05	-0.04	0.04	-0.03
14192.7	664.8	664.8	664.8	666.5	666.5	666.5	667.5	667.5	667.5	0.00	-0.01	0.00	0.00	-0.02	0.01
14150.0	662.7	662.8	662.6	663.9	663.9	663.8	664.8	664.8	664.7	0.15	-0.10	0.09	-0.09	0.08	-0.07
14096.7	660.9	661.0	660.9	662.6	662.6	662.5	663.8	663.8	663.7	0.06	-0.04	0.01	-0.07	0.00	-0.02
14082.0	660.3	660.4	660.3	661.7	661.8	661.7	662.7	662.8	662.8	0.07	-0.08	0.10	0.02	0.04	0.02
14050.0	659.5	659.6	659.5	661.2	661.2	661.1	662.2	662.2	662.2	0.03	-0.01	0.03	-0.08	-0.05	-0.05
14000.0	658.1	658.2	658.0	659.5	659.6	659.5	660.5	660.7	660.5	0.12	-0.14	0.06	0.00	0.20	-0.01
13950.0	656.3	656.3	656.3	658.0	658.1	657.9	659.1	659.1	659.0	0.00	0.00	0.11	-0.13	-0.02	-0.16
13900.0	653.7	653.8	652.6	654.8	654.8	654.7	656.0	656.1	655.9	0.14	-1.04	0.07	-0.07	0.11	-0.03
13850.0	652.0	652.0	652.0	653.6	653.6	653.5	654.2	654.3	654.1	0.00	0.00	0.01	-0.12	0.12	-0.13
13800.0	650.5	650.5	650.4	651.8	651.9	651.3	652.8	652.9	652.7	0.04	-0.06	0.11	-0.54	0.13	-0.12
13750.0	649.0	649.1	648.9	650.5	650.5	650.5	651.4	651.4	651.5	0.10	-0.06	-0.02	0.02	-0.05	0.05
13700.0	647.7	647.7	647.7	649.4	649.4	649.3	650.4	650.5	650.3	0.04	0.01	0.02	-0.10	0.06	-0.09
13657.2	646.5	646.6	646.3	647.7	647.9	647.7	648.8	648.8	648.8	0.13	-0.16	0.14	-0.01	0.03	0.00
13594.6	644.6	644.6	644.6	645.6	645.7	645.5	646.5	646.6	646.3	-0.01	0.00	0.05	-0.15	0.16	-0.16
13560.7	644.0	644.0	643.9	645.4	645.4	645.3	646.2	646.2	646.1	0.04	-0.04	0.04	-0.03	0.05	-0.06
13500.0	643.1	643.2	643.0	644.3	644.4	644.2	645.2	645.3	645.1	0.08	-0.11	0.06	-0.09	0.05	-0.07
13450.0	641.3	641.3	641.3	643.0	643.0	643.0	643.9	643.9	644.0	0.00	0.00	0.00	0.02	-0.05	0.07
13426.5	640.0	640.1	639.9	641.1	641.2	641.1	641.9	642.0	641.9	0.12	-0.11	0.05	-0.05	0.05	-0.04
13400.0	639.2	639.2	639.1	640.5	640.6	640.4	641.7	641.8	641.6	0.06	-0.07	0.10	-0.08	0.13	-0.14
13350.0	638.3	638.4	638.2	639.7	639.9	639.6	641.1	641.3	640.9	0.08	-0.08	0.15	-0.18	0.15	-0.19
13335.6	637.9	638.0	637.8	639.5	639.6	639.3	640.9	641.0	640.7	0.09	-0.09	0.15	-0.16	0.14	-0.16
13300.0	637.1	637.2	637.0	638.8	639.0	638.6	640.3	640.4	640.1	0.12	-0.14	0.16	-0.20	0.14	-0.17
13239.0	636.5	636.5	636.5	637.9	638.0	637.8	638.8	638.9	638.7	0.04	-0.04	0.06	-0.06	0.12	-0.08
13208.1	635.7	635.7	635.7	636.9	636.8	636.9	637.8	637.7	637.9	-0.01	0.02	-0.04	0.07	-0.07	0.04
13200.0	632.8	632.8	632.7	635.1	635.1	635.0	636.2	636.2	636.2	0.04	-0.04	0.03	-0.03	-0.01	0.01
13171.2	630.8	630.9	630.6	634.0	634.0	634.0	635.6	635.5	635.6	0.15	-0.18	0.03	-0.03	-0.06	0.06
13150.0	630.8	631.0	630.7	633.1	633.0	633.1	634.3	634.2	634.3	0.20	-0.05	-0.02	0.03	-0.09	0.07
13113.0	629.8	629.8	629.6	631.3	631.4	631.2	632.5	632.6	632.5	0.00	-0.17	0.08	-0.07	0.08	-0.04
13087.0	626.6	626.7	626.6	628.9	629.0	628.8	630.3	630.4	630.2	0.09	-0.03	0.12	-0.13	0.12	-0.11
13050.0	625.8	625.8	625.6	627.0	627.2	626.9	628.4	628.6	628.2	0.02	-0.24	0.19	-0.17	0.22	-0.20
13000.0	623.2	623.4	623.1	625.8	625.9	625.4	627.6	627.7	627.1	0.21	-0.05	0.06	-0.44	0.05	-0.54
12950.0	620.0	620.1	619.8	621.8	621.9	621.7	623.0	623.0	622.9	0.09	-0.19	0.12	-0.07	0.07	-0.05
12900.0	618.2	618.3	618.2	620.6	620.7	620.3	622.3	622.3	621.7	0.08	0.00	0.11	-0.30	-0.02	-0.60
12850.0	617.2	617.3	617.0	619.0	619.3	618.2	620.0	620.3	619.8	0.15	-0.16	0.26	-0.78	0.22	-0.24

TABLE T4. SENSITIVITY ANALYSIS: COMPARISONS OF WATER SURFACE ELEVATIONS FROM HEC-RAS BY RAISING AND LOWERING CHANNEL ROUGHNESS DESIGN VALUES BY 10%
PERMANENTE CREEK RESTORATION PLAN

HEC-RAS	Water Surface Elevations 1.5-YR Proposed Conditions			Water Surface Elevations 10-YR Proposed Conditions			Water Surface Elevations 100-YR Proposed Conditions			Differences between Sensitivity Trial and Design *					
										1.5-YR Water Surface		10-YR Water Surface		100-YR Water Surface	
STATION	DESIGN	n + 10%	n - 10%	DESIGN	n + 10%	n - 10%	DESIGN	n + 10%	n - 10%	n + 10%	n - 10%	n + 10%	n - 10%	n + 10%	n - 10%
12800.0	615.4	615.4	615.4	617.7	617.7	617.7	619.2	619.2	619.1	0.00	0.00	0.00	0.01	0.02	-0.11
12750.0	613.8	614.0	613.7	614.7	615.0	614.5	616.0	616.1	615.9	0.15	-0.17	0.22	-0.21	0.13	-0.12
12700.0	612.1	612.1	612.1	614.2	614.2	614.1	615.3	615.3	615.0	0.02	0.00	-0.01	-0.06	0.03	-0.34
12650.0	610.5	610.6	610.3	611.4	611.6	611.3	612.6	612.8	612.5	0.11	-0.16	0.17	-0.13	0.15	-0.10
12600.0	608.8	609.0	608.8	610.7	610.7	610.6	611.6	611.7	611.3	0.12	-0.06	-0.02	-0.13	0.08	-0.32
12590.0	608.4	608.5	608.3	610.0	610.1	610.0	611.1	611.1	610.9	0.06	-0.16	0.04	-0.04	0.04	-0.19
12580.0	608.0	608.2	608.0	609.4	609.5	609.3	610.3	610.9	610.2	0.20	0.03	0.08	-0.08	0.56	-0.15
12570.0	607.6	607.7	607.6	609.3	609.4	609.4	610.5	610.5	610.4	0.11	0.03	0.10	0.04	0.00	-0.07
12560.0	607.2	607.3	607.1	609.0	609.1	609.0	610.0	610.2	610.0	0.07	-0.11	0.07	-0.05	0.15	-0.02
12550.0	606.9	606.9	606.8	607.7	607.7	607.7	609.8	609.9	609.7	0.05	-0.05	-0.01	0.01	0.06	-0.08
12540.4	606.4	606.5	606.4	607.3	608.4	607.4	609.5	609.5	609.4	0.06	-0.07	1.02	0.02	0.04	-0.10
12530.9	606.0	606.1	606.0	607.9	608.0	607.0	609.0	609.0	609.0	0.06	-0.07	0.04	-0.96	0.04	0.03
12521.3	605.7	605.7	605.6	607.4	607.5	607.5	608.6	608.6	608.5	0.06	-0.07	0.06	0.10	0.02	-0.09
12511.7	605.3	605.3	605.2	607.0	607.0	606.9	608.2	608.2	608.2	0.07	-0.07	0.01	-0.14	0.05	0.09
12502.1	604.9	604.9	604.8	606.5	606.6	606.5	607.8	607.8	607.7	0.06	-0.06	0.10	0.01	-0.02	-0.15
12492.5	604.5	604.5	604.5	606.2	606.3	606.1	607.3	607.3	607.2	0.03	-0.03	0.12	-0.09	0.09	-0.06
12482.9	604.0	604.1	603.9	605.6	605.7	605.6	606.9	606.9	606.7	0.08	-0.07	0.04	-0.07	-0.03	-0.18
12473.3	603.7	603.8	603.6	605.4	605.4	604.9	606.6	606.7	605.9	0.05	-0.07	0.09	-0.45	0.12	-0.69
12463.7	603.4	603.5	603.3	604.9	604.9	604.9	606.2	606.1	606.2	0.05	-0.09	0.01	0.01	-0.02	0.02
12411.9	601.4	601.5	601.3	603.2	603.3	603.1	603.9	604.3	603.7	0.10	-0.07	0.10	-0.11	0.48	-0.12
12356.3	600.2	600.3	600.2	601.7	601.8	601.6	602.8	602.8	602.9	0.07	-0.07	0.11	-0.12	-0.02	0.03
12301.3	598.0	598.0	598.0	599.7	599.7	599.7	600.7	600.8	600.6	0.00	-0.01	-0.02	0.01	0.11	-0.10
12250.5	596.0	596.1	595.9	597.7	597.9	597.6	599.0	599.1	598.7	0.09	-0.13	0.12	-0.16	0.19	-0.22
12225.1	594.8	594.9	594.8	596.8	596.8	596.8	598.3	598.2	598.4	0.04	0.00	-0.01	0.00	-0.06	0.08
12191.7	593.6	593.7	593.3	594.7	594.8	594.6	595.7	595.9	595.6	0.04	-0.34	0.13	-0.12	0.13	-0.13
12142.0	592.0	592.1	592.0	593.5	593.5	593.6	594.6	594.6	594.5	0.14	-0.03	-0.07	0.03	-0.05	-0.18
12092.7	590.2	590.2	590.1	591.4	591.5	591.3	592.1	592.2	592.1	-0.01	-0.11	0.13	-0.09	0.11	-0.02
12033.9	587.2	587.3	587.1	589.3	589.5	588.4	589.7	589.9	589.4	0.15	-0.07	0.14	-0.92	0.12	-0.32
11982.1	585.1	585.1	585.0	587.2	587.2	587.2	588.5	588.5	588.5	0.02	-0.01	0.00	0.02	0.00	0.00
11932.5	582.4	582.6	582.2	583.7	583.8	583.6	584.6	584.5	584.7	0.19	-0.19	0.09	-0.09	-0.10	0.12
11881.8	580.3	580.3	580.2	581.7	582.0	581.5	582.9	583.1	582.5	0.02	-0.06	0.23	-0.23	0.27	-0.36
11827.8	576.2	576.3	576.1	577.8	579.0	577.7	578.8	580.2	578.8	0.14	-0.10	1.16	-0.08	1.42	-0.06
11774.4	575.0	575.1	575.0	578.9	578.9	578.8	580.1	580.1	580.1	0.05	-0.05	0.02	-0.02	0.03	-0.03
11724.3	574.8	574.8	574.8	578.8	578.8	578.8	580.1	580.1	580.0	0.02	-0.02	0.01	-0.01	0.00	-0.02
11678.1	574.7	574.7	574.7	578.8	578.8	578.8	580.0	580.0	580.0	0.01	-0.01	0.01	-0.01	0.00	-0.01
11668.6	574.7	574.7	574.7	578.8	578.8	578.8	580.0	580.0	580.0	0.01	-0.01	0.01	-0.01	0.00	-0.01
11659.0	574.7	574.7	574.7	578.8	578.8	578.7	579.9	579.9	579.9	0.01	-0.01	0.01	-0.01	0.00	-0.01
11649.4	574.6	574.7	574.6	578.7	578.7	578.7	579.9	579.9	579.9	0.01	0.00	0.00	-0.01	0.00	-0.01
11639.9	574.6	574.6	574.6	578.7	578.7	578.7	579.8	579.8	579.8	0.01	0.00	0.00	-0.01	0.00	-0.01
11630.3	574.6	574.6	574.6	578.7	578.7	578.7	579.8	579.8	579.8	0.00	-0.01	0.00	0.00	0.00	-0.01
11620.76 **	574.6	574.6	574.6	578.6	578.6	578.6	579.7	579.7	579.7	0.00	0.00	0.01	0.00	0.00	-0.02
11527.0	569.7	569.7	569.7	574.1	574.1	574.1	575.4	575.4	575.4	0.00	0.00	0.00	0.00	0.00	0.00

TABLE T4. SENSITIVITY ANALYSIS: COMPARISONS OF WATER SURFACE ELEVATIONS FROM HEC-RAS BY RAISING AND LOWERING CHANNEL ROUGHNESS DESIGN VALUES BY 10%
PERMANENTE CREEK RESTORATION PLAN

HEC-RAS	Water Surface Elevations 1.5-YR Proposed Conditions			Water Surface Elevations 10-YR Proposed Conditions			Water Surface Elevations 100-YR Proposed Conditions			Differences between Sensitivity Trial and Design *					
										1.5-YR Water Surface		10-YR Water Surface		100-YR Water Surface	
STATION	DESIGN	n + 10%	n - 10%	DESIGN	n + 10%	n - 10%	DESIGN	n + 10%	n - 10%	n + 10%	n - 10%	n + 10%	n - 10%	n + 10%	n - 10%
11476.8	566.6	566.6	566.6	567.4	567.4	567.4	568.3	568.3	568.3	0.00	0.00	0.00	0.00	0.00	0.00
11412.9	566.3	566.3	566.3	568.3	568.3	568.3	569.3	569.3	569.3	0.00	0.00	0.00	0.00	0.00	0.00
11362.7	566.3	566.3	566.3	568.3	568.3	568.3	569.5	569.5	569.5	0.00	0.00	0.00	0.00	0.00	0.00
11318.1	566.3	566.3	566.3	568.3	568.3	568.3	569.5	569.5	569.5	0.00	0.00	0.00	0.00	0.00	0.00
11287.2	565.8	565.8	565.8	568.0	568.0	568.0	569.0	569.0	569.0	0.00	0.00	0.00	0.00	0.00	0.00
11211.2	561.0	561.0	561.0	565.8	565.8	565.8	566.5	566.5	566.5	0.00	0.00	0.00	0.00	0.00	0.00
11200.0	557.7	557.7	557.7	559.0	559.0	559.0	560.2	560.2	560.2	0.00	0.00	0.00	0.00	0.00	0.00
11186.2	559.5	559.5	559.5	560.9	560.9	560.9	561.9	561.9	561.9	0.00	0.00	0.00	0.00	0.00	0.00
11137.9	559.5	559.5	559.5	560.9	560.9	560.9	561.8	561.8	561.8	0.00	0.00	0.00	0.00	0.00	0.00
11102.5	559.5	559.5	559.5	560.8	560.8	560.8	561.8	561.8	561.8	0.00	0.00	0.00	0.00	0.00	0.00
11070.7	559.5	559.5	559.5	560.7	560.7	560.7	561.7	561.7	561.7	0.00	0.00	0.00	0.00	0.00	0.00
10790.0	546.7	546.7	546.7	549.3	549.3	549.3	551.8	551.8	551.8	0.00	0.00	0.00	0.00	0.00	0.00
10739.3	545.1	545.1	545.1	548.3	548.3	548.3	550.6	550.6	550.6	0.00	0.00	0.00	0.00	0.00	0.00
10690.7	544.6	544.6	544.6	548.1	548.1	548.1	550.6	550.6	550.6	0.00	0.00	0.00	0.00	0.00	0.00
10644.3	544.3	544.3	544.3	548.0	548.0	548.0	550.6	550.6	550.6	0.00	0.00	0.00	0.00	0.00	0.00
10601.6	543.4	543.4	543.4	546.7	546.7	546.7	548.2	548.2	548.2	0.00	0.00	0.00	0.00	0.00	0.00
10485.2	542.8	542.8	542.8	545.9	545.9	545.9	546.9	546.9	546.9	0.00	0.00	0.00	0.00	0.00	0.00
10432.9	541.7	541.7	541.7	543.4	543.4	543.4	544.1	544.1	544.1	0.00	0.00	0.00	0.00	0.00	0.00
10382.9	541.3	541.3	541.3	542.7	542.7	542.7	543.7	543.7	543.7	0.00	0.00	0.00	0.00	0.00	0.00
10332.7	541.2	541.2	541.2	542.6	542.6	542.6	543.7	543.7	543.7	0.00	0.00	0.00	0.00	0.00	0.00
10295.4	541.1	541.1	541.1	542.5	542.5	542.5	543.6	543.6	543.6	0.00	0.00	0.00	0.00	0.00	0.00
10166.1	536.7	536.7	536.7	538.0	538.0	538.0	538.5	538.5	538.5	0.00	0.00	0.00	0.00	0.00	0.00
10115.9	532.9	532.9	532.9	535.1	535.1	535.1	536.4	536.4	536.4	0.00	0.00	0.00	0.00	0.00	0.00
10065.8	532.1	532.1	532.1	534.0	534.0	534.0	534.7	534.7	534.7	0.00	0.00	0.00	0.00	0.00	0.00
10016.3	530.5	530.5	530.5	532.5	532.5	532.5	533.2	533.2	533.2	0.00	0.00	0.00	0.00	0.00	0.00
9966.5	528.5	528.5	528.5	531.1	531.1	531.1	531.9	531.9	531.9	0.00	0.00	0.00	0.00	0.00	0.00
9920.0	527.1	527.1	527.1	529.6	529.6	529.6	530.8	530.8	530.8	0.00	0.00	0.00	0.00	0.00	0.00
9869.7	525.4	525.4	525.4	528.1	528.1	528.1	529.5	529.5	529.5	0.00	0.00	0.00	0.00	0.00	0.00
9819.5	524.3	524.3	524.3	527.0	527.0	527.0	528.0	528.0	528.0	0.00	0.00	0.00	0.00	0.00	0.00
9769.3	523.0	523.0	523.0	525.7	525.7	525.7	527.5	527.5	527.5	0.00	0.00	0.00	0.00	0.00	0.00
9739.1	522.3	522.3	522.3	525.1	525.1	525.1	526.9	526.9	526.9	0.00	0.00	0.00	0.00	0.00	0.00

NOTES:

* Some differences between the water surface elevations for the design model and the sensitivity models exceeded a magnitude (absolute value) of 0.3 feet at discreet locations, as shown in green. These fluctations in water surface elevations occur at single cross sections and are bracketed by fluctations that are typically well below 0.3 feet. The sensitivity models were not iterated and stabilized to remove these fluctuations, as the goal of the sensitiy analysis was to assess general and potential changes in water surface elevations from specific changes in channel roughness values. The spot variations are attributed to anamolies in model stability that would typically be resolved for design purposes.

** Mannings n was not revised downstream of Culvert #6 at station 11620.76, as proposed conditions in the channel do not extend beyond that point.

APPENDIX F

Engineered Streambed Material, Floodplain Armor and Vegetated Rock Slope Protection Sizing Calculations

Engineered Streambed Material (ESM) Calculations

Project: Permanente Quarry
Project #: 13-016
Date: 9/28/2018
Calculated by: BMZ
Checked by: B.M.S.

Calculations to determine the gradation and thickness of ESM for constructed floodplains throughout project area.

1. Inputs

Proposed Conditions Site Data (Culvert #7)		
Design Flow*	1087	cfs
Channel Width =	20	ft
q =	54.4	cu.ft./sec ft
gravity, g	32.2	ft/sec^2
Slope, S	0.039	ft/ft

Proposed Conditions Site Data (Culvert #8)		
Design Flow*	1009	cfs
Channel Width =	26	ft
q =	38.8	cu.ft./sec ft
gravity, g	32.2	ft/sec^2
Slope, S	0.027	ft/ft

Sediment Fan Tributary		
Design Flow*	12.1	cfs
Channel Width =	6	ft
q =	2.0	cu.ft./sec ft
gravity, g	32.2	ft/sec^2
Slope, S	0.249	ft/ft

Material Removal Area Tributary		
Design Flow*	16.2	cfs
Channel Width =	7	ft
q =	2.3	cu.ft./sec ft
gravity, g	32.2	ft/sec^2
Slope, S	0.141	ft/ft

Rock Pile 7.7%		
Design Flow*	949	cfs
Channel Width =	18.5	ft
q =	51.3	cu.ft./sec ft
gravity, g	32.2	ft/sec^2
Slope, S	0.077	ft/ft

Material Removal Area 12%		
Design Flow*	683	cfs
Channel Width =	16.3	ft
q =	41.9	cu.ft./sec ft
gravity, g	32.2	ft/sec^2
Slope, S	0.120	ft/ft

***Portion of 100-year design flow that is being conveyed over the ESM.**

***Portion of 100-year design flow that is being conveyed**

2. Equations to Calculate D50 particle size

Bathhurst (1987)	
developed for:	slope (0.23 to 9%)
	particle dia. (0.35 to 11 inches)
D_{50} =	3.56 q^2/3 S^.75 / g^1/3
D_{50} =	1.4 ft

Bathhurst (1987)	
developed for:	slope (0.23 to 9%)
	particle dia. (0.35 to 11 inches)
D_{50} =	3.56 q^2/3 S^.75 / g^1/3
D_{50} =	0.9 ft

Bathhurst (1987)	
developed for:	slope (0.23 to 9%)
	particle dia. (0.35 to 11 inches)
D_{50} =	3.56 q^2/3 S^.75 / g^1/3
D_{50} =	0.6 ft

Bathhurst (1987)	
developed for:	slope (0.23 to 9%)
	particle dia. (0.35 to 11 inches)
D_{50} =	3.56 q^2/3 S^.75 / g^1/3
D_{50} =	0.5 ft

Bathhurst (1987)	
developed for:	slope (0.23 to 9%)
	particle dia. (0.35 to 11 inches)
D_{50} =	3.56 q^2/3 S^.75 / g^1/3
D_{50} =	2.3 ft

Bathhurst (1987)	
developed for:	slope (0.23 to 9%)
	particle dia. (0.35 to 11 inches)
D_{50} =	3.56 q^2/3 S^.75 / g^1/3
D_{50} =	2.8 ft

Robinson et al. (1998)	
developed for:	slope (2% to 40%)
	particle dia. (0.6 to 11 inches)
D_{50} =	$[q_{design} / (8.07 \times 10^{-6} S^{-0.58})]^{0.529}$
q_{design} (m^3/s/m) =	5.05
D_{50} (mm) =	431
D_{50} =	1.4 ft

Robinson et al. (1998)	
developed for:	slope (2% to 40%)
	particle dia. (0.6 to 11 inches)
D_{50} =	$[q_{design} / (8.07 \times 10^{-6} S^{-0.58})]^{0.529}$
q_{design} (m^3/s/m) =	3.61
D_{50} (mm) =	322
D_{50} =	1.1 ft

Robinson et al. (1998)	
developed for:	slope (2% to 40%)
	particle dia. (0.6 to 11 inches)
D_{50} =	$[q_{design} / (8.07 \times 10^{-6} S^{-0.58})]^{0.529}$
q_{design} (m^3/s/m) =	0.19
D_{50} (mm) =	133
D_{50} =	0.4 ft

Robinson et al. (1998)	
developed for:	slope (2% to 40%)
	particle dia. (0.6 to 11 inches)
D_{50} =	$[q_{design} / (8.07 \times 10^{-6} S^{-0.58})]^{0.529}$
q_{design} (m^3/s/m) =	0.21
D_{50} (mm) =	120
D_{50} =	0.4 ft

Robinson et al. (1998)	
developed for:	slope (2% to 40%)
	particle dia. (0.6 to 11 inches)
D_{50} =	$[q_{design} / (8.07 \times 10^{-6} S^{-0.58})]^{0.529}$
q_{design} (m^3/s/m) =	4.77
D_{50} (mm) =	514
D_{50} =	1.7 ft

Robinson et al. (1998)	
developed for:	slope (2% to 40%)
	particle dia. (0.6 to 11 inches)
D_{50} =	$[q_{design} / (8.07 \times 10^{-6} S^{-0.58})]^{0.529}$
q_{design} (m^3/s/m) =	3.89
D_{50} (mm) =	354
D_{50} =	1.2 ft

Abt and Johnson (1991)	
developed for:	slope (1% to 20%)
	particle dia. (1 to 6 inches)
D_{50} =	0.436 q_{sizing}^0.56 S^0.43
	q_{sizing} = q * sizing factor
	sizing factor = 1.35
D_{50} =	1.2 ft

Abt and Johnson (1991)	
developed for:	slope (1% to 20%)
	particle dia. (1 to 6 inches)
D_{50} =	0.436 q_{sizing}^0.56 S^0.43
	q_{sizing} = q * sizing factor
	sizing factor = 1.35
D_{50} =	0.8 ft

Abt and Johnson (1991)	
developed for:	slope (1% to 20%)
	particle dia. (1 to 6 inches)
D_{50} =	0.436 q_{sizing}^0.56 S^0.43
	q_{sizing} = q * sizing factor
	sizing factor = 1.35
D_{50} =	0.4 ft

Abt and Johnson (1991)	
developed for:	slope (1% to 20%)
	particle dia. (1 to 6 inches)
D_{50} =	0.436 q_{sizing}^0.56 S^0.43
	q_{sizing} = q * sizing factor
	sizing factor = 1.35
D_{50} =	0.4 ft

Abt and Johnson (1991)	
developed for:	slope (1% to 20%)
	particle dia. (1 to 6 inches)
D_{50} =	0.436 q_{sizing}^0.56 S^0.43
	q_{sizing} = q * sizing factor
	sizing factor = 1.35
D_{50} =	1.6 ft

Abt and Johnson (1991)	
developed for:	slope (1% to 20%)
	particle dia. (1 to 6 inches)
D_{50} =	0.436 q_{sizing}^0.56 S^0.43
	q_{sizing} = q * sizing factor
	sizing factor = 1.35
D_{50} =	1.7 ft

Choose D_{50} =	1.4 ft	Choose D_{50} =	1.1 ft	Choose D_{50} =	0.6 ft	Choose D_{50} =	0.5 ft	Choose D_{50} =	2.0 ft	Choose D_{50} =	2.0 ft

3. Develop Grain Size Distribution Utilizing the Calculated D_{50}

Washinton Department of Fish and Wildlife Grain Size Distribution (WDFW, 2003)

D_{84}/D_{100} =	0.4
D_{84}/D_{50} =	2.5
D_{84}/D_{16} =	8

WDFW Substrate Gradation	
D_{100} =	8.8 ft
D_{84} =	3.5 ft
D_{50} =	1.4 ft
D_{16} =	5.25 in

D_{84}/D_{100} =	0.4
D_{84}/D_{50} =	2.5
D_{84}/D_{16} =	8

WDFW Substrate Gradation	
D_{100} =	6.9 ft
D_{84} =	2.8 ft
D_{50} =	1.1 ft
D_{16} =	4.13 in

D_{84}/D_{100} =	0.4
D_{84}/D_{50} =	2.5
D_{84}/D_{16} =	8

WDFW Substrate Gradation	
D_{100} =	3.8 ft
D_{84} =	1.5 ft
D_{50} =	0.6 ft
D_{16} =	2.25 in

D_{84}/D_{100} =	0.4
D_{84}/D_{50} =	2.5
D_{84}/D_{16} =	8

WDFW Substrate Gradation	
D_{100} =	3.1 ft
D_{84} =	1.3 ft
D_{50} =	0.5 ft
D_{16} =	1.88 in

D_{84}/D_{100} =	0.4
D_{84}/D_{50} =	2.5
D_{84}/D_{16} =	8

WDFW Substrate Gradation	
D_{100} =	12.5 ft
D_{84} =	5.0 ft
D_{50} =	2.0 ft
D_{16} =	7.50 in

D_{84}/D_{100} =	0.4
D_{84}/D_{50} =	2.5
D_{84}/D_{16} =	8

WDFW Substrate Gradation	
D_{100} =	12.5 ft
D_{84} =	5.0 ft
D_{50} =	2.0 ft
D_{16} =	7.50 in

Note: WDFW gradation above is based on wide variety of stream beds in different environments. The D_{84}/D_{100} ratio of 0.4 may give too large of boulder size in some cases. Experience and engineering judgment should be used to adjust distribution to the site. ACOE EM 1110-2-1601 suggests using D_{100}=2xD_{50}. If using ACOE steep slope methods to size substrate, then D_{84} =1.5D_{30} (WDFW, 2003). Choose the largest size of Stream Simulation Material to be equal to the D_{84} calculated using the WDFW gradation. Note: the largest rock should not be greater in individual size than 1/4 of the active channel width.

Resulting Floodplain Armor Gradation for Various Work Areas

Size Class	Particle Diamter
D_{100} =	3.5 ft
D_{84} =	2.5 ft
D_{50} =	1.4 ft
D_{16} =	2.0 in
D_8 =	0.08 in

Note: Refer to Specifications for final size gradation

Size Class	Particle Diamter
D_{100} =	2.8 ft
D_{84} =	2.0 ft
D_{50} =	1.1 ft
D_{16} =	2.0 in
D_8 =	0.08 in

Note: Refer to Specifications for final size gradation

Size Class	Particle Diamter
D_{100} =	1.5 ft
D_{84} =	1.0 ft
D_{50} =	0.6 ft
D_{16} =	2.0 in
D_8 =	0.08 in

Note: Refer to Specifications for final size gradation

Size Class	Particle Diamter
D_{100} =	1.3 ft
D_{84} =	0.9 ft
D_{50} =	0.5 ft
D_{16} =	2.0 in
D_8 =	0.08 in

Note: Refer to Specifications for final size gradation

Size Class	Particle Diamter
D_{100} =	5.0 ft
D_{84} =	4.0 ft
D_{50} =	2.0 ft
D_{16} =	6.0 in
D_8 =	0.08 in

Note: Refer to Specifications for final size gradation

Size Class	Particle Diamter
D_{100} =	5.0 ft
D_{84} =	4.0 ft
D_{50} =	2.2 ft
D_{16} =	4.0 in
D_8 =	0.08 in

Note: Refer to Specifications for final size gradation

Justification

Choose largest size of Floodplain Armor to be equal to the D_{84} calculated using the WDFW gradation.

4. ESM Thickness

Thickness greater or equal to max(1.5XD_{50} or D_{100}) (ACOE EM 1110-2-1601)

5. References

1.) U.S. Department of the Interior Bureau of Reclamation. 2007. Rock Ramp Design Guidelines.
2.) Washington Department of Fish and Wildlife. 2003 Design of Road Culverts for Fish Passage
3.) U.S. Army Corps of Engineers. 1994. Hydraulic Design of Flood Control Channels, EM-1110-2-1601
4.) California Department of Fish and Game (CDFG). 2009. Fish Passage Design and Implementation: Part XII of the California Salmonid Stream Habitat Restoration Manual. Sacramento, CA, CA Department of Fish and Game.

Floodplain Armor Calculations (Page 1 of 2)

Project: Permanente Quarry
Project #: 13-016
Date: 9/28/2018
Calculated by: BMZ
Checked by: B.M.S.

Calculations to determine the gradation and thickness of Floodplain Armor for constructed floodplains throughout project area.

1. Inputs

Channel Widening (Sta. 16+70 to 21+25)		
Design Flow*	577	cfs
Channel Width =	50	ft
q =	11.5	cu.ft./sec ft
gravity, g	32.2	ft/sec^2
Slope, S	0.049	ft/ft

Channel Widening (Sta. 21+25 to 23+00)		
Design Flow*	174	cfs
Channel Width =	14	ft
q =	12.4	cu.ft./sec ft
gravity, g	32.2	ft/sec^2
Slope, S	0.035	ft/ft

Channel Widening (Sta. 23+00 to 28+00)		
Design Flow*	326.9	cfs
Channel Width =	31.3	ft
q =	10.4	cu.ft./sec ft
gravity, g	32.2	ft/sec^2
Slope, S	0.040	ft/ft

Channel Widening (Sta. 30+75 to 31+75)		
Design Flow*	381.3	cfs
Channel Width =	35	ft
q =	10.9	cu.ft./sec ft
gravity, g	32.2	ft/sec^2
Slope, S	0.081	ft/ft

Channel Widening (Sta.31+75 to 40+50)		
Design Flow*	115.9	cfs
Channel Width =	18.5	ft
q =	6.3	cu.ft./sec ft
gravity, g	32.2	ft/sec^2
Slope, S	0.032	ft/ft

***Portion of 100-year design flow that is being conveyed over the floodplain armor.**

2. Equations to Calculate D50 particle size

Bathhurst (1987)	
developed for:	slope (0.23 to 9%)
	particle dia. (0.35 to 11 inches)
D_{50} =	3.56 q^2/3 S^.75 / g^1/3
D_{50} =	0.6 ft

Bathhurst (1987)	
developed for:	slope (0.23 to 9%)
	particle dia. (0.35 to 11 inches)
D_{50} =	3.56 q^2/3 S^.75 / g^1/3
D_{50} =	0.5 ft

Bathhurst (1987)	
developed for:	slope (0.23 to 9%)
	particle dia. (0.35 to 11 inches)
D_{50} =	3.56 q^2/3 S^.75 / g^1/3
D_{50} =	0.5 ft

Bathhurst (1987)	
developed for:	slope (0.23 to 9%)
	particle dia. (0.35 to 11 inches)
D_{50} =	3.56 q^2/3 S^.75 / g^1/3
D_{50} =	0.8 ft

Bathhurst (1987)	
developed for:	slope (0.23 to 9%)
	particle dia. (0.35 to 11 inches)
D_{50} =	3.56 q^2/3 S^.75 / g^1/3
D_{50} =	0.3 ft

Robinson et al. (1998)	
developed for:	slope (2% to 40%)
	particle dia. (0.6 to 11 inches)
D_{50} =	$[q_{design} / (8.07 \times 10^{-6} S^{-0.58})]^{0.529}$
q_{design} (m^3/s/m) =	1.07
D_{50} (mm) =	204
D_{50} =	0.7 ft

Robinson et al. (1998)	
developed for:	slope (2% to 40%)
	particle dia. (0.6 to 11 inches)
D_{50} =	$[q_{design} / (8.07 \times 10^{-6} S^{-0.58})]^{0.529}$
q_{design} (m^3/s/m) =	1.15
D_{50} (mm) =	191
D_{50} =	0.6 ft

Robinson et al. (1998)	
developed for:	slope (2% to 40%)
	particle dia. (0.6 to 11 inches)
D_{50} =	$[q_{design} / (8.07 \times 10^{-6} S^{-0.58})]^{0.529}$
q_{design} (m^3/s/m) =	0.97
D_{50} (mm) =	182
D_{50} =	0.6 ft

Robinson et al. (1998)	
developed for:	slope (2% to 40%)
	particle dia. (0.6 to 11 inches)
D_{50} =	$[q_{design} / (8.07 \times 10^{-6} S^{-0.58})]^{0.529}$
q_{design} (m^3/s/m) =	1.01
D_{50} (mm) =	230
D_{50} =	0.8 ft

Robinson et al. (1998)	
developed for:	slope (2% to 40%)
	particle dia. (0.6 to 11 inches)
D_{50} =	$[q_{design} / (8.07 \times 10^{-6} S^{-0.58})]^{0.529}$
q_{design} (m^3/s/m) =	0.58
D_{50} (mm) =	129
D_{50} =	0.4 ft

Abt and Johnson (1991)	
developed for:	slope (1% to 20%)
	particle dia. (1 to 6 inches)
D_{50} =	0.436 q_{sizing}^0.56 S^0.43
	q_{sizing} = q * sizing factor
	sizing factor = 1.35
D_{50} =	0.6 ft
Choose D_{50} =	0.6 ft

Abt and Johnson (1991)	
developed for:	slope (1% to 20%)
	particle dia. (1 to 6 inches)
D_{50} =	0.436 q_{sizing}^0.56 S^0.43
	q_{sizing} = q * sizing factor
	sizing factor = 1.35
D_{50} =	0.5 ft
Choose D_{50} =	0.6 ft

Abt and Johnson (1991)	
developed for:	slope (1% to 20%)
	particle dia. (1 to 6 inches)
D_{50} =	0.436 q_{sizing}^0.56 S^0.43
	q_{sizing} = q * sizing factor
	sizing factor = 1.35
D_{50} =	0.5 ft
Choose D_{50} =	0.6 ft

Abt and Johnson (1991)	
developed for:	slope (1% to 20%)
	particle dia. (1 to 6 inches)
D_{50} =	0.436 q_{sizing}^0.56 S^0.43
	q_{sizing} = q * sizing factor
	sizing factor = 1.35
D_{50} =	0.7 ft
Choose D_{50} =	0.8 ft

Abt and Johnson (1991)	
developed for:	slope (1% to 20%)
	particle dia. (1 to 6 inches)
D_{50} =	0.436 q_{sizing}^0.56 S^0.43
	q_{sizing} = q * sizing factor
	sizing factor = 1.35
D_{50} =	0.3 ft
Choose D_{50} =	0.4 ft

3. Develop Grain Size Distribution Utilizing the Calculated D_{50}

Washinton Department of Fish and Wildlife Grain Size Distribution (WDFW, 2003)

D_{84}/D_{100} =	0.4
D_{84}/D_{50} =	2.5
D_{84}/D_{16} =	8

WDFW Substrate Gradation		
D_{100} =	3.8	ft
D_{84} =	1.5	ft
D_{50} =	0.6	ft
D_{16} =	2.25	in

D_{84}/D_{100} =	0.4
D_{84}/D_{50} =	2.5
D_{84}/D_{16} =	8

WDFW Substrate Gradation		
D_{100} =	3.8	ft
D_{84} =	1.5	ft
D_{50} =	0.6	ft
D_{16} =	2.25	in

D_{84}/D_{100} =	0.4
D_{84}/D_{50} =	2.5
D_{84}/D_{16} =	8

WDFW Substrate Gradation		
D_{100} =	3.8	ft
D_{84} =	1.5	ft
D_{50} =	0.6	ft
D_{16} =	2.25	in

D_{84}/D_{100} =	0.4
D_{84}/D_{50} =	2.5
D_{84}/D_{16} =	8

WDFW Substrate Gradation		
D_{100} =	5.0	ft
D_{84} =	2.0	ft
D_{50} =	0.8	ft
D_{16} =	3.00	in

D_{84}/D_{100} =	0.4
D_{84}/D_{50} =	2.5
D_{84}/D_{16} =	8

WDFW Substrate Gradation		
D_{100} =	2.5	ft
D_{84} =	1.0	ft
D_{50} =	0.4	ft
D_{16} =	1.50	in

Note: WDFW gradation above is based on wide variety of stream beds in different environments. The D_{84}/D_{100} ratio of 0.4 may give too large of boulder size in some cases. Experience and engineering judgment should be used to adjust distribution to the site. ACOE EM 1110-2-1601 suggests using D_{100}=2xD_{50}. If using ACOE steep slope methods to size substrate, then D_{84} =1.5D_{30} (WDFW, 2003). Choose the largest size of Stream Simulation Material to be equal to the D_{84} calculated using the WDFW gradation. Note: the largest rock should not be greater in individual size than 1/4 of the active channel width.

Resulting Floodplain Armor Gradation for Various Work Areas

Size Class	Particle Diamter	
D_{100} =	1.5	ft
D_{84} =	1.0	ft
D_{50} =	0.6	ft
D_{16} =	2.0	in
D_8 =	0.08	in

Note: Refer to Specifications for final size gradation

Size Class	Particle Diamter	
D_{100} =	1.5	ft
D_{84} =	1.0	ft
D_{50} =	0.6	ft
D_{16} =	2.0	in
D_8 =	0.08	in

Note: Refer to Specifications for final size gradation

Size Class	Particle Diamter	
D_{100} =	1.5	ft
D_{84} =	1.0	ft
D_{50} =	0.6	ft
D_{16} =	2.0	in
D_8 =	0.08	in

Note: Refer to Specifications for final size gradation

Size Class	Particle Diamter	
D_{100} =	2.0	ft
D_{84} =	1.3	ft
D_{50} =	0.8	ft
D_{16} =	2.0	in
D_8 =	0.08	in

Note: Refer to Specifications for final size gradation

Size Class	Particle Diamter	
D_{100} =	1.0	ft
D_{84} =	0.8	ft
D_{50} =	0.4	ft
D_{16} =	2.0	in
D_8 =	0.08	in

Note: Refer to Specifications for final size gradation

Justification

Choose largest size of Floodplain Armor to be equal to the D_{84} calculated using the WDFW gradation.

4. Floodplain Armor Thickness

Thickness greater or equal to max(1.5XD_{50} or D_{100}) (ACOE EM 1110-2-1601)

5. References

1.) U.S. Department of the Interior Bureau of Reclamation. 2007. Rock Ramp Design Guidelines.
2.) Washington Department of Fish and Wildlife. 2003 Design of Road Culverts for Fish Passage
3.) U.S. Army Corps of Engineers. 1994. Hydraulic Design of Flood Control Channels, EM-1110-2-1601
4.) California Department of Fish and Game (CDFG). 2009. Fish Passage Design and Implementation: Part XII of the California Salmonid Stream Habitat Restoration Manual. Sacramento, CA, CA Department of Fish and Game.

Floodplain Armor Calculations (Page 2 of 2)

Project: Permanente Quarry
Project #: 13-016
Date: 9/28/2018
Calculated by: BMZ
Checked by: B.M.S.

Calculations to determine the gradation and thickness of Floodplain Armor for constructed floodplains throughout project area.

1. Inputs

Channel Widening (Sta. 40+50 to 45+00)		
Design Flow*	159	cfs
Channel Width =	8	ft
q =	19.9	cu.ft./sec ft
gravity, g	32.2	ft/sec^2
Slope, S	0.057	ft/ft

Channel Widening (Sta. 40+50 to 45+00)		
Design Flow*	433	cfs
Channel Width =	14	ft
q =	30.9	cu.ft./sec ft
gravity, g	32.2	ft/sec^2
Slope, S	0.057	ft/ft

Channel Widening (Sta. 45+00 to 48+75)		
Design Flow*	449	cfs
Channel Width =	60	ft
q =	7.5	cu.ft./sec ft
gravity, g	32.2	ft/sec^2
Slope, S	0.054	ft/ft

Rock Pile		
Design Flow*	1145	cfs
Channel Width =	22	ft
q =	52.0	cu.ft./sec ft
gravity, g	32.2	ft/sec^2
Slope, S	0.12	ft/ft

***Portion of 100-year design flow that is being conveyed over the floodplain armor.**

2. Equations to Calculate D50 particle size

Bathhurst (1987)

developed for: slope (0.23 to 9%)
particle dia. (0.35 to 11 inches)
D_{50} = 3.56 q^2/3 S^.75 / g^1/3

D_{50} =	1.0 ft

Bathhurst (1987)

developed for: slope (0.23 to 9%)
particle dia. (0.35 to 11 inches)
D_{50} = 3.56 q^2/3 S^.75 / g^1/3

D_{50} =	1.3 ft

Bathhurst (1987)

developed for: slope (0.23 to 9%)
particle dia. (0.35 to 11 inches)
D_{50} = 3.56 q^2/3 S^.75 / g^1/3

D_{50} =	0.5 ft

Bathhurst (1987)

developed for: slope (0.23 to 9%)
particle dia. (0.35 to 11 inches)
D_{50} = 3.56 q^2/3 S^.75 / g^1/3

D_{50} =	3.2 ft

Robinson et al. (1998)

developed for: slope (2% to 40%)
particle dia. (0.6 to 11 inches)
$D_{50} = [q_{design} / (8.07 \times 10^{-6} S^{-0.58})]^{0.529}$

q_{design} (m^3/s/m) =	1.85
D_{50} (mm) =	238
D_{50} =	0.8 ft

Robinson et al. (1998)

developed for: slope (2% to 40%)
particle dia. (0.6 to 11 inches)
$D_{50} = [q_{design} / (8.07 \times 10^{-6} S^{-0.58})]^{0.529}$

q_{design} (m^3/s/m) =	2.87
D_{50} (mm) =	359
D_{50} =	1.2 ft

Robinson et al. (1998)

developed for: slope (2% to 40%)
particle dia. (0.6 to 11 inches)
$D_{50} = [q_{design} / (8.07 \times 10^{-6} S^{-0.58})]^{0.529}$

q_{design} (m^3/s/m) =	0.70
D_{50} (mm) =	170
D_{50} =	0.6 ft

Robinson et al. (1998)

developed for: slope (2% to 40%)
particle dia. (0.6 to 11 inches)
$D_{50} = [q_{design} / (8.07 \times 10^{-6} S^{-0.58})]^{0.529}$

q_{design} (m^3/s/m) =	4.84
D_{50} (mm) =	473
D_{50} =	1.6 ft

Abt and Johnson (1991)

developed for: slope (1% to 20%)
particle dia. (1 to 6 inches)
D_{50} = 0.436 q_{sizing}^0.56 S^0.43
q_{sizing} = q * sizing factor
sizing factor = 1.35

D_{50} =	0.8 ft
Choose D_{50} =	1.0 ft

Abt and Johnson (1991)

developed for: slope (1% to 20%)
particle dia. (1 to 6 inches)
D_{50} = 0.436 q_{sizing}^0.56 S^0.43
q_{sizing} = q * sizing factor
sizing factor = 1.35

D_{50} =	1.0 ft
Choose D_{50} =	1.3 ft

Abt and Johnson (1991)

developed for: slope (1% to 20%)
particle dia. (1 to 6 inches)
D_{50} = 0.436 q_{sizing}^0.56 S^0.43
q_{sizing} = q * sizing factor
sizing factor = 1.35

D_{50} =	0.5 ft
Choose D_{50} =	0.6 ft

Abt and Johnson (1991)

developed for: slope (1% to 20%)
particle dia. (1 to 6 inches)
D_{50} = 0.436 q_{sizing}^0.56 S^0.43
q_{sizing} = q * sizing factor
sizing factor = 1.35

D_{50} =	1.9 ft
Choose D_{50} =	1.9 ft

3. Develop Grain Size Distribution Utilizing the Calculated D_{50}

Washinton Department of Fish and Wildlife Grain Size Distribution (WDFW, 2003)

D_{84}/D_{100} =	0.4
D_{84}/D_{50} =	2.5
D_{84}/D_{16} =	8

WDFW Substrate Gradation

D_{100} =	6.3	ft
D_{84} =	2.5	ft
D_{50} =	1.0	ft
D_{16} =	3.75	in

D_{84}/D_{100} =	0.4
D_{84}/D_{50} =	2.5
D_{84}/D_{16} =	8

WDFW Substrate Gradation

D_{100} =	8.1	ft
D_{84} =	3.3	ft
D_{50} =	1.3	ft
D_{16} =	4.88	in

D_{84}/D_{100} =	0.4
D_{84}/D_{50} =	2.5
D_{84}/D_{16} =	8

WDFW Substrate Gradation

D_{100} =	3.8	ft
D_{84} =	1.5	ft
D_{50} =	0.6	ft
D_{16} =	2.25	in

D_{84}/D_{100} =	0.4
D_{84}/D_{50} =	2.5
D_{84}/D_{16} =	8

WDFW Substrate Gradation

D_{100} =	11.9	ft
D_{84} =	4.8	ft
D_{50} =	1.9	ft
D_{16} =	7.13	in

Note: WDFW gradation above is based on wide variety of stream beds in different environments. The D_{84}/D_{100} ratio of 0.4 may give too large of boulder size in some cases. Experience and engineering judgment should be used to adjust distribution to the site. ACOE EM 1110-2-1601 suggests using $D_{100}=2xD_{50}$. If using ACOE steep slope methods to size substrate, then $D_{84}=1.5D_{30}$ (WDFW, 2003). Choose the largest size of Stream Simulation Material to be equal to the D_{84} calculated using the WDFW gradation. Note: the largest rock should not be greater in individual size than 1/4 of the active channel width.

Resulting Floodplain Armor Gradation for Various Work Areas

Size Class	Particle Diamter	
D_{100} =	2.5	ft
D_{84} =	2.0	ft
D_{50} =	1.0	ft
D_{16} =	4.0	in
D_8 =	0.08	in

Note: Refer to Specifications for final size gradation

Size Class	Particle Diamter	
D_{100} =	3.3	ft
D_{84} =	2.5	ft
D_{50} =	1.3	ft
D_{16} =	4.0	in
D_8 =	0.08	in

Note: Refer to Specifications for final size gradation

Size Class	Particle Diamter	
D_{100} =	1.5	ft
D_{84} =	1.0	ft
D_{50} =	0.6	ft
D_{16} =	2.0	in
D_8 =	0.08	in

Note: Refer to Specifications for final size gradation

Size Class	Particle Diamter	
D_{100} =	5.0	ft
D_{84} =	4.0	ft
D_{50} =	2.0	ft
D_{16} =	6.0	in
D_8 =	0.08	in

Note: Refer to Specifications for final size gradation

Justification

Choose largest size of Floodplain Armor to be equal to the D_{84} calculated using the WDFW gradation.

4. Floodplain Armor Thickness

Thickness greater or equal to max(1.5XD_{50} or D_{100}) (ACOE EM 1110-2-1601)

5. References

1.) U.S. Department of the Interior Bureau of Reclamation. 2007. Rock Ramp Design Guidelines.
2.) Washington Department of Fish and Wildlife. 2003 Design of Road Culverts for Fish Passage
3.) U.S. Army Corps of Engineers. 1994. Hydraulic Design of Flood Control Channels, EM-1110-2-1601
4.) California Department of Fish and Game (CDFG). 2009. Fish Passage Design and Implementation: Part XII of the California Salmonid Stream Habitat Restoration Manual. Sacramento, CA, CA Department of Fish and Game.

Rock Slope Protection Calculations

Project: Permanente Creek
Project #: 13-016
Date: 10/15/2019
Calculated by: DR
Checked by: BMZ

Caltrans RSP Design at Culvert #6

FHWC-CA-TL-95-10

$$W_{min} = \frac{0.00002\ (V_{av}.V_f)^6\ SG}{(SG-1)^3\ SIN^3(r-a)}$$ (Eq. 1, 5-1-C)

Parameter	Value	Units	Data type	Description
Flow	1276	cfs		100-year Design Flow
RS u/s	116+20.76	ft	(enter)	River Station
V_{av}	**4.53**	fps	(enter)	Average channel velocity at Section A
SG	2.5	-	(constant)	Min. Specific Gravity (Caltrans 72-2.02)
r	70	-	(constant)	Constant for randomly placed rubble.
a	45.00	degrees	(enter)	Outside slope face angle (26.6 for 2H:1V)
sin(r-a)	0.42	-	(result)	
V_f	1.33	-	(enter)	Velocity Factor (.67 for parallel and 1.33 for impinging)
V_{ss}	6.02	fps	(result)	Factored velocity (V_{av} x V_f)
W_{min}	**9**	lbs	(result)	Theoretical Min. Rock Mass that remains stable
RSP-Class	0.50	ton	(enter)	STANDARD Rock Size greater than W_{min} (T 5-1)
RSP-Class	1000	lbs	(result)	STANDARD Rock Size greater than W_{min} (T 5-1)
D_{min}	0.48	ft	(result)	Min. Rock Dia. based on a sphere, 165 pcf.
D_{50}	2.26	ft	(result)	Diameter of STANDARD (50-100%) rock size, 165 pcf.
t_A	3.39	ft	(result)	Thickness for Type A placement, t = 1.5 D_{50}
t_B	4.24	ft	(result)	Thickness for Type B placement, t = 1.875 D_{50}

Notes:
Results are for HEC Sta. 116+20.76
Design velocity is low, resulting in small rock size.

Use 1/2 ton RSP for construction efficiency (1/2 ton RSP is specified for the Culvert #7 removal area). The 1/2 ton RSP will also allow for stacking of rock to conform the proposed floodplain bench to the existing oversteepened bank at the Culvert #6 inlet. The larger rock size will also help ensure stability if debris collects near the culvert inlet and creates complex hydraulic conditions that result in eddy formation or other hydraulic forces that are not easy to predict and have the potential to be erosive.

Use Method A - individually place rocks.

Rock Slope Protection Calculations

Project: Permanente Creek
Project #: 13-016
Date: 10/15/2019
Calculated by: DR
Checked by: BMZ

Caltrans RSP Design at Culvert #7

FHWC-CA-TL-95-10

$$W_{min} = \frac{0.00002\ (V_{av}.V_f)^6\ SG}{(SG-1)^3\ SIN^3(r-a)}$$ (Eq. 1, 5-1-C)

Parameter	Value	Units	Data type	Description
Flow	1276	cfs		100-year Design Flow
RS u/s	121+91	ft	(enter)	River Station
V_{av}	**14.61**	fps	(enter)	Average channel velocity at Section A
SG	2.5	-	(constant)	Min. Specific Gravity (Caltrans 72-2.02)
r	70	-	(constant)	Constant for randomly placed rubble.
a	45.00	degrees	(enter)	Outside slope face angle (26.6 for 2H:1V)
sin(r-a)	0.42	-	(result)	
Vf	0.9	-	(enter)	Velocity Factor (.67 for parallel and 1.33 for impinging)
V_{ss}	1.20	fps	(result)	Factored velocity (V_{av} x V_f)
W_{min}	**949**	lbs	(result)	Theoretical Min. Rock Mass that remains stable
RSP-Class	0.50	ton	(enter)	STANDARD Rock Size greater than W_{min} (T 5-1)
RSP-Class	1000	lbs	(result)	STANDARD Rock Size greater than W_{min} (T 5-1)
D_{min}	2.22	ft	(result)	Min. Rock Dia. based on a sphere, 165 pcf.
D_{50}	2.26	ft	(result)	Diameter of STANDARD (50-100%) rock size, 165 pcf.
t_A	3.39	ft	(result)	Thickness for Type A placement, t = 1.5 D_{50}
t_B	4.24	ft	(result)	Thickness for Type B placement, t = 1.875 D_{50}

Notes:
Results are for HEC Sta. 122+25
Use Method A - individually place rocks
Use 1/2 Ton RSP

Rock Slope Protection Calculations

Project: Permanente Creek
Project #: 13-016
Date: 10/25/2019
Calculated by: BMZ
Checked by: BMS

Caltrans RSP Design at Culvert #9

FHWC-CA-TL-95-10

$$W_{min} = \frac{0.00002\ (V_{av}.V_f)^6\ SG}{(SG-1)^3\ SIN^3(r-a)}$$ (Eq. 1, 5-1-C)

Parameter	Value	Units	Data type	Description
Flow	1276	cfs		100-year Design Flow
RS u/s	143+50	ft	(enter)	River Station
V_{av}	**18.24**	fps	(enter)	Average channel velocity at Section A
SG	2.5	-	(constant)	Min. Specific Gravity (Caltrans 72-2.02)
r	70	-	(constant)	Constant for randomly placed rubble.
a	45.00	degrees	(enter)	Outside slope face angle (26.6 for 2H:1V)
sin(r-a)	0.42	-	(result)	
Vf	0.9	-	(enter)	Velocity Factor (.67 for parallel and 1.33 for impinging)
V_{ss}	16.42	fps	(result)	Factored velocity (V_{av} x V_f)
W_{min}	**3841**	lbs	(result)	Theoretical Min. Rock Mass that remains stable
RSP-Class	2.00	ton	(enter)	STANDARD Rock Size greater than W_{min} (T 5-1)
RSP-Class	4000	lbs	(result)	STANDARD Rock Size greater than W_{min} (T 5-1)
D_{min}	3.54	ft	(result)	Min. Rock Dia. based on a sphere, 165 pcf.
D_{50}	3.59	ft	(result)	Diameter of STANDARD (50-100%) rock size, 165 pcf.
t_A	5.39	ft	(result)	Thickness for Type A placement, t = 1.5 D_{50}
t_B	6.73	ft	(result)	Thickness for Type B placement, t = 1.875 D_{50}

Notes:
Results are for HEC Sta. 122+25
Use Method A - individually place rocks
Use 2 Ton RSP

WATERWAYS CONSULTING, INC.

RSP Sizing Sensitivity Analysis

Rock Slope Protection Calculations

Project: Permanente Creek
Project #: 13-016
Date: 10/25/2019
Calculated by: BMZ
Checked by: BMS

Caltrans RSP Design at Culvert #7

FHWC-CA-TL-95-10

(The velocity is from the hydraulic modeling sensitivity analysis where Manning's n was increased by 10%)

$$W_{min} = \frac{0.00002\ (V_{av}.V_f)^6\ SG}{(SG-1)^3\ SIN^3(r-a)}$$ (Eq. 1, 5-1-C)

Parameter	Value	Units	Data type	Description
Flow	1276	cfs		100-year Design Flow
RS u/s	121+91	ft	(enter)	River Station
V_{av}	**13.90**	fps	(enter)	Average channel velocity at Section A
SG	2.5	-	(constant)	Min. Specific Gravity (Caltrans 72-2.02)
r	70	-	(constant)	Constant for randomly placed rubble.
a	45.00	degrees	(enter)	Outside slope face angle (26.6 for 2H:1V)
sin(r-a)	0.42	-	(result)	
V_f	0.9	-	(enter)	Velocity Factor (.67 for parallel and 1.33 for impinging)
V_{ss}	1.20	fps	(result)	Factored velocity (V_{av} x V_f)
W_{min}	**704**	lbs	(result)	Theoretical Min. Rock Mass that remains stable
RSP-Class	0.50	ton	(enter)	STANDARD Rock Size greater than W_{min} (T 5-1)
RSP-Class	1000	lbs	(result)	STANDARD Rock Size greater than W_{min} (T 5-1)
D_{min}	2.01	ft	(result)	Min. Rock Dia. based on a sphere, 165 pcf.
D_{50}	2.26	ft	(result)	Diameter of STANDARD (50-100%) rock size, 165 pcf.
t_A	3.39	ft	(result)	Thickness for Type A placement, t = 1.5 D_{50}
t_B	4.24	ft	(result)	Thickness for Type B placement, t = 1.875 D_{50}

Notes:
Results are for HEC Sta. 122+25
Use Method A - individually place rocks
Use 1/2 Ton RSP

Rock Slope Protection Calculations

Project: Permanente Creek
Project #: 13-016
Date: 10/25/2019
Calculated by: BMZ
Checked by: BMS

Caltrans RSP Design at Culvert #7

FHWC-CA-TL-95-10

(The velocity is from the hydraulic modeling sensitivity analysis where Manning's n was decreased by 10%)

$$W_{min} = \frac{0.00002\ (V_{av}.V_f)^6\ SG}{(SG-1)^3\ SIN^3(r-a)}$$ (Eq. 1, 5-1-C)

Parameter	Value	Units	Data type	Description
Flow	1276	cfs		100-year Design Flow
RS u/s	121+91	ft	(enter)	River Station
V_{av}	**15.34**	fps	(enter)	Average channel velocity at Section A
SG	2.5	-	(constant)	Min. Specific Gravity (Caltrans 72-2.02)
r	70	-	(constant)	Constant for randomly placed rubble.
a	45.00	degrees	(enter)	Outside slope face angle (26.6 for 2H:1V)
sin(r-a)	0.42	-	(result)	
V_f	0.9	-	(enter)	Velocity Factor (.67 for parallel and 1.33 for impinging)
V_{ss}	1.20	fps	(result)	Factored velocity (V_{av} x V_f)
W_{min}	**1188**	lbs	(result)	Theoretical Min. Rock Mass that remains stable
RSP-Class	0.50	ton	(enter)	STANDARD Rock Size greater than W_{min} (T 5-1)
RSP-Class	1000	lbs	(result)	STANDARD Rock Size greater than W_{min} (T 5-1)
D_{min}	2.40	ft	(result)	Min. Rock Dia. based on a sphere, 165 pcf.
D_{50}	2.26	ft	(result)	Diameter of STANDARD (50-100%) rock size, 165 pcf.
t_A	3.39	ft	(result)	Thickness for Type A placement, t = 1.5 D_{50}
t_B	4.24	ft	(result)	Thickness for Type B placement, t = 1.875 D_{50}

Notes:
Results are for HEC Sta. 122+25
Use Method A - individually place rocks
Use 1/2 Ton RSP

Rock Slope Protection Calculations

Project: Permanente Creek
Project #: 13-016
Date: 10/25/2019
Calculated by: BMZ
Checked by: BMS

Caltrans RSP Design at Culvert #9

FHWC-CA-TL-95-10

(The velocity is from the hydraulic modeling sensitivity analysis where Manning's n was increased by 10%)

$$W_{min} = \frac{0.00002\ (V_{av}.V_f)^6\ SG}{(SG-1)^3\ SIN^3(r-a)}$$ (Eq. 1, 5-1-C)

Parameter	Value	Units	Data type	Description
Flow	1276	cfs		100-year Design Flow
RS u/s	143+50	ft	(enter)	River Station
V_{av}	**17.88**	fps	(enter)	Average channel velocity at Section A
SG	2.5	-	(constant)	Min. Specific Gravity (Caltrans 72-2.02)
r	70	-	(constant)	Constant for randomly placed rubble.
a	45.00	degrees	(enter)	Outside slope face angle (26.6 for 2H:1V)
sin(r-a)	0.42	-	(result)	
V_f	0.9	-	(enter)	Velocity Factor (.67 for parallel and 1.33 for impinging)
V_{ss}	16.09	fps	(result)	Factored velocity (V_{av} x V_f)
W_{min}	**3408**	lbs	(result)	Theoretical Min. Rock Mass that remains stable
RSP-Class	2.00	ton	(enter)	STANDARD Rock Size greater than W_{min} (T 5-1)
RSP-Class	4000	lbs	(result)	STANDARD Rock Size greater than W_{min} (T 5-1)
D_{min}	3.40	ft	(result)	Min. Rock Dia. based on a sphere, 165 pcf.
D_{50}	3.59	ft	(result)	Diameter of STANDARD (50-100%) rock size, 165 pcf.
t_A	5.39	ft	(result)	Thickness for Type A placement, t = 1.5 D_{50}
t_B	6.73	ft	(result)	Thickness for Type B placement, t = 1.875 D_{50}

Notes:
Results are for HEC Sta. 122+25
Use Method A - individually place rocks
Use 2 Ton RSP

Rock Slope Protection Calculations

Project: Permanente Creek
Project #: 13-016
Date: 10/25/2019
Calculated by: BMZ
Checked by: BMS

Caltrans RSP Design at Culvert #9

FHWC-CA-TL-95-10

(The velocity is from the hydraulic modeling sensitivity analysis where Manning's n was decreased by 10%)

$$W_{min} = \frac{0.00002\ (V_{av}.V_f)^6\ SG}{(SG-1)^3\ SIN^3(r-a)}$$ (Eq. 1, 5-1-C)

Parameter	Value	Units	Data type	Description
Flow	1276	cfs		100-year Design Flow
RS u/s	143+50	ft	(enter)	River Station
V_{av}	**18.57**	fps	(enter)	Average channel velocity at Section A
SG	2.5	-	(constant)	Min. Specific Gravity (Caltrans 72-2.02)
r	70	-	(constant)	Constant for randomly placed rubble.
a	45.00	degrees	(enter)	Outside slope face angle (26.6 for 2H:1V)
sin(r-a)	0.42	-	(result)	
V_f	0.9	-	(enter)	Velocity Factor (.67 for parallel and 1.33 for impinging)
V_{ss}	16.53	fps	(result)	Factored velocity (V_{av} x V_f)
W_{min}	**4000**	lbs	(result)	Theoretical Min. Rock Mass that remains stable
RSP-Class	2.00	ton	(enter)	STANDARD Rock Size greater than W_{min} (T 5-1)
RSP-Class	4000	lbs	(result)	STANDARD Rock Size greater than W_{min} (T 5-1)
D_{min}	3.59	ft	(result)	Min. Rock Dia. based on a sphere, 165 pcf.
D_{50}	3.59	ft	(result)	Diameter of STANDARD (50-100%) rock size, 165 pcf.
t_A	5.39	ft	(result)	Thickness for Type A placement, t = 1.5 D_{50}
t_B	6.73	ft	(result)	Thickness for Type B placement, t = 1.875 D_{50}

Notes:
Results are for HEC Sta. 122+25
Use Method A - individually place rocks
Use 2 Ton RSP

APPENDIX G

Floodplain Log Ballast Calculations

Wood and Ballast Calculations for Floodplain logs at Permanente Creek

Project: Permanente Creek Restoration Project
Project #: 13-016
Date: 10/25/18
Calculated by: B.M.S.
Checked by: B.M.Z.

Note: adjust values in red cells.

Alder/willow average dry density = 28 lbs/cuft

Ballast Estimate

Density of water = 62.4 lbs/cuft

Ballast in one cubic foot Small Cobble:

Average Dry Unit Weigh Cobble = 142.6 lbs/cuft
Ballast provided by one cubic foot of Cobble = 80.20 lbs/cuft

Log Dimensions

Diameter 1.5 ft average diameter along length of log

Bouyant Force on Log = 60.8 lbs/ft

Ballast of Cobble Over Log per Linear Foot

Width of trench = 1.5 Width of trench equal to diameter of log
Burial Depth (i.e. trench depth) = 1.5 Adjust burial depth as needed to calculate acceptible factor of safety

Ballast of rock in trench = 180.45 lbs/ft ballast force per linear foot of trench

Assume:

50% of log is burried by rock ballast to a minimum depth of 1.5 ft

Then

Weight of rock ballast per linear foot of trench = 180.45 lbs/ft

Unit weight of ballast per linear foot over entire log assuming 50% of log buried below ballast = 90.225 lbs/ft ballast force per foot of burried log

Factor of Safety = 1.5 for a 1.5 ft. diameter log

Note: Smaller diameter logs would have a greater factor of safety, larger diameter logs would have a smaller Fs for the specified burial depth.
Adjust calculations as required during construction to conform to available log sizes and species.

Calculations are conservative because they do not account for:

Friction forces of soil/ballast material on log that result pullout
Additional ballast weight from cone of influence of material outside of trench width

Log Structure Ballast Calculations
Project: Permanente Creek Restoration Project
Project #: 13-016
Date: 10/15/19
Calculated by: BMZ

Anchor Mass Solver: Log Revetment Structure

Reference: D'Aoust and Millar, 2000. Stability of ballasted woody debris habitat structures.

Input Variables

Design Velocity (V)	**4.5**	m/s	
Target FS_B	**1.50**		**Solution**
Number of anchor boulders	**4**	X	**1.22** m boulder(s)
			for a total mass of
			9,980 kg

Summary of LWD & F_{BL}	LWD			Ballast Factor	Buoyancy Force (F_{BL}) Equation (3-1)
	Length (m)	Diam.(m)	Number		(N)
LWD No. 1 (25 foot cross logs)	**7.6**	**0.6**	**2**	**2**	27,511
LWD No. 2 (25 foot cross logs)					0
LWD No. 3 (20 foot cell logs)					0
LWD No. 4 (10 foot back piles)					0
LWD No. 5 (15 foot back piles)					0
LWD No. 6					
	Length	RW Diam.	Butt Diam.	Number	
Root Wad No.1	**1.2**	**1.8**	**0.9**	**1**	5,282
Root Wad No.2					
Total Buoyant Force					**32,793**

Vertical Lift Force on Boulders (F_{LB})	7,832	N	Equation (3-4)
Immersed Weight of Boulders (W')	60,955	N	Equation (3-5)
Computed Mass of Boulders	**9,979**	kg	
Computed Factors of Safety (FS)	**1.50**		Equation (3-9)

Summary (English untis)

Total Buoyant Force	7,378	lbf
Vertical Lift Force on Boulders (F_{LB})	1,762	lbf
Immersed Weight of Boulders (W')	13,715	lbf
Computed Mass of Boulders	**21,954**	lbs
Number of 4' dia. Boulders	**4.0**	

Adjusted for Backfill Ballast

Volume of Backfill Ballast*	45	cu.ft.
Immersed Weight of 1 cu. Ft. gravel	61.56	lbs
Immersed Weight of Backfill Ballast	2,770	lbs
Actual Weight of Ballast	4,454	lbs
Adjusted Mass of Boulders Required*	**17,501**	lbs
Number of 4' dia. Boulders	**3.2**	

Design Assumptions:

Log structures to be installed at the Culvert #7 and #8 removal areas.

The design velocity is the maximum Q100 velocity from the proposed conditions HEC-RAS model occuring at the Culvert #7 removal area.

Log structures to be ballasted with four 2.5 ton (5,000 lb) boulders and backfill to resist buoyont forces.

APPENDIX H

Golder Associates 2019

Geologic and Geomorphic Assessment of Permanente Creek

TECHNICAL MEMORANDUM

DATE October 31, 2019 **Project No.** 179018601

TO Erika Guerra, Talia Flagan
Lehigh Permanente

CC Brent Zacharia, Waterways Consulting, Inc.

FROM Robert Humphries; William Fowler, PG 4401, CEG 1401 **EMAIL bfowler@golder.com**

GEOLOGIC AND GEOMORPHIC ASSESSMENT OF PERMANENTE CREEK, LEHIGH HANSON PERMANENTE QUARRY, SANTA CLARA COUNTY, CA

1.0 INTRODUCTION

This technical memorandum provides the results of our geologic and geomorphic assessment of the Permanente Creek Restoration Plan – 90% Level Submittal, Waterways Consulting, Inc., dated 11/15/18 and updated 10/31/19 (the Project). The focus of the study was to determine if there were any specific areas of the proposed project which require further subsurface geotechnical exploration and testing to refine the project restoration design, so as to respond to comments dated February 14, 2019 from the County of Santa Clara Planning Office ("County"). Specifically, this work focused on a field assessment of the proposed alignment and longitudinal gradient of the proposed stream channel and how it compares to existing conditions. Particular attention was placed on the Rock Pile and Material Removal Area and the proposed depth of excavations required and stability of the adjacent creek sideslopes.

The scope of work for our study included a desktop data review, and site reconnaissance and mapping of the project area to evaluate the geologic conditions in conjunction with the proposed restoration design. The work product from our investigation includes a geologic map and cross sections of the project area, along with this technical memorandum. This memorandum includes:

- A brief presentation of the methods applied in this assessment
- A summary of pertinent supporting data from our previous investigations throughout the facility
- A geologic map and a description of the earth materials encountered along Permanente Creek
- A geologic and geomorphic assessment of the Permanente Creek channel profile
- A discussion of these results and their significance to the proposed Permanente Creek Restoration Plan
- Golder Associates Inc.'s (Golder) conclusions and recommendations regarding this assessment

Golder and the G logo are trademarks of Golder Associates Corporation

2.0 METHODS

2.1 Data Compilation and Review

Golder reviewed available existing data pertaining to the project including aerial photographs, historical USGS topographic and geologic maps, site boring logs, seismic data from previously completed work within the project area, the Waterways 90% plan set, and pertinent site and regional geologic data.

2.2 Site Reconnaissance

Golder conducted a site visit over three days from July 25 to 27, 2019. The field team consisted of three primary members, including a fluvial geomorphologist, a geohazards geologist, and a staff geologist. The field team was given a site orientation and tailgate safety briefing by a locally based senior technician with long term familiarity with the site and specific knowledge of creek access points and safety. Creek access is difficult, and locally hazardous, because of very steep terrain, heavy vegetation, and other obstacles such as loose rock, fallen trees, etc. This rugged terrain also severely limits access for drill rigs to many of the reaches of the creek.

Golder communicated with Waterways to discuss our initial opinions and received feedback as to what specific reaches or features needed further study, or have the most uncertainty, with respect to the 90% design effort to focus our field mapping efforts. The field mapping efforts focused on the reaches that include the following two areas: 1) Rockpile and 2) Material Removal Area. Note, however, that the entire project area was traversed on foot by the field reconnaissance team.

2.3 Field Mapping

The mapping focused on defining areas of mining disturbance, (e.g., overburden, roads, structures, etc.) versus native slopes and development of geologic cross sections in key locations (e.g., Rockpile and Materials Removal Area). The mapping also identified other pertinent geomorphic features such as native slope angles, natural shallow slides, areas of erosion, sediment accumulation, bedrock exposures, etc.

3.0 REGIONAL GEOLOGIC AND GEOMORPHIC SETTING

3.1 Bedrock Geologic Units

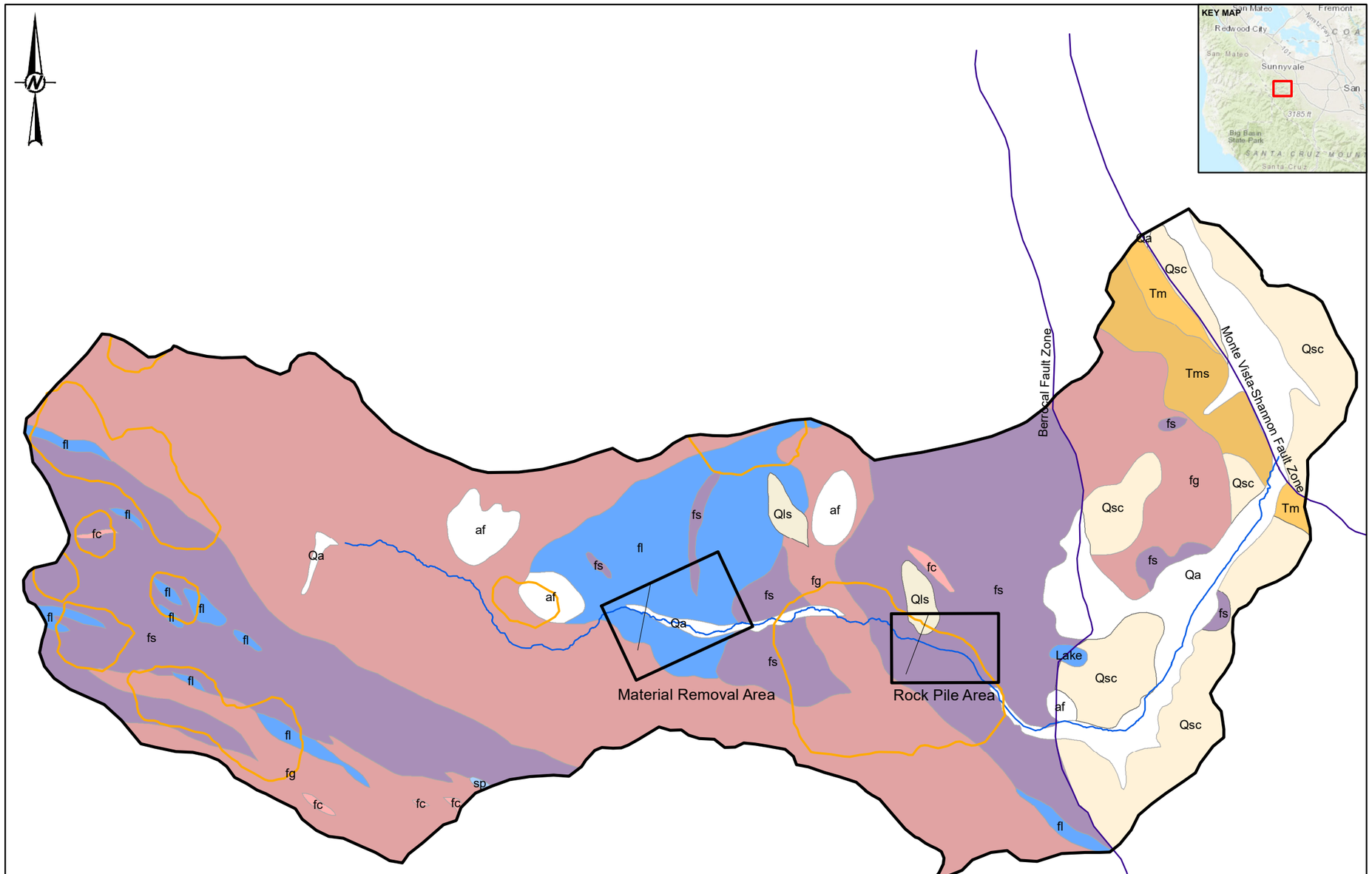
The bedrock materials exposed in the Quarry are part of the Permanente Terrane of the Franciscan Assemblage. The Franciscan Assemblage is comprised of highly deformed and variably metamorphosed, marine sedimentary rocks with submarine basalt (greenstone), chert, and limestone. The Franciscan is considered a tectonic mélange that was formed in the subduction zone between the Pacific tectonic plate and the North American plate. This plate boundary is now a transform, strike-slip plate boundary defined by the San Andreas Fault zone located about two miles southwest of the Quarry.

Golder has referenced two geologic map sources in our presentation of the geology of the Permanente Creek Basin (Figure 1). One set of maps comes from the Cupertino and Mindego Hills quadrangles (Dibblee and Minch 2007a and b), and the other comes from the San Francisco Bay Landslide Mapping Team (USGS 1997). Previous researchers have mapped the basin (Brabb 1970, Pulver 1979a and b).

3.2 Surficial Geologic Units

3.2.1 Overburden and Fill

Many of the south-facing slopes that flank Permanente Creek are mantled with varying thicknesses of overburden. These are generally described as side-cast fills that mantle existing canyon slopes and fill small



LEGEND

- Areas of Interest
- Cross Sections
- Permanente Creek
- PermCrkBasin_V2
- Mostly Landslides
- Faults
- Earthquake Epicenter Location

Geologic Units

UnitNam

- Lake
- af
- Qa
- Qls
- Qsc
- Tm
- Tms
- sp
- fg
- fs
- fc
- fl

0 2,000 4,000

1 IN = 1,667 FT FEET

NOTE(S)
1. LINE NOTES
2. LINE NOTES
3. LINE NOTES

REFERENCE(S)

1. USGS (LANDSLIDES, 1997; FAULTS, 2000, 2002)
2. CALIFORNIA DIVISION OF MINES AND GEOLOGY (EARTHQUAKES, 1982)
3. WATERWAYS CONSULTING, INC. (PERMANENTE CREEK, 2018)
4. CALIFORNIA DEPARTMENT OF FORESTRY (GEOLOGY AND LANDSLIDES, 1979)
5. COORDINATE SYSTEM: NAD 1983 STATE PLANE CALIFORNIA III (FT)
6. SERVICE LAYER CREDITS: SOURCES: ESRI, HERE, GARMIN, INTERMAP, INCREMENT P CORP., GEBCO, USGS, FAO, NPS, NRCAN, GEOBASE, IGN, KADASTER NL, ORDNANCE SURVEY, ESRI JAPAN, METI, ESRI CHINA (HONG KONG), SWISSTOPO, © OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY

CLIENT
LEHIGH SOUTHWEST CEMENT COMPANY AND HANSON PERMANENTE CEMENT, INC.

PROJECT
GEOLOGIC AND GEOMORPHIC ASSESSMENT OF PERMANENTE CREEK

TITLE
GEOLOGIC MAP OF PERMANENTE CREEK BASIN

CONSULTANT
GOLDER

YYYY-MM-DD	2019-10-02
DESIGNED	RPH/BVJ
PREPARED	RPH/BVJ
REVIEWED	BF/CJ/RPH
APPROVED	BF

PROJECT NO.	PHASE	REV.	FIGURE
179018601	100	0	1

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

PATH: G:\Lehigh\Hanson\PermanenteCreek\699_PROJECTS\179018601_GeomorphMap\100\02_PRODUCTION\MXD\FIGURES\Rev0\179018601_100_001_Fx_Rev0_GeologyMap.mxd PRINTED ON: 2019-10-02 AT: 10:44:12 AM

drainages and swales that formerly reported to Permanente Creek. The overburden deposits are of highly variable thickness, starting at the Rock Pile Area and continuing up through the Material Removal Area. A large percentage of this material within the Project area will be removed as part of the restoration effort.

The Rock Pile area is comprised of stockpiled material for production. The character of the overburden is variable but generally consists of fine to coarse gravel to angular cobble sized rock fragments. Elsewhere, overburden is a heterogeneous mixture of fines, sand, gravel and cobble sized fragments (i.e., greenstone, graywacke, cherts, and soil materials) but with small percentages of limestone.

3.2.2 Alluvium

This includes modern unconsolidated alluvial deposits along the active stream channel of Permanente Creek. These deposits are comprised of a poorly sorted mixture of cobbles, gravels, sand, silt and clay. Deposits range from a few inches thick in the upper reaches of the watershed where erosion has cut the channel down into bedrock, to tens of feet thick where the channel widens and deepens as it approaches the flatter terrain of the Santa Clara Valley.

3.2.3 Colluvium

Colluvial and slope wash deposits are common throughout the steep terrain of the Santa Cruz Mountains. In general, the natural slopes in the region are overlain with approximately one to two feet of soil and colluvial materials, which thicken to several feet or more in the larger natural swales in the region. Colluvium is generally described as predominantly clayey sand with gravel to clayey gravel, with some gravelly clay.

3.2.4 Ancient Natural Landslide Deposits

Several large, ancient landslides have been mapped by various investigators in various areas of the 3,510-acre Lehigh property, and throughout the broader foothill's region (Figure 1). These landslides are generally described as possible old landslides and considered to be early Holocene or possibly late- Pleistocene features. These are naturally occurring landslides that are not related to any modern day mining activities. Along the south flank of Permanente Creek, two large landslides are identified by Sorg and McLaughlin (1975) while Rogers and Armstrong (1973) map only one of the landslide features.

The presence of these ancient landslides, as well as much smaller surficial slides that occur along the canyon walls, and in steep zero-order drainages that report to Permanent Creek, reflects the young, steep geologic terrain that comprises the Santa Cruz Mountains. The relatively thin surficial failures that are common in this terrain are to be expected going forward with this Project both from natural sources—like the zero-order drainages along the south canyon wall—and potentially from restored natural grades once overburden is removed as part of the Project. Note that one of the primary goals of the creek restoration program is to remove specified overburden and fill materials and restore, to the extent practicable, natural slope angles both along the longitudinal profile of the creek and transverse to the creek (i.e., the creek banks).

3.3 Faulting and Seismicity

The San Andreas Fault zone is located approximately two miles southwest of the Quarry (Figure 1). The Sargent-Berrocal Fault Zone (SBFZ), part of the Santa Cruz Mountains front-range thrust fault system, parallels the San Andreas to the east and forms the eastern-most structural boundary to the Permanente Terrain.

Near the Quarry, the SBFZ consists of two northwest-trending, sub-parallel faults, namely the northeastern-most Monta Vista Fault Zone and the southwestern-most Berrocal Fault Zone (Sorg and McLaughlin, 1975) (Figure 1).

The Monta Vista Fault Zone is located approximately 1 mile to the northeast of the Quarry. A strand of the Berrocal Fault Zone lies beneath the Permanente Cement Plant area to the south of the EMSA, and extends west to other portions of the Quarry (Mathieson, 1982; Sorg and McLaughlin, 1975).

Using the 2008 Update of the United States National Seismic Hazard Maps (Peterson, et.al., 2008), which incorporates the findings of the Next Generation Attenuation Relation Project, Golder estimates that design peak ground accelerations should be approximately 0.57g for the site.

4.0 BASIN GEOMORPHOLOGY

The geomorphology of the Permanente Creek basin is influenced by multiple active geologic processes. The highly active tectonics of the San Andreas Fault and other nearby faults and fault zones result in a high rate of uplift and relatively frequent, high magnitude earthquakes. The tectonic activity has modified both the headwater basins and offsets lower elevations of landscape in juxtaposition to each other. The relatively frequent occurrence of high magnitude earthquakes is likely to have increased magnitude and occurrence of ancient, naturally-occurring landslides within the basin. Additionally, the highly variable rock types, tectonic histories, and geomechanical properties of the accretionary island arc geology of the Franciscan mélange have resulted in highly differential rates of erosion. These differential erosion rates are expressed in the varying morphologic characteristics of the basin.

As an added complexity, the carbonate units of the Franciscan complex have resulted in carbonate-rich water precipitating travertine deposits on the bed and banks of Permanente Creek. These travertine deposits interact with the self-forming step-pools of the steeper portions of the channel and contribute to a repeating cycle of travertine dam formation and breaching (Fuller et al. 2010). Additionally, the subsurface precipitation of travertine in the interstitial voids between sediment grains in sediment deposits increases the intergranular bond strength, making the sediment more resistant to erosion and potentially decreasing the rippability of the material.

In addition to the natural processes interacting with the basin morphology, the long history of mining in the basin has also substantially interacted with the surface processes defining the basin morphology. The very high rate of sediment supplied to the channel, in the form of overburden and fill placed along the margin of the stream channel during the early history of mining (1940s and 1950s), has resulted in aggradation of the channel in lower gradient portions of the channel.

4.1 Fault Influence

The drainage basins of the northeast side of the Santa Cruz mountains are characterized by geomorphic features that are controlled by faulting. The features include right-lateral deflected and offset drainages, drainages that follow lineaments, sidehill benches, closed depressions, aligned benches, linear scarps, linear troughs, saddles, and linear vegetation contrasts (Smith 1981).

In the downstream portion of the basin, the Monte Vista-Shannon fault zone defines geomorphic features. These features are believed to have been formed during the Pleistocene and possible Holocene. They include the reverse displacement of lower elevation sediment to higher elevations than those of their original deposition, forming benches, saddles, linear valleys, faceted spurs, scarps, linear range fronts, linear depressions, and associated vegetation contrasts (Bedrossian 1980, Hitchcock et al. 1994).

Similarly, the Jurassic and Cretaceous aged rocks of the Franciscan Complex are thrust over Pliocene and Pleistocene alluvial sediment of the Santa Clara Formation and younger Quaternary deposits (Sorg and

McLaughlin 1975, Wesling and Helley 1989, McLaughlin et al. 1991, Hitchcock et al. 1994). On the site, colluvial deposits are thrust over fluvial gravel of Permanente Creek, indicating late Pleistocene and possible Holocene displacement (Hitchcock et al. 1994).

Hitchcock and Kelson (1999) noted that coseismic deformation associated with the 1989 Loma Prieta earthquake, was coincident with geomorphic features suggestive of faulting along the Monte Vista-Shannon fault zone (Haugerud and Ellen 1990, Hitchcock et al. 1994, Langenheim et al. 1997). This could indicate that repeated localized contraction is in part coincident with the occurrence of Loma Prieta-type earthquakes. This would suggest a recurrence interval of about 400 years (Working Group on California Earthquake Probabilities 1996). Hitchcock et al. (1994) reported a late Pleistocene displacement rate across the Monte Vista fault zone of 0.3 ±0.2 mm/yr.

4.2 Hillslopes and Landslide Processes

The Santa Cruz Mountains are a steep and rugged terrain with a long history of landslide activity. The geomorphology of the Permanente Creek basin exhibits a high rate of dynamic change. This high rate of change, termed morphodynamics, is driven by the complex interaction between the dual processes of rapid uplift associated with the compressional tectonics along the San Andreas Fault system (as discussed above) and the relatively weak, easily erodible, and highly variable rocks of the Franciscan Complex.

The resulting topography forms narrow, steep sided, and actively eroding canyons. The Santa Cruz Mountains, and Permanente Creek canyon, are subject to both shallow (e.g., debris flows or “mudslides”) and deep landslides (e.g., large rotational slumps or translational block glides). Average slope angles in the canyon are approximately 25 degrees (or 2H:1V) which is reflective of the natural stability of the highly broken and sheared greenstone and mélange terrane. Steeper slopes, greater than 35 to 40 degrees, are locally observed in areas underlain by more competent limestone and graywacke bedrock but these are the exception.

4.3 Geotechnical Background and Considerations

Golder has a long history of geologic and geotechnical investigations at the Permanente Site starting in 2006 and continuing to present. The investigations include (but are not limited to) sector specific investigations of the quarry pitshell including existing landslides, both the EMSA and WMSA overburden stockpiles and foundation conditions, several investigations for updated storm water basins, a new crusher location and foundation, and a proposed water treatment plant location. In summary, we have an extensive library of material properties and corresponding stability analyses and therefore a good understanding of slope behavior for different types of materials and slope angles. Our geotechnical recommendations for slope design, discussed below, are based on this extensive background. A summary of material types and properties based on a number of our previous investigations is included in Appendix A.

From a geotechnical perspective, the proposed project primarily involves excavation and removal of man-made surficial deposits (i.e., overburden and artificial fills) to restore the creek channel and creek banks back to a more natural state. The intent is to remove the man-made surficial materials down to bedrock (or native soils) while minimizing excavations/cuts into bedrock or soil slopes. In general, excavations onto canyon slopes will only be done where the surfaces have been altered or affected by mining activities. Existing natural slopes will not be modified or excavated.

Our geotechnical recommendations for the Project include:

- Rock Slopes: Slopes greater than 20 feet in height in greenstone materials should not exceed slope angles of 2H:1V if possible. Slopes less than 20 feet should perform adequately at 1.5H:1V; however, localized areas of instability may be encountered. Cutslopes in limestone and graywacke greater than 20 feet in height should not exceed 1H:1V and slopes less than 20 feet should be limited to no steeper than 3/4H:1V.
- Fill or Soil Slopes: For planning purposes, permanent slopes comprised of overburden, alluvium, colluvium or other site-derived fill should not exceed 2H:1V.

Earlier versions of the Project included construction of retaining structures, or engineered structural elements, that warranted more detailed geotechnical investigations for design purposes. Retaining structures have been eliminated from the Project (with the exception of the Material Removal Area), and with other modifications, the main geotechnical considerations are limited to recommended slope angles for final slopes of previously filled or otherwise disturbed surfaces.

The Material Removal Area, and the Rock Pile Area, present the largest challenges due to depths of the cuts that are required, and the steep natural terrain underlying and comprising the hillslopes that are overlain by overburden. In some locations along creek banks, it is anticipated that cuts will expose natural surficial materials (i.e., colluvium and slope wash) as opposed to bedrock and may require localized cuts steeper than 2H:1V in order to daylight the cuts into natural slopes.

The Material Removal Area may require a retaining structure, depending on timing of the creek restoration project with respect to site operations, to preserve infrastructure and access associated with the Upper Water Treatment System (UTS). This is discussed in further detail in Section 6.2.

5.0 SITE RECONNAISSANCE AND GEOMORPHIC CHARACTERIZATION

The following section provides a summary of our geomorphic observations of the Project. All station references in this report are coincident with that used by Waterways on Sheets C2-C4 in their 90% restoration plan report (2019).

5.1 Overview of Permanente Creek Profile

The profile of Permanente Creek can broadly be classified into depositional reaches and bedrock reaches (delineated on Figure 2 as Reach A, Reach B, etc.). The processes that define these reaches are the rate that sediment is supplied to the channel and the rate at which the channel can convey the supplied sediment. The rate of sediment supply is controlled by hillslope processes and the rate that sediment is delivered to the channel. The rate of sediment transport is controlled by the channel geometry and the hydraulic characteristics of the reach. The channel hydraulics are directly coupled to the rate at which water is delivered to the channel.

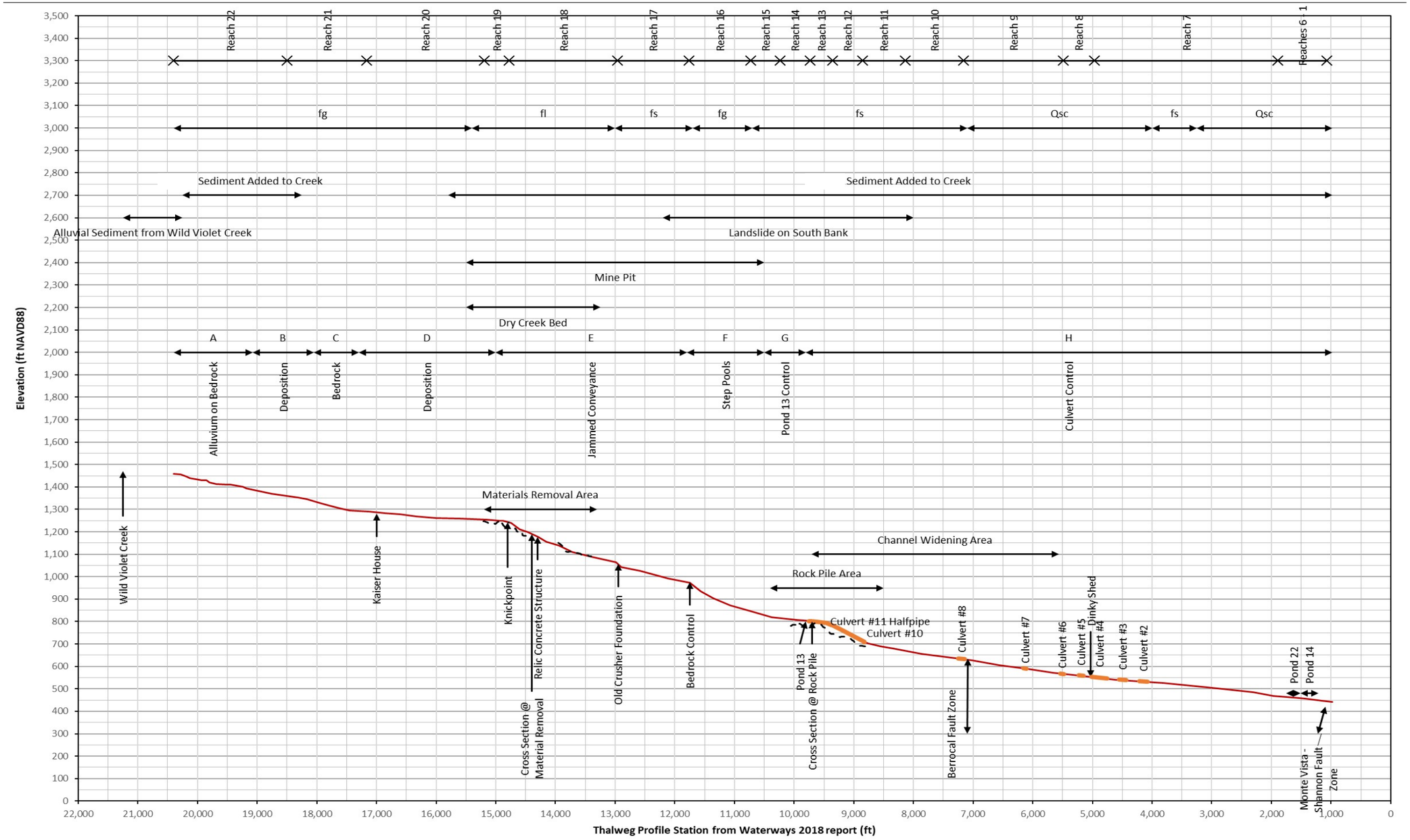


Figure 2: Permanente Creek Profile with geomorphic and geologic delineations. Stationing from Waterways (2019).

5.1.1 Reach A: Alluvium on Bedrock

The upstream most portion of the survey channel is characterized by alluvium in the form of travertine reinforced step pool morphology that partially covers a bedrock channel. The sediment supplied here is likely to come from natural processes and is likely partially supplied from an alluvial fan originating from Wild Violet Creek. Carbonate-rich water percolates from the south bank of the channel in this reach, indicating that the source of the carbonate-rich spring is likely within the Wild Violet drainage. Geologic maps (Dibblee and Minch 2007a and b) indicate that the limestone unit of the Franciscan complex outcrops within the Wild Violet drainage. The debris from this alluvial fan is being transported downstream and has deposited small terraces along both valley walls. These terraces are possibly abandoned by the modern hydraulic regime of the river and may be coupled to the debris flows originating from Wild Violet Creek.

5.1.2 Reach B: Deposition

This depositional reach is characterized by a relatively wide, low gradient, flat valley floor that extends for approximately 1,000 feet along the valley axis. In combination with downstream gradient controlled from the Bedrock reach, the sediment load is too great and too coarse for the local hydraulics to transport, resulting in deposition on the valley floor.

5.1.3 Reach C: Bedrock Control

The Bedrock controlled reach is relatively short (750 feet) and has a relatively low gradient (<2%), but the narrow bedrock channel maintains hydraulic and sediment continuity through this reach, resulting in a thin alluvial cover on a bedrock channel bed. It appears that this reach only receives sediment from the channel upstream and conveys almost all of this load through to the downstream reach.

5.1.4 Reach D: Deposition

This Deposition reach is characterized by the aggradation of sediment on the valley floor and relatively wide flat valley bottom that receives sediment from the upstream reach and the tributaries that confluence with Permanente Creek from the south. The downstream end of this reach is marked by the occurrence of a sharp change in channel gradient associated with a bedrock knickpoint. This portion of the landscape is within the Materials Removal Area. Further discussion of the implications of these features to the restoration plan are discussed in Section 6.

5.1.5 Reach E: Jammed Conveyance

The Jammed Conveyance is very steep (>9%), but due to the large quantity of material it receives, and the armoring effect of both the coarse sediment and the relict mining infrastructure within the channel, a large portion of this material remains within the reach. The geomorphic term ‘jammed’ describes steep channels that are clogged with debris (Zimmerman et al. 2010). Natural channels of this gradient are typically not depositional but rather erosional. The debris residing on the bed in this reach is immobile, and the modern channel alignment is constricted between the debris from the north and the south valley wall for much of this reach. The Material Removal Area is contained within the upstream portion of this reach.

5.1.6 Reach F: Step Pools

Downstream of the Jammed Conveyance, a large, mapped natural landslide borders the south bank of the river for the entirety of this reach. The large boulders from both mining and natural sources, as well as woody debris, form large, steep step-pools within this reach. Some of these step-pools appear to have been reinforced with travertine deposits, as evidenced by the relict abutment deposits on the channel margins.

5.1.7 Reach G: Pond 13 Control

The reach downstream of the Step Pools reach, appears to act as a gradient control. Although this gradient control may be driven by the back-water effect of the small reservoir at Pond 13, data from the Seismic survey indicates that this feature may be reinforced by naturally occurring bedrock ridges within the channel. A local bedrock ridge is present just downstream of Pond 13 (Figure 2).

5.1.8 Reach H: Culvert Control

Downstream from Pond 13 the channel is confined within culverts and canals that do not exhibit a morphologic connection to the adjacent landscape.

5.2 Geomorphic Observations

5.2.1 Knickpoints

In response to the dynamic changes driven by tectonic base level change, upstream propagating waves of erosion have migrated up Permanente Creek. The upstream most location of a given wave is marked by a distinct change in channel gradient, termed a knickpoint. Knickpoints characteristically migrate more rapidly through more easily erodible material, and more slowly through more erosion-resistant material (Whipple 2004). The upstream most knickpoint with the assessed channel is located at Station 148+00 within the Material Removal Area (Figure 2). This reach is characterized by a relatively low gradient reach upstream of this point and a steep reach downstream. The steep reach downstream is simultaneously receiving and conveying a large quantity of material, typically composed of the finer fraction of the total sediment load, and aggrading the coarser fraction, composed of large boulders.

Figure 3 - Travertine Deposits

5.2.2 Travertine

Travertine is a form of limestone precipitate that forms when calcium carbonate-rich water undergoes changes that cause the mineral to transition from solution to a solid state. This transition is largely controlled by physical processes, such as changes in pressure, temperature, or pH, but it can be influenced by biological processes and hydraulic variability as well (Fuller et al. 2010). Golder observed two types of travertine formation in Permanente Creek. One in which stalactites grew out of the southern stream bank downstream of the confluence with Wild Violet Creek, and the other along large portions of the channel where naturally forming step-pools were reinforced by travertine deposition to form travertine dams (Figure 3). These dams display a history of repeated formation and breaching, as evidenced by the clasts of travertine conglomerate from older dams being incorporated into modern dams, as well as the relict abutments of older travertine dams remaining on the channel margins. This natural process has been taking place throughout geologic time along Permanente Creek.

5.2.3 Basin Capture

A process termed basin capture can occur whereby drainage networks and flow paths are rearranged through landscape modifying influences of tectonics and surface processes. This process can result in characteristic landscape features like wind gaps, where valley geometry and upstream drainage are mismatched, and fishhooks, where headwater streams exhibit a significant curved alignment where the drainage meets the basin edge. The fishhook morphology is observable in the Permanente Creek basin, and adjacent basins (Figure 4). Evidence of basin capture is significant to the current investigation as the changes in basin area related to basin capture can be associated with a dis-equilibrium between the channel morphology and the sediment regime of the river. More straightforwardly, this implies that the basin used to be bigger, and the current hydrologic regime may not be sufficient to transport the former natural sediment load.

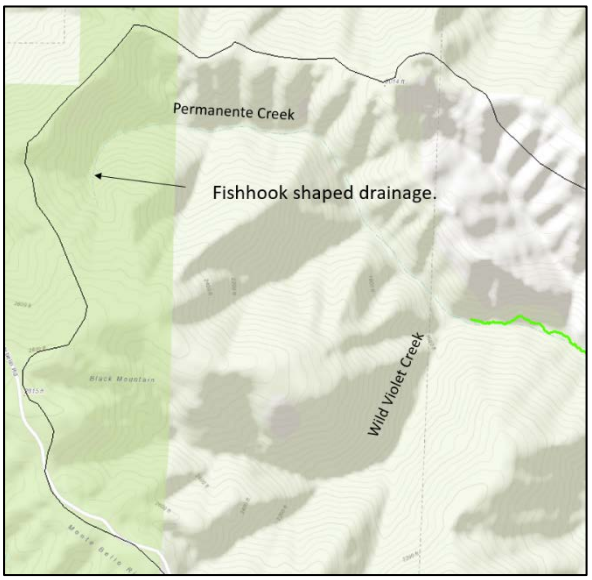


Figure 4 – Fishhook shaped headwaters

6.0 REVIEW OF RESTORATION DESIGN

This section provides an overview of the Waterways 90% design report (2019) with respect to the design basis and an evaluation of potential geotechnical issues for the Rock Pile and Material Removal Areas.

6.1 Geomorphic Design Basis

Waterways has based their geomorphic design on maintaining sediment transport continuity through the constructed reaches and proportionately distributing shear stresses across the channel bed and floodplain areas during floods to maintain a dynamic morphology without destabilizing the landscape. They optimized the design geometry by matching the hydraulics during flooding to the sediment size and transport rate of the channel. Additionally, design geometry incorporated the bankfull width and depth, and pool dimension and spacing relationships, of nearby reference watersheds and analog reaches (URS 2009). Waterways (2019) conducted hydrologic and hydraulic simulations of the restoration design and compared those results to fish passage capability, channel stability, flood conveyance, and sediment transport.

Waterways (2019) design specifications include the following primary elements:

- Engineered Streambed Material (ESM)
- Floodplain Armoring
- Vegetated Rock Slope Protection
- Vegetation Design
- Best Management Practices
- Engineered Woody Debris

- Slope Angle Guidance (Golder 2014)

6.2 Material Removal Area Design

Location: From Station 150+25 to 130+25

General Description (Waterways):

"This area has been modified by the placement of material within and adjacent to the channel… A seismic refraction analysis has been performed to estimate the depth to bedrock, in an effort to gain a clearer understanding of the pre-disturbance site geometry and allow a more informed evaluation of opportunities and constraints to enhancement.

Proposed cuts extend to depths of over thirty feet below existing ground, resulting in profile grades of 7.1% to 22.7%. These grades follow the peaks of the estimated subsurface bedrock profile. Final grades would be determined in the field to best fit bedrock exposures encountered during excavation."

Design Elements and Objectives:

- Removal of overburden/fill and a relic concrete structure, and moving the north toe of slope northward 25 feet along the majority of the project area, except near Pond 4A where it will move northward 16 feet;
- Construction of a new channel with floodplain bench areas with habitat elements that will help improve ecological complexity; and
- Installation of native vegetation.

6.2.1 Evaluation and Discussion of Materials Removal Area

A geologic and a geomorphic map of the Material Removal Area is presented in Figure 5. Longitudinal and thalweg profiles of this area are presented in Figures 6, 7 and 8. In general, both the cross section and long profile indicate that bedrock is close to the surface throughout the Material Removal Area with the exception of a few local areas where depths may be in the range of 15 to 20 ft bgs. The design approach used by Waterways notes that the estimated bedrock contacts as shown are approximate, and that the design will allow for the work to conform to and follow the bedrock surface as it uncovered during excavation.[1] Golder concurs with this general approach and doesn't believe any additional exploration would provide value to the design above and beyond the data provided by the seismic refraction surveys.

[1] It should be noted that where shown on included figures that the bedrock surface as interpreted from seismic refraction data is approximately located and will be field verified during construction.

LEGEND

- Areas of Interest
- Permanente Creek
- Design Thalweg
- Cross Section @ Material Removal Area
- BedrockPoints

Geomorphic Units

- Active Mine
- Bedrock
- Channel
- Floodplain
- Lake
- Mostly Landslides
- Open Culvert
- Pond 4 Fill
- Rock Pile
- Sidecast Overburden
- Terrace

0 200 400
FEET
1 IN = 206 FT

NOTE(S)
1. LINE NOTES
2. LINE NOTES
3. LINE NOTES

REFERENCE(S)
1. WATERWAYS CONSULTING, INC. 2018. PERMANENTE CREEK RESTORATION PLAN INTERNAL DRAFT 90% LEVEL SUBMITTAL DESIGN BASIS TECHNICAL MEMORANDUM. PREPARED FOR LEHIGH SOUTHWEST CEMENT COMPANY AND HANSON PERMANENTE CEMENT, INC. NOVEMBER 5, 2018.
2. COORDINATE SYSTEM: NAD 1983 STATE PLANE CALIFORNIA III (FT)

CLIENT
LEHIGH SOUTHWEST CEMENT COMPANY AND HANSON PERMANENTE CEMENT, INC.

PROJECT
GEOLOGIC AND GEOMORPHIC ASSESSMENT OF PERMANENTE CREEK: MATERIAL REMOVAL AREA

TITLE
GEOMORPHIC MAP OF THE MATERIAL REMOVAL AREA

CONSULTANT
GOLDER

YYYY-MM-DD	2019-10-02
DESIGNED	RPH/BVJ
PREPARED	RPH/BVJ
REVIEWED	BF/CJ/RPH
APPROVED	BF

PROJECT NO.	PHASE	REV.	FIGURE
179018601	100	0	5

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

1 in
0

PATH: G:\Lehigh\Hanson\PermanenteCreek\99_PROJECTS\179018601_GeomorphMap\10\02_PRODUCTION\MXD\FIGURES\Rev0\179018601_100_001_Fx_Rev0_MailRemov_Geomorph.mxd PRINTED ON: 2019-10-02 AT: 10:28:22 AM

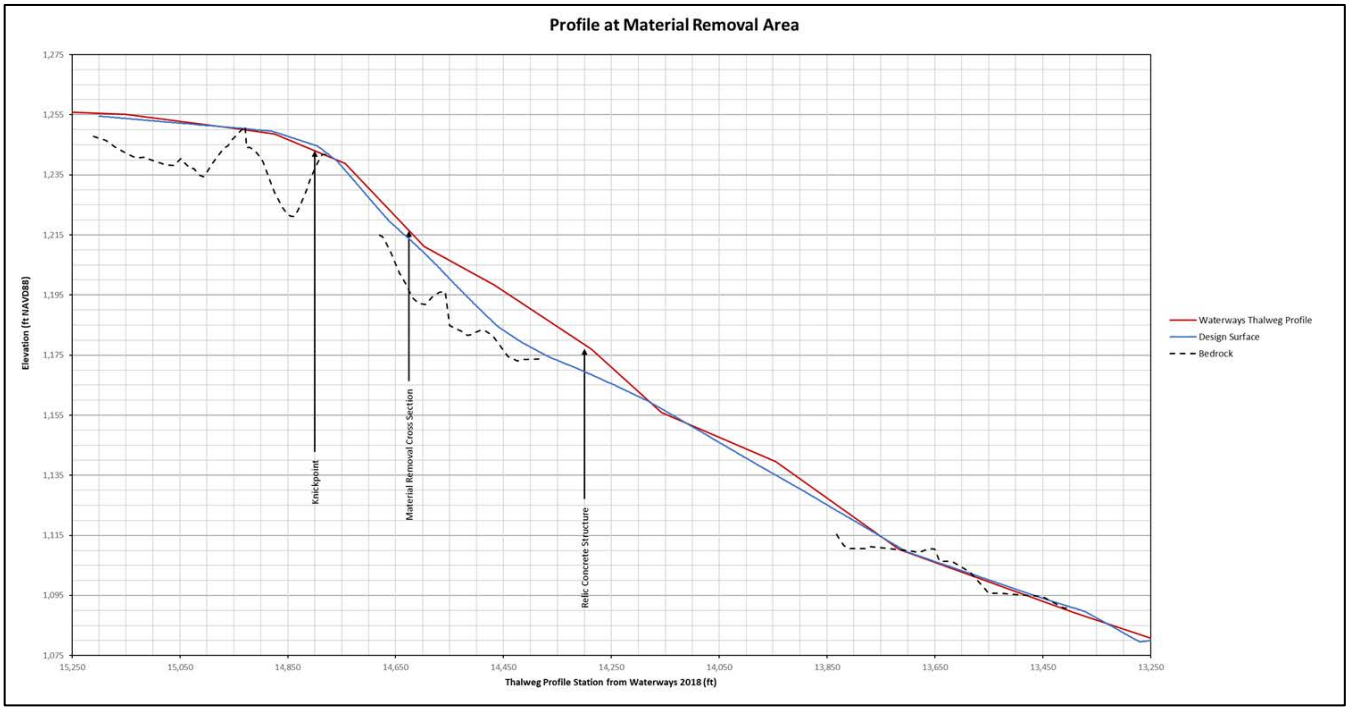


Figure 6: Profile of Material Removal Area from Station 152+50 to 132+50.

The following bullet points provide Golder's observations of the design as compared to conditions observed in the site reconnaissance and as informed by the seismic refraction survey data.

- At Station 148+00, bedrock close to the surface is likely the controlling feature of an upstream migrating knickpoint. The design shows the channel invert conforming to knickpoint and then potentially being established on exposed bedrock downstream of the knickpoint. We concur with this design approach. Additional design elements proposed including ESM and other profile control elements such as boulder weirs and sills should help to ensure stability of the knickpoint.
- Between Stations 146+50 and 142+50, the restoration design identifies a large quantity of material for removal from the channel. The relic mining infrastructure may play a role in defining the channel alignment and facilitating an armored surface on some of the debris. The result of the restoration efforts will increase the local gradient within this reach and extend the length of the high-gradient portion of the channel. Sheet C34 of the 2019 plan set provides additional details for Step-pool and cascade channel design segments in this reach to mitigate the local gradient. We concur with this approach and note that field engineering design modifications and follow on monitoring may be necessary to ensure that the post material removal channel geometry is stable.
- Between Stations 138+50 and 134+50, the seismic profiles indicate that bedrock may be encountered below design grade, but as the seismic profile lines were collected adjacent to the channel and not in the thalweg, Golder believes that bedrock may be exposed at relatively shallow depths along the thalweg. We understand that the intent of the design is to construct the channel on exposed bedrock

occurring within the proposed grading envelope and based on our reconnaissance we think this is generally achievable.

- There is a large relic concrete structure located in the left bank of the stream channel five to ten feet above the channel invert (143+00). There is a smaller relic concrete structure located in the channel further downstream. Golder understands that the removal of old mining infrastructure from the channel will increase the connectivity of the channel to the adjacent landscape and also that the relict structures may currently be contributing to the stability of this reach. We understand that weirs and steps will be constructed using material with a minimum size meeting the D50 of the specified material and a boulder sill w/ a minimum size meeting the D84. This design approach is intended to replace any potential stability relic structures are providing.
- The most challenging geologic and geotechnical issue in the Material Removal Area is the presence of the Upper Water Treatment System infrastructure, including the 1250 Pond and associated facilities located along the top of the creek bank and the access road to Permanente Creek. The lifetime of these facilities is uncertain at this time as they are required for on-going operations of the Facility. However, once reclamation is completed, they may no longer be necessary. If the facilities need to be protected during the creek restoration project, a retaining structure (e.g., Mechanically Stabilized Earth wall) will be necessary to maintain the road and the 1250 pond (as shown in Figure 4.0 of Waterways Updated Response Letter to the County dated 3-5-18 shown below). The retaining structure would be required as the design calls for pushing the north bank of the creek approximately 25 further north than current conditions.

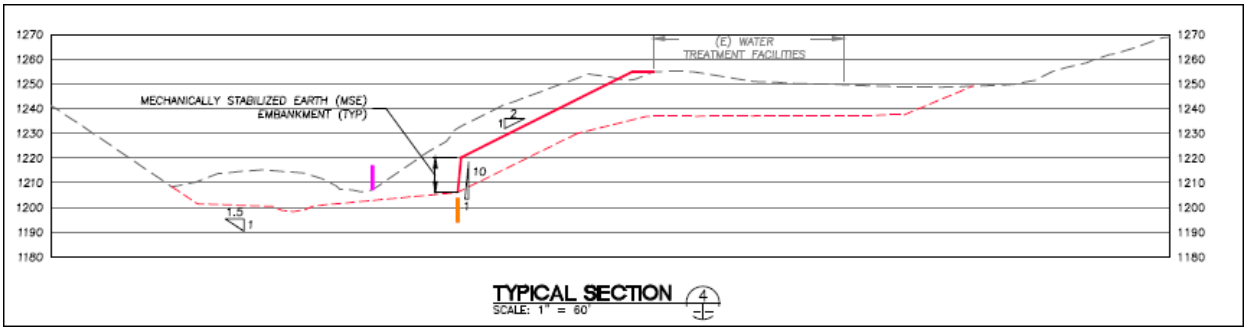


Figure 7: Typical Section of Potential MSE Wall to protect Water Treatment Facilities

- If a retaining structure is required, Golder recommends that a geotechnical investigation be performed along the alignment of the wall to verify depth to bedrock and to obtain appropriate design parameters for the design of the wall. However, depending on the timing of the restoration project, a retaining structure may not be necessary and therefore we recommend delaying any further investigation until such time it is needed. Figure 8 illustrates the design surface and bedrock conditions if the slope can be graded back at 2H:1V. This slope configuration meets Golder's general recommendations for cutslopes developed in surficial materials and is considered acceptable.

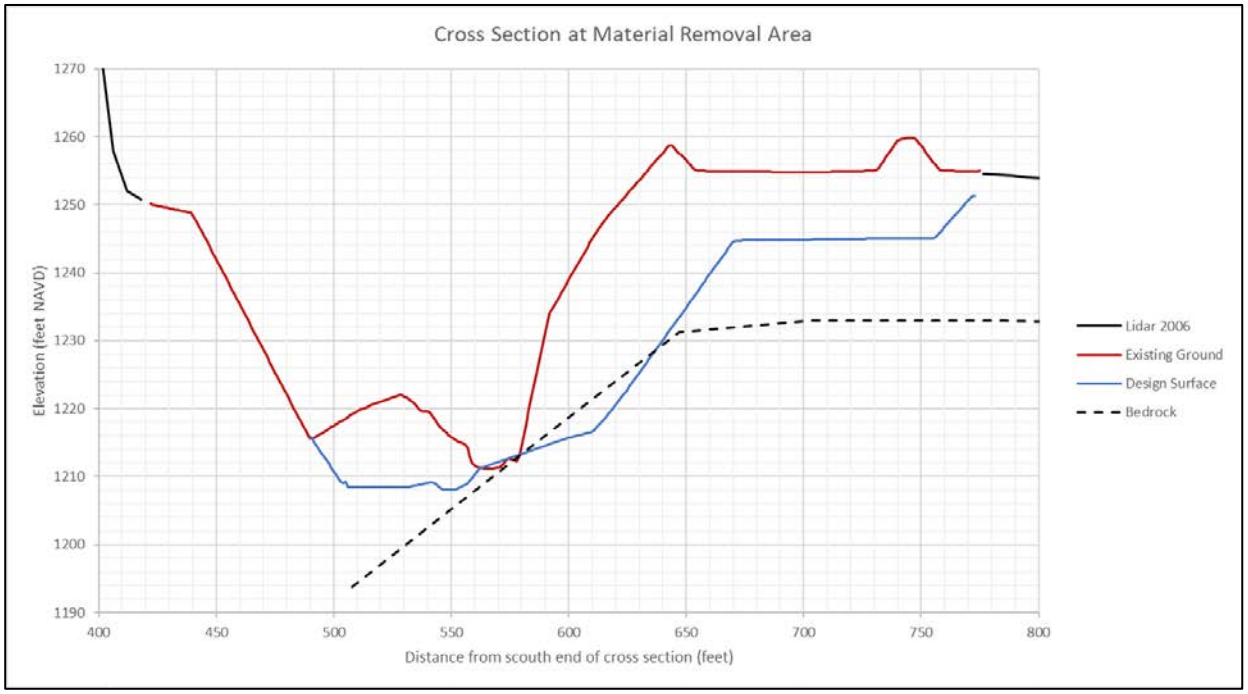


Figure 8: Cross section at Material Removal Area. Located at Thalweg Profile Station 146+00. Note depth to bedrock is approximate and estimated based on seismic refraction data.

6.3 Rock Pile Area Design

Location: From Station 104+50 to 85+50 within the Channel Widening Reach.

General Description (Waterways 2019):

"Extensive channel realignment and reconstruction is proposed throughout this area, including removal of Culverts #10 & #11 and the dam at Pond 13…. Cuts approximating thirty to forty feet of depth are required to accomplish this. The grading plan reflects the Lower Limit of Potential Design Channel Invert. The Upper Limit of Potential Design Channel Invert shown in profile has been established as a best fit to bedrock elevations that were estimated using a seismic refraction analysis and geotechnical borings. Final geometry will likely vary somewhat from that shown on the drawings, as necessary to conform to existing bedrock.

The rock pile and associated infrastructure will be removed to accommodate the lowered and widened channel…The slope exposed below the Rock Pile will be inspected by the Geotechnical Engineer or Project Engineering Geologist to evaluate the nature and stability of the exposed material and provide recommendations, as necessary, to ensure geotechnical stability of the slope and access road."

Design Elements and Objectives:

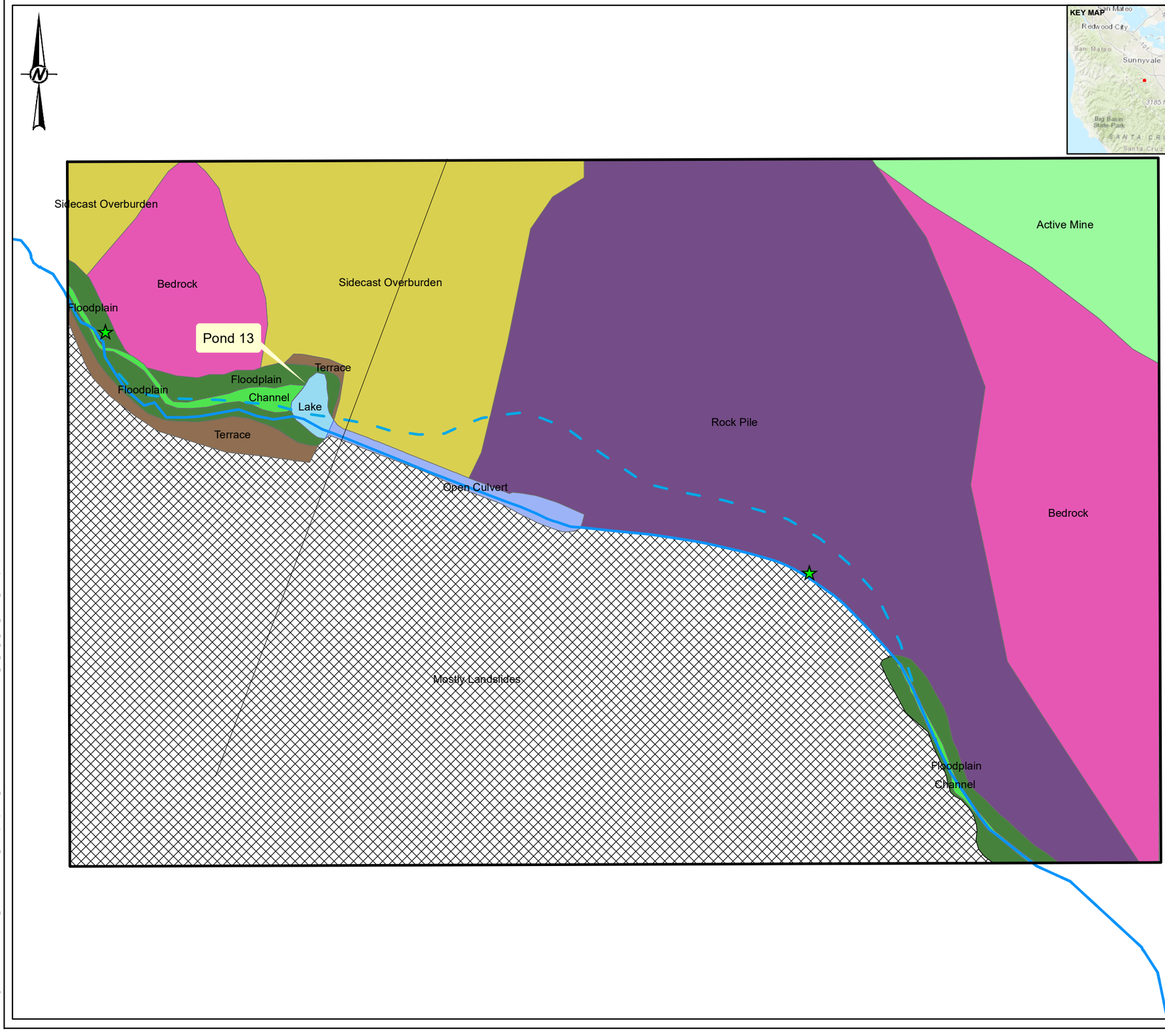
- Removal of concrete road segments and road-related fill material;
- Removal of 930 linear feet of culverts and daylighting of the creek that will help improve ecological complexity;
- Construction of a new channel with floodplain bench areas with habitat elements that will help improve ecological complexity;

- Removal of Rock Pile, retired Rock Plant conveyor system and associated infrastructure;
- Removal of Pond 13 dam/metal infrastructure; and
- Installation of native vegetation.

6.3.1 Evaluation and Discussion of Rock Pile Area

A geologic and a geomorphic map of the Rock Pile Area is presented in Figure 9. Cross sections and thalweg profiles of this area are presented in Figures 10 and 11. Appendix B includes Figure 1 from Waterways Updated Response Letter to the County dated March 5, 2018 showing the locations of exploratory borings drilled previously by Golder in the area of the Rockpile restoration work and boring logs. The following discussion provides additional observations of specific design elements as compared to conditions observed in the site reconnaissance and as informed by the seismic refraction survey data.

- In the Rock Pile Area, Golder's comparison of the restoration design with seismic survey results indicates that bedrock ranges from about 5 feet to approximately 25 feet below ground surface with significant relief along the longitudinal profile (Figure 10). As with the Material Removal Area, the design intent will allow for the work to conform to and follow the bedrock surface as it is uncovered during excavation.
- The interpreted depth to top of native alluvium or bedrock for borings along the proposed thalweg (Borings 1101 and 1103) is approximately 25 feet although native surficial materials were likely encountered approximately 5 to 10 feet shallower. Boring 1107, also along the thalweg but near the downstream limit of the area, encountered a concrete structure at approximately 7 feet bgs interpreted as being near original ground surface along the channel thalweg. The remaining borings were drilled upslope of the thalweg to evaluate depths of fill along the toe of the proposed slope. In general, these borings indicate depths of overburden along the toe of the slope in the range of 60 to 70 ft bgs.
- The bedrock surface depicted on Figure 10 is close to the "Upper Limit of Potential Design Channel Invert" as defined by Waterways (based on seismic lines and verification borings), whereas the grading plan included on the design drawings represents the "Lower Limit of Potential Design Channel Invert" to show the maximum extent of potential grading. It is our opinion based on the review of available data that the constructed profile will be close to the "Upper Limit" upstream of Rock Pile Design. In summary, it is our opinion that the design is reasonable, and additional exploration will not provide value to the design above and beyond the data provided by the seismic refraction surveys and previous completed borings.
- The seismic data also identifies a potential former bedrock channel, which extends through the Rock Pile Area that in some locations is north of the proposed thalweg (Figure 11). Golder understands that Waterways has, to the extent possible, re-occupied the historic thalweg; however, extensive grading would be required in some areas to realign the channel and move it further to the north to occupy the historic channel thalweg. We understand that pushing the toe of the slope further north is not considered feasible given that this would require significant flattening of the slope which would impact the extensive infrastructure located at the top of slope including the main access road and the crusher facility. Golder recommends that field engineering design modifications be applied to utilize existing



LEGEND

- Areas of Interest
- Permanente Creek
- Design Thalweg
- Cross Section @ Rock Pile Area
- BedrockPoints

Geomorphic Units

- Active Mine
- Bedrock
- Channel
- Floodplain
- Lake
- Mostly Landslides
- Open Culvert
- Pond 4 Fill
- Rock Pile
- Sidecast Overburden
- Terrace

0 200 400 FEET

1 IN = 145 FT

NOTE(S)

1. LINE NOTES
2. LINE NOTES
3. LINE NOTES

REFERENCE(S)

1. WATERWAYS CONSULTING, INC. 2018. PERMANENTE CREEK RESTORATION PLAN INTERNAL DRAFT 90% LEVEL SUBMITTAL DESIGN BASIS TECHNICAL MEMORANDUM. PREPARED FOR LEHIGH SOUTHWEST CEMENT COMPANY AND HANSON PERMANENTE CEMENT, INC. NOVEMBER 5, 2018.
2. COORDINATE SYSTEM: NAD 1983 STATE PLANE CALIFORNIA III (FT)

CLIENT
LEHIGH SOUTHWEST CEMENT COMPANY AND HANSON PERMANENTE CEMENT, INC.

PROJECT
GEOLOGIC AND GEOMORPHIC ASSESSMENT OF PERMANENTE CREEK: ROCK PILE AREA

TITLE
GEOMORPHIC MAP OF THE ROCK PILE AREA

CONSULTANT
GOLDER

YYYY-MM-DD	2019-10-02
DESIGNED	RPH/BVJ
PREPARED	RPH/BVJ
REVIEWED	BF/CJ/RPH
APPROVED	BF

PROJECT NO.	PHASE	REV.	FIGURE
179018601	100	0	9

PATH: G:\Lehigh\Hanson\PermanenteCreek\99_PROJECTS\179018601_Geomorph\Map\100\02_PRODUCTION\MXD\FIGURES\Rev0\179018601-100_001_Fx_Rev0_RockPile_Geomorph.mxd PRINTED ON: 2019-10-02 AT: 10:32:45 AM
IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

bedrock topography and historic thalweg to the extent possible to meet the desired restoration outcomes.

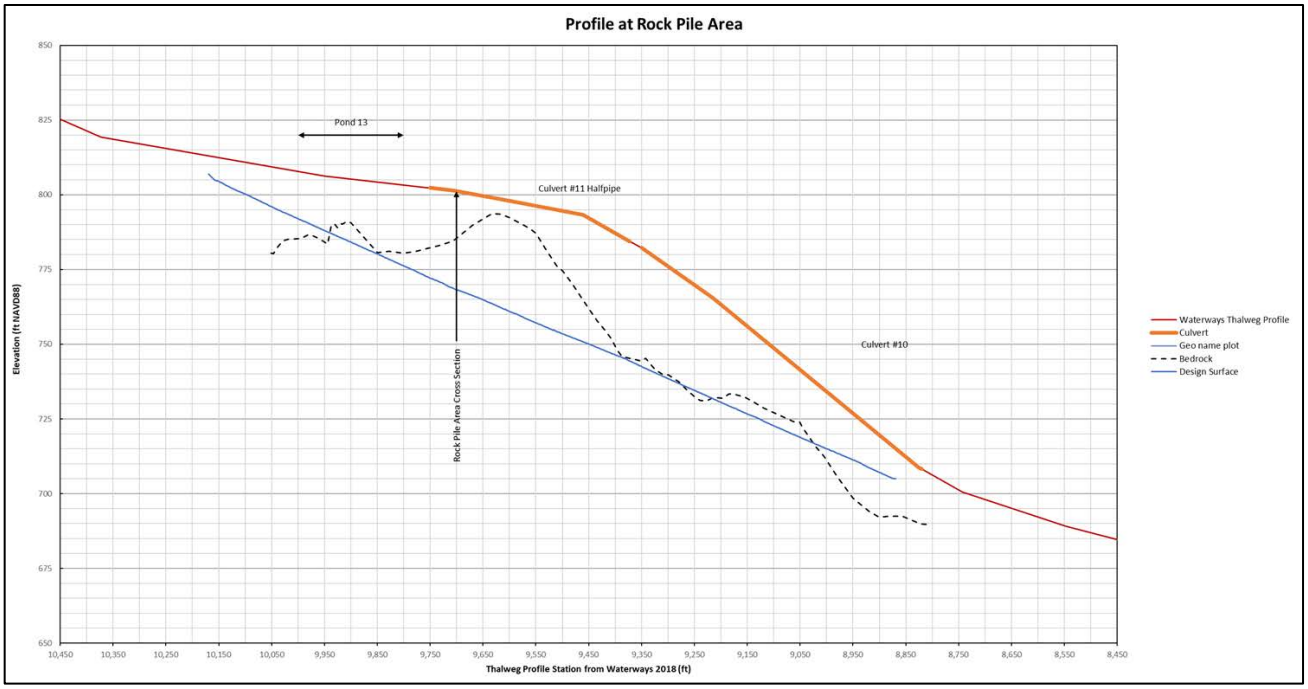


Figure 10: Profile of Rock Pile Area from Station 104+50 to 84+50.

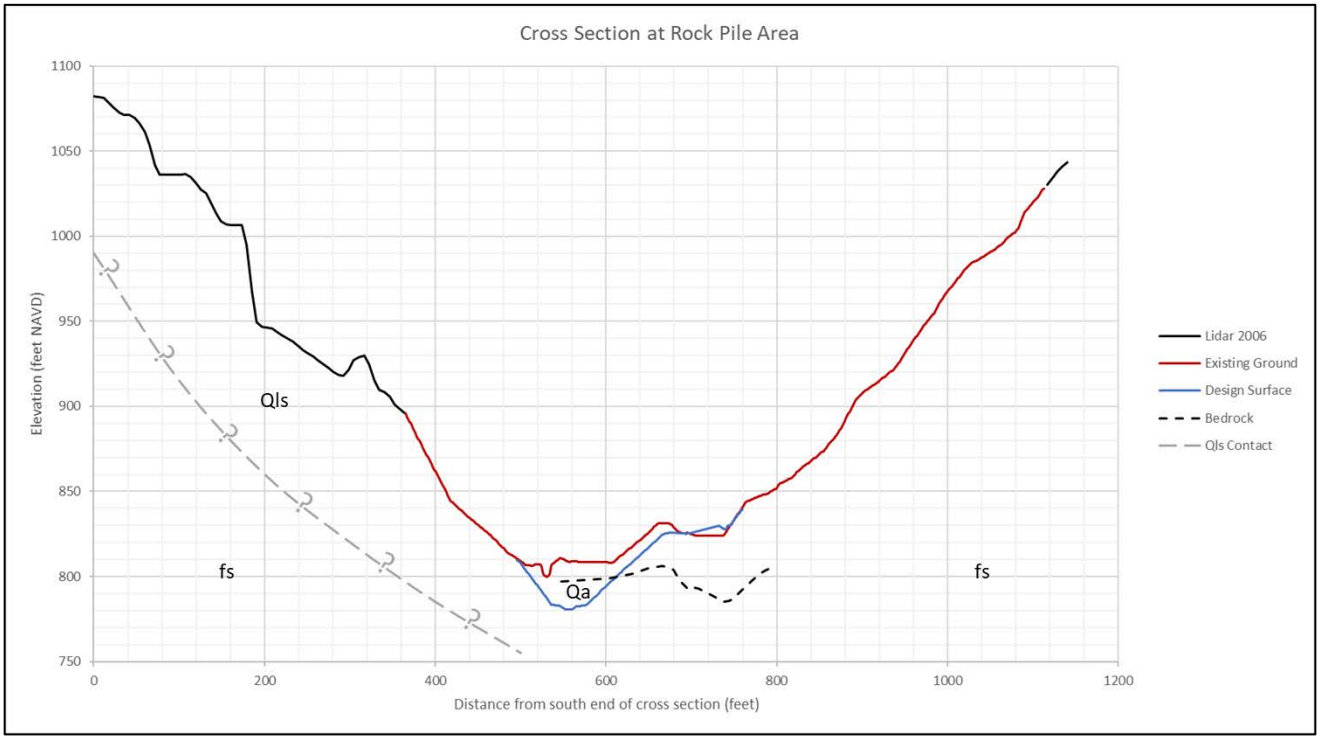


Figure 11: Cross section at the Rock Pile Area. Located at Thalweg Profile Station 97+00.

- The removal of the two culverts and creation of a floodplain with an inset channel in this reach will re-establish the lateral connectivity of the channel to the adjacent hillslopes. Reconnecting the channel to the adjacent landscape will have positive benefits as designed by Waterways, but it will also increase the potential for a laterally migrating channel to affect adjacent hillslopes. The north valley wall will consist of the excavated Rock Pile and the south valley wall is defined as a large, ancient landslide based on regional geologic mapping.
- The seismic data indicate that there is a bedrock ridge, oriented perpendicular to the valley axis, located just downstream of Pond 13. It appears that Pond 13, and/or the underlying more resistant bedrock, may be acting as a grade control structure on the reach upstream of Pond 13 (Figure 10).The channel morphology upstream of Pond 13 appears to have adjusted to this local gradient control and has resulted in the aggradation of sediment upstream of Pond 13. We understand that, the channel upstream of Pond 13 will be excavated into the stored sediment and depending on the depth to bedrock, a large proportion of these sediments will be removed as part of the restoration effort. In addition, we understand that grade control will be installed at the upstream limits of work under either Profile scenario.

7.0 CONCLUSIONS AND RECOMMENDATIONS

In this section, Golder summarizes the finding of our investigations and provides recommendations to facilitate the implementation of the Restoration Plan (Waterways 2018).

7.1 Adaptive Management and Monitoring

In our opinion, the most effective way to ensure a successful project is thorough engineering observation and field fitting of final profiles during excavation activities. This is the best way to achieve the goal of restoring natural profiles while minimizing excavation of native soils or bedrock materials. Note that this is a well-established concept first described and promoted by Karl Terzaghi as the “Observational Method” and was later described in detail by Ralph Peck (1969). The intent of the method is to balance the cost of investigation and design while still achieving a successful project through adaptive management in the field. The method entails designing to the most probable conditions rather than the most unfavorable conditions. Data gaps are filled by detailed observations during construction and designs are modified as needed.

It is important that stakeholders recognize that this is a restoration project, not an engineered stream channel, and this will by necessity entail restoration of new slopes to match previously existing slopes. This will require slope angles which, in some cases, may evidence stability just like the existing natural slopes. In our opinion, additional subsurface exploration will not alter this fundamental concept or improve the project outcome. Rather, it is understood by the Project team that shallow slides and/or erosion may occur on restored natural slopes.

7.2 Evolution of Design

The plan set is in general conformance with the applicable geotechnical recommendations as outlined in our “Preliminary Geotechnical Recommendations for Conceptual Level Permanente Creek Restoration Plans” dated April 28, 2014 (Golder 2014). We note that several structural construction elements that were part of the original project design in 2014 have been eliminated from the 2019 plan set. With the exception of a possible MSE wall in the Material Removal Area, structural elements such as gabions or retaining walls, which would warrant more detailed subsurface investigation and testing, are no longer part of the project.

7.3 Field Observations and Adaptive Management

As stated in the Field Engineering Notes section of the project plan notes (Sheet C28) stability of hillsides may necessitate:

- Field engineering and a field directed construction approach, i.e., field observations and adaptive design as discussed above
- Final geometries to be directed in the field by the Project Engineer to account for unanticipated subsurface conditions
- Flexibility with respect to final gradients and defined “grading envelopes” for channel gradients
- A narrowing of floodplain widths in areas where the final design profile approaches the lower limit of the grading envelope
- Slope benching to reduce slope angles and lengths in areas of disturbed terrain, and to control surface runoff and erosion while vegetation is established

We concur with the above recommendations, and the Field Engineering Notes in general, with respect to addressing and minimizing potential slope instabilities. We further recommend that the Project Geotechnical Engineer or Project Engineering Geologist inspect all interim and final cutslopes as the project progresses such that any potential areas of concern can be identified early in the process and remedial measures developed, if required.

7.4 Material Removal Area

The Material Removal Area may require a retaining structure, depending on timing of the creek restoration project with respect to site operations, to preserve infrastructure and access associated with the Upper Water Treatment System (UTS). Our understanding is that Waterways is recommending that work at the Material Removal Area is sequenced to occur after other portions of the project are constructed if the treatment facilities and Pond 1250 need to remain in place at the start of project implementation. Work would start with the Channel Widening Area and generally proceed upstream. The second phase of work would include the Rock Pile Area. The final stage of work would include the Material Removal Area.

If the MSE wall is required, then Golder recommends a geotechnical investigation be completed to prepare final design and construction plans. Based on the above construction sequence, there will adequate time to plan, permit and implement this investigation even after the project has started.

7.5 Rock Pile Area

The main geotechnical challenge for the proposed project is likely related to the Rock Pile Area which entails a reach of the creek where culverts will be removed, and a large stockpile of aggregate materials placed along the margin of the creek and up onto the hillside to a height in excess of 200 vertical feet. The estimated thickness of the rock pile ranges up to 100 feet. Estimated natural slopes angles underneath and above the rock pile are shown as steep as 1H:1V. We recommend inspection of these slopes by the Project Engineering Geologist or Geotechnical Engineer following the removals to evaluate the geologic conditions and stability of the exposed materials. If the removals expose bedrock, stability of the slopes should be adequate. However, if the cut leaves significant thicknesses of overburden in place, potential localized slope instability may be encountered. Golder

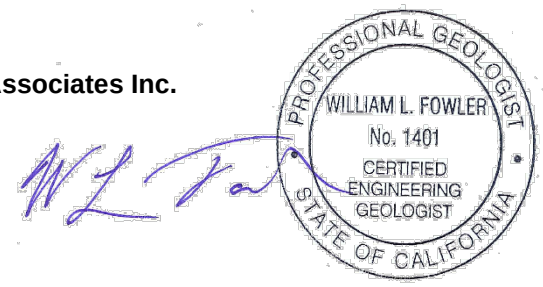
recommends that Lehigh and Waterways have contingency plans in place to design and implement remedial measures such as:

- Additional localized removals of loose or unstable materials
- Slope laybacks and benching
- Engineered drainage controls
- Buttresses or slope sections comprised of compacted rockfill

7.6 Travertine Deposits

The deposition of travertine between clasts in step-pools and dam-like structures, as well as deposited sediment that is accessed by the channel flow is likely to have increased the apparent strength of localized areas of alluvial materials along the channel. This cementation may make the removal of this material more difficult than anticipated and may play a role in long term channel stability. Golder recommends that this cemented material be left in place wherever possible to augment the restoration design.

Golder Associates Inc.



William L. Fowler, PG, CEG *Dated: 10/31/19*
Senior Program Leader/Principal

https://golderassociates-my.sharepoint.com/personal/bfowler_golder_com/documents/permanente/creek restoration/perm creek recon_final_wlf_10-31-19 r4.docx

References

Bakun, William H. 1999. "Seismic activity of the San Francisco Bay region." *Bulletin of the Seismological Society of America* 89, no. 3: 764-784.

Bedrossian, T.L. 1980. Shannon, Monte Vista and related faults: California Division of Mines and Geology Fault Evaluation Report FER-95, microfiche copy in California Division of Mines and Geology Open-File Report 90-11, scale 1:24,000.

Brabb, Earl E. 1970. Preliminary geologic map of the central Santa Cruz Mountains, California. No. 70-36. US Geological Survey.

Bryant, W.A., compiler. 2000. Fault number 57, Berrocal fault zone, in Quaternary fault and fold database of the United States: U.S. Geological Survey website, https://earthquakes.usgs.gov/hazards/qfaults, accessed 09/12/2019 09:33 AM.

Bryant, W.A., compiler. 2000. Fault number 56, Monte Vista-Shannon fault zone, in Quaternary fault and fold database of the United States: U.S. Geological Survey website, https://earthquakes.usgs.gov/hazards/qfaults, accessed 09/16/2019 02:40 PM.

Bryant, W.A., and Lundberg, M., compilers. 2002. Fault number 1c, San Andreas fault zone, Peninsula section, in Quaternary fault and fold database of the United States: U.S. Geological Survey website, https://earthquakes.usgs.gov/hazards/qfaults, accessed 09/16/2019 02:38 PM.

Caterpillar, I. N. C. "Handbook of Ripping." (2000).

Dibblee, T. W., and J. A. Minch. 2007a. "Geologic Map of the Cupertino and San Jose West quadrangles, Santa Clara and Santa Cruz Counties, California" Dibblee Geological Foundation Map DF-351, scale 1, no. 24,000.

Dibblee, T. W., and J. A. Minch. 2007b. "Geologic map of the Mindego Hill quadrangle, San Mateo, Santa Clara, and Santa Cruz Counties, California" Dibblee Geological Foundation Map DF-349, scale 1:24,000.

Ellis, W.L., Harp, E.L., Arnal, C.H., and Godt, J.W. 1999. Map showing locations of damaging landslides in Santa Clara County, California, resulting from 1997-98 El Nino rainstorms: U.S. Geological Survey, Miscellaneous Field Studies Map MF-2325-J, scale 1:125,000.

Fuller, Brian M., Leonard S. Sklar, Zacchaeus G. Compson, Kenneth J. Adams, Jane C. Marks, and Andrew C. Wilcox. 2010. "Ecogeomorphic feedbacks in regrowth of travertine step-pool morphology after dam decommissioning, Fossil Creek, Arizona." Geomorphology 126, no. 3-4: 314-332.

Foruria, J. 2004. Geology of the Permanente Limestone and Aggregate Quarry, Santa Clara County, California: Report prepared for Hanson Permanente Cement dated September 24, 2004.

Golder Associates Inc., 2014. “Preliminary Geotechnical Recommendations for Conceptual Level Permanente Creek Restoration Plans”. April 28, 2014

Haugerud, R. A., S. D. Ellen, D. P. Schwartz, and D. J. Ponti. 1990. "Coseismic ground deformation along the northeast margin of the Santa Cruz Mountains." *Field guide to neotectonics of the San Andreas fault system, Santa Cruz Mountains, in light of the 1989 Loma Prieta earthquake: US Geological Survey Open-File Report*: 90-274.

Hitchcock, C.S., and Kelson, K.I. 1999. Growth of late Quaternary folds in southwest Santa Clara Valley, San Francisco Bay area, California: Implications of triggered slip for seismic hazard and earthquake recurrence: Geology, v. 27, no. 5, p. 391–394.

Hitchcock, Christopher S., Keith I. Kelson, and Stephen C. Thompson. 1994. *Geomorphic investigations of deformation along the northeastern margin of the Santa Cruz Mountains*. No. 94-187. US Geological Survey.

Jennings, C.W. 1994. Fault activity map of California and adjacent areas, with locations of recent volcanic eruptions: California Division of Mines and Geology Geologic Data Map 6, 92 p., 2 pls., scale 1:750,000

Lawson, Andrew Cowper, and Harry Fielding Reid. 1908. *The California Earthquake of April 18, 1906: Report of the State Earthquake Investigation Commission...*. No. 87. Carnegie institution of Washington.

Langenheim, V. E., K. M. Schmidt, and R. C. Jachens. 1997. "Coseismic deformation during the 1989 Loma Prieta earthquake and range-front thrusting along the southwestern margin of the Santa Clara Valley, California." *Geology* 25, no. 12: 1091-1094.

McLaughlin, R. J., W. V. Sliter, D. H. Sorg, P. C. Russell, and A. M. Sarna-Wojcicki. 1996. "Large-scale right-slip displacement on the East San Francisco Bay Region fault system, California: Implications for location of late Miocene to Pliocene Pacific plate boundary." *Tectonics* 15, no. 1: 1-18.

McLaughlin, R.J., Clark, J.C., Brabb, E.E., and Helley, E.J. 1991. Geologic map and structure sections of the Los Gatos 7.5-minute quadrangle, Santa Clara and Santa Cruz Counties, California: U.S. Geological Survey Open-File Map 91-593, scale 1:24,000.

Nolan, K.M., and Hill, B.R. 1989. Effects of limestone quarrying and cement-plant operations on runoff and sediment yields in the upper Permanente Creek basin, Santa Clara County, California: U.S. Geological Survey, Water-Resources Investigations Report 89-4130, scale 1:40,900.

NORCAL Geophysical Consultants, Inc. 2014. Seismic Refraction Survey, Sites 4 and 11, Permanente Quarry, Cupertino, California. #14-245.15B May 22, 2014.

Peck, R.B. 1969. Advantages and limitations of the observational method in applied soil mechanics, Geotechnique, 19, No. 2, pp. 171–187.

Pulver, B.S. 1979a. Geology and landslides of the Mindego Hill 7.5' Quadrangle, California, California Department of Forestry, Title II Data Compilation Project, scale 1:24,000.

Pulver, B.S. 1979b. Geology and landslides of the Cupertino 7.5' Quadrangle, California, California Department of Forestry, Title II Data Compilation Project, scale 1:24,000.

Rogers, T.H. and Armstrong, C.F. 1973. Environmental Geologic Analysis of the Monte Bello Ridge Mountain Study Area, Santa Clara County, California, California Division of Mines and Geology Preliminary Report 17.

Sieh, Kerry E. 1978. "Prehistoric large earthquakes produced by slip on the San Andreas fault at Pallett Creek, California." *Journal of Geophysical Research: Solid Earth* 83, no. B8: 3907-3939.

Smith, T.C. 1981. Evidence of Holocene movement on the San Andreas fault zone, northern San Mateo County, California: California Division of Mines and Geology Open-File Report 81-6SF, scale 1:24,000.

Sorg, D.H., and McLaughlin, R.J. 1975. Geologic Map of the Sargent-Berrocal Fault Zone Between Los Gatos and Los Altos Hills, Santa Clara County, California: U.S. Geological Survey Miscellaneous Field Studies Map MF-643, scale 1:24,000.

Toppozada, T. R., C. R. Real, and D. L. Parke. 1981. Preparation of isoseismal maps and summaries of reported effects for pre-1900 California earthquakes, Calif. Div. Mines Geol. Open-File Rept. 81-11 SAC, 182 pp.

Toppozada, T. R. and D. L. Parke. 1982. Areas damaged by California earthquakes, 1900-1949, Calif. Div. Mines Geol. Open-File Rept. 82-17, 65 pp.

Toppozada, Tousson R., and Glenn Borchardt. 1998. "Re-evaluation of the 1836 “Hayward fault” and the 1838 San Andreas fault earthquakes." *Bulletin of the Seismological Society of America* 88, no. 1: 140-159.

Tuttle, Martitia P., and Lynn R. Sykes. 1992. "Re-evaluation of several large historic earthquakes in the vicinity of the Loma Prieta and Peninsular segments of the San Andreas fault, California." *Bulletin of the Seismological Society of America* 82, no. 4: 1802-1820.

URS. 2009. Permanente Creek Long-Term Restoration Plan. July 31, 2009.

USGS: San Francisco Bay Landslide Mapping Team. 1997. Introduction to the San Francisco Bay region, California, landslide folio: U.S. Geological Survey, Open-File Report OF-97-745-A, scale 1:125,000.

Waterways Consulting, Inc. 2018. Permanente Creek Restoration Plan Internal Draft 90% Level Submittal Design Basis Technical Memorandum. Prepared for Lehigh Southwest Cement Company and Hanson Permanente Cement, Inc. November 5, 2018.

Wesling, J.R., and Helley, E.J. 1989. Quaternary geologic map of the San Jose West quadrangle, Santa Clara County, California: U.S. Geological Survey Open-File Map 89-672, scale 1:24,000.

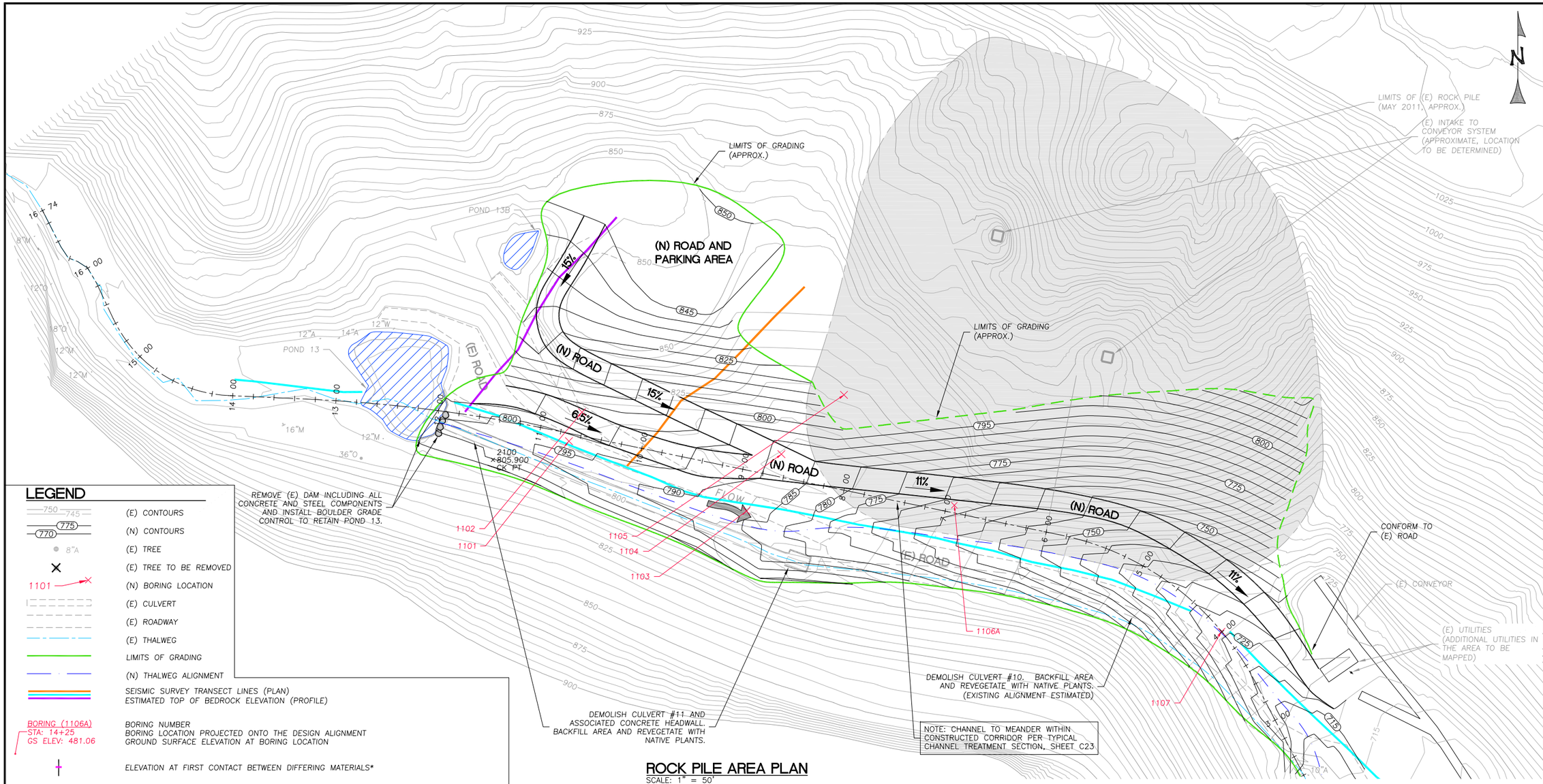
Working Group on Northern California Earthquake Potential (WGNCEP). 1996. Database of potential sources for earthquakes larger than magnitude 6 in northern California: U.S. Geological Survey Open-File Report 96-705, 40 p.

Whipple, Kelin X. 2004. "Bedrock rivers and the geomorphology of active orogens." Annual Rev. Earth Planet. Sci. 32: 151-185.

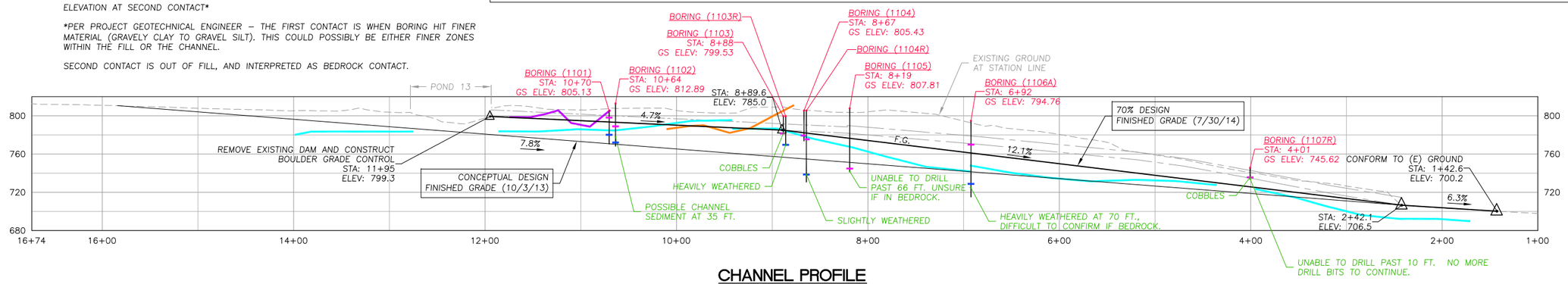
Zimmermann, André, Michael Church, and Marwan A. Hassan. "Step-pool stability: Testing the jammed state hypothesis." *Journal of Geophysical Research: Earth Surface* 115, no. F2 (2010).

Appendix A

Appendix B



ROCK PILE AREA PLAN
SCALE: 1" = 50'



CHANNEL PROFILE
SCALE: 1" = 60'

WATERWAYS CONSULTING INC.
509A SWIFT ST.
SANTA CRUZ, CA 95060
PH:(831)421-9291 // FAX:(888)819-6847
WWW.WATWAYS.COM

PRELIMINARY

NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:

LEHIGH HANSON
HEIDELBERG CEMENT GROUP

ROCK PILE AREA SEISMIC STUDY AND BORING RESULTS

PERMANENTE CREEK RESTORATION PLAN

SUBSURFACE BORING LOCATIONS

DESIGNED BY:	B.Z.
DRAWN BY:	B.M.S
CHECKED BY:	M.W.W.
DATE:	03/10/15
JOB NO.:	13-016

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS

0 1"

FIG. 1

Golder Associates, Inc.

Telephone:

BORING NUMBER 1101

PROJECT NUMBER 1302968-01 **DATE STARTED** 2/12/15

PROJECT NAME Lehigh Rockpile Drill **DATE COMPLETED** 2/12/15

LOCATION Cupertino, CA **CASING TYPE/DIAMETER** ----

DRILLING METHOD HSA **SCREEN TYPE/SLOT** ----

GROUND ELEVATION **GRAVEL PACK TYPE** ----

TOP OF CASING ---- **GROUT TYPE/QUANTITY** ----

LOGGED BY LF **DRILLING COMPANY** Gregg Drilling

REMARKS Borehole 1101 is located on road (furthest east location). Estimated depth of bedrock with seismic line is about 25 feet.

REMARKS CONTINUED Possible pond sediment at ~7 feet and weathered bedrock at ~25 feet.

SAMPLING METHOD	Recovery (ft)	USCS	DEPTH (ft. BGL)	GRAPHIC LOG	LITHOLOGIC DESCRIPTION
		ML	0		(FILL; ML) gravelly SANDY SILT, subangular to subrounded sand and gravel, low plastic fines; brown; moist.
			5		
		CH	10		(NATIVE possible pond sediment; CH) gravelly CLAY, medium to high plastic fines, fine subangular gravel, some coarse sand; dark brownish-gray; mosit.
			15		gravel decreases with depth
			20		
			25		at 25 feet: driller notice material is a little harder
SS	18/18	CL	30		(NATIVE; CL) gravelly CLAY, angular to subangular gravel, some FeOx staining, weathered Franciscan clasts; dark gray; moist.
		GM			(NATIVE; GM) SILTY GRAVEL, angular to subangular, low to medium plastic fines, weathered Franciscan bedrock; dark gray; moist to wet.
	12/18		35		Bottom of borehole at 35.0 feet.

LEHIGH ROCKPILE TEMPLATE GINT STD US LAB_LEHIGHROCKPILEDRILL.GPJ LOG A EWNN01.GDT 3/20/15

Golder Associates, Inc.

Telephone:

BORING NUMBER 1102

PROJECT NUMBER 1302968-01 **DATE STARTED** 2/12/15

PROJECT NAME Lehigh Rockpile Drill **DATE COMPLETED** 2/12/15

LOCATION Cupertino, CA **CASING TYPE/DIAMETER** ----

DRILLING METHOD HSA **SCREEN TYPE/SLOT** ----

GROUND ELEVATION **GRAVEL PACK TYPE** ----

TOP OF CASING ---- **GROUT TYPE/QUANTITY** ----

LOGGED BY LF **DRILLING COMPANY** Gregg Drilling

REMARKS Borehole 1102 is located on road above 1101. Drilled through fill and hit clay at ~19 feet and possibly weathered Franciscan at ~41 feet.

REMARKS CONTINUED

SAMPLING METHOD	Recovery (ft)	USCS	DEPTH (ft. BGL)	GRAPHIC LOG	LITHOLOGIC DESCRIPTION
			0		(FILL; SM) gravelly SILTY SAND, fine sand, subangular to subrounded gravel; brown; dry to moist.
			5		
			10		at 10-15 feet: increase in gravel, fine to coarse angular to subangular gravel; whitish-brown.
		SM	15		
	0/18		20		at 19 feet: driller noticed softer material; attempted a drive sample (no recovery)
		CL	25		(FILL; CL) gravelly SILTY CLAY, fine subangular to subrounded gravel, some coarse sand; grayish-brown; moist.
		GM	30		(FILL; GM) SILTY GRAVEL, angular to subangular gravel, some sand; wet.
		CH	35		(NATIVE; CH) CLAY, possible channel sediment, medium to high plastic fines.
	18/18	GM	40		(NATIVE; GM) sandy SILTY GRAVEL, possible channel sediment.
		ML			(NATIVE; ML) sandy gravelly SILT, low to medium plastic fines, weathered Franciscan bedrock; brownish-gray.

Bottom of borehole at 45.0 feet.

LEHIGH ROCKPILE TEMPLATE GINT STD US LAB_LEHIGHROCKPILEDRILL.GPJ LOG A EWNN01.GDT 3/20/15

Golder Associates, Inc.

Telephone:

BORING NUMBER 1103

PROJECT NUMBER 1302968-01 **DATE STARTED** 2/12/15

PROJECT NAME Lehigh Rockpile Drill **DATE COMPLETED** 2/12/15

LOCATION Cupertino, CA **CASING TYPE/DIAMETER** ----

DRILLING METHOD HSA **SCREEN TYPE/SLOT** ----

GROUND ELEVATION **GRAVEL PACK TYPE** ----

TOP OF CASING ---- **GROUT TYPE/QUANTITY** ----

LOGGED BY LF **DRILLING COMPANY** Gregg Drilling

REMARKS Borehole 1103 is located on road. Hit cobbles at 18 feet and unable to drill past.

REMARKS CONTINUED

SAMPLING METHOD	Recovery (ft)	USCS	DEPTH (ft. BGL)	GRAPHIC LOG	LITHOLOGIC DESCRIPTION
		ML	0		(FILL; ML) gravelly SILT, low plastic fines, subangular to subrounded gravel, some fine sand; dark grayish-brown; moist.
		SM	5		(FILL; SM) gravelly SILTY SAND, fine sand, low plastic fines, subangular to subrounded gravel; brown; moist.
		ML	10		(FILL; ML) gravelly sandy SILT, low to medium plastic fines; dark brown; moist.
		GM	15		(FILL; GM) SILTY GRAVEL and COBBLES, angular to subangular; whitish-brown. unable to drill past 18 feet; possibly stuck on a boulder
					Bottom of borehole at 18.0 feet.

Golder Associates, Inc.

Telephone:

BORING NUMBER 1103R

PROJECT NUMBER 1302968-01 **DATE STARTED** 2/12/15

PROJECT NAME Lehigh Rockpile Drill **DATE COMPLETED** 2/12/15

LOCATION Cupertino, CA **CASING TYPE/DIAMETER** ----

DRILLING METHOD HSA **SCREEN TYPE/SLOT** ----

GROUND ELEVATION **GRAVEL PACK TYPE** ----

TOP OF CASING ---- **GROUT TYPE/QUANTITY** ----

LOGGED BY LF **DRILLING COMPANY** Gregg Drilling

REMARKS Borehole 1103R is 3 feet east of 1103. Hit weathered Franciscan bedrock at ~25-30 feet.

REMARKS CONTINUED

SAMPLING METHOD	Recovery (ft)	USCS	DEPTH (ft. BGL)	GRAPHIC LOG	LITHOLOGIC DESCRIPTION
		ML	0		(FILL; ML) gravelly SILT, low plastic fines, subangular to subrounded gravel, some fine sand; light brown to brown; moist.
		SM	5		(FILL; SM) gravelly SILTY SAND, fine sand, low to medium plastic fines, subangular to subrounded gravel; brown to dark brown; moist.
		ML	10		(FILL, ML) gravelly sandy SILT, angular to subangular gravel, weathered Franciscan clasts; brown.
		CL-ML	15		(NATIVE; CL-ML) gravelly SILT to gravelly CLAY, angular to subangular gravel, weathered Franciscan bedrock; reddish-orangish-brownish-gray; moist to wet.
			20		
			25		
			30		Bottom of borehole at 30.0 feet.

LEHIGH ROCKPILE TEMPLATE GINT STD US LAB_LEHIGHROCKPILEDRILL.GPJ LOG A EWNN01.GDT 3/20/15

Golder Associates, Inc.

Telephone:

BORING NUMBER 1104

PROJECT NUMBER 1302968-01 **DATE STARTED** 2/12/15

PROJECT NAME Lehigh Rockpile Drill **DATE COMPLETED** 2/12/15

LOCATION Cupertino, CA **CASING TYPE/DIAMETER** ----

DRILLING METHOD HSA **SCREEN TYPE/SLOT** ----

GROUND ELEVATION **GRAVEL PACK TYPE** ----

TOP OF CASING ---- **GROUT TYPE/QUANTITY** ----

LOGGED BY LF **DRILLING COMPANY** Gregg Drilling

REMARKS Borehole 1104 is located on rockpile. Hit cobbles at 32 feet and unable to drill past.

REMARKS CONTINUED

SAMPLING METHOD	Recovery (ft)	USCS	DEPTH (ft. BGL)	GRAPHIC LOG	LITHOLOGIC DESCRIPTION
			0		(FILL; ML) gravelly sandy SILT, low to medium plastic fines, subangular to subrounded gravel; gray; moist.
		ML	5		color change to light grayish-brown
			10		color change to light brown
		CL-ML	15		(FILL; ML-CL) gravelly SILT to gravelly CLAY, medium plastic fines, subangular to subrounded gravel, trace coarse sand; brown; moist.
		GM	20		(FILL; GM-ML) SILTY GRAVEL to gravelly SILT, low plastic fines, angular gravel, some coarse angular sand; tannish-whitish-brown; moist.
			25		at 26 feet: driller noticed material became more stiff
	18/18	CL-ML	30		(FILL; ML-CL) gravelly CLAY to gravelly SILT, medium plastic fines, fine subangular to subrounded gravel, some fine sand, weathered; dark brownish-gray; moist.
	3/12				at 32 feet: hard material; unable to drill any further.
					Bottom of borehole at 33.0 feet.

LEHIGH ROCKPILE TEMPLATE GINT STD US LAB_LEHIGHROCKPILEDRILL.GPJ LOG A EWNN01.GDT 3/20/15

Golder Associates, Inc.

Telephone:

BORING NUMBER 1104R

PROJECT NUMBER 1302968-01 **DATE STARTED** 2/12/15

PROJECT NAME Lehigh Rockpile Drill **DATE COMPLETED** 2/12/15

LOCATION Cupertino, CA **CASING TYPE/DIAMETER** ----

DRILLING METHOD HSA **SCREEN TYPE/SLOT** ----

GROUND ELEVATION **GRAVEL PACK TYPE** ----

TOP OF CASING ---- **GROUT TYPE/QUANTITY** ----

LOGGED BY LF **DRILLING COMPANY** Gregg Drilling

REMARKS Borehole 1104R is 3 feet east of 1104. Possibly hit weathered Franciscan bedrock at about 67 feet.

REMARKS CONTINUED

SAMPLING METHOD	Recovery (ft)	USCS	DEPTH (ft. BGL)	GRAPHIC LOG	LITHOLOGIC DESCRIPTION
			0		(FILL; ML) gravelly sandy SILT, low plastic fines, angular to subangular gravel; grayish-brown; moist.
		ML	5		
			10		at 9 ' color changes to light brown
			15		
		CL-ML			(FILL; ML-CL) gravelly SILT to gravelly CLAY, low to medium plastic fines; brown; moist.
			20		
		GM	25		(FILL; GM-ML) SILTY GRAVEL to gravelly SILT, low plastic fines, angular gravel; tanish-brown; moist.
			30		
		CL-ML	35		(FILL: ML-CL) gravelly SILT to gravelly CLAY, subangular to subrounded gravel; brown to reddish-brown; moist.
					at 35' color changes to reddish-brown

LEHIGH ROCKPILE TEMPLATE GINT STD US LAB_LEHIGHROCKPILEDRILL.GPJ LOG A EWNN01.GDT 3/20/15

Golder Associates, Inc.

Telephone:

BORING NUMBER 1104R

PROJECT NUMBER 1302968-01 **DATE STARTED** 2/12/15

PROJECT NAME Lehigh Rockpile Drill **DATE COMPLETED** 2/12/15

SAMPLING METHOD	Recovery (ft)	USCS	DEPTH (ft. BGL)	GRAPHIC LOG	LITHOLOGIC DESCRIPTION
		CL-ML	45		(FILL: ML-CL) gravelly SILT to gravelly CLAY, subangular to subrounded gravel; brown to reddish-brown; moist. *(continued)*
		ML	50		(FILL; ML) gravelly SILT, low plastic fines, coarse subangular to angular gravel; brown; moist.
		CL-ML	55		(FILL; ML-CL) gravelly SILT to gravelly CLAY, low to medium plastic fines, angular to subangular gravel; brown; moist.
		GM	60		(FILL; GM) SILTY GRAVEL, low plastic fines, fine subangular gravel; light tanish-brown; moist.
			65		at 67 feet: driller notices a change in drilling
		GM	70		(NATIVE; GM-SM) sandy GRAVEL to gravely SAND, low plastic fines, weathered Franciscan clasts; brownish-gray to greenish-gray; moist to wet.
		CL	75		(NATIVE; CL) CLAY, slightly weathered Franciscan; dark gray; moist to wet.
					Bottom of borehole at 75.0 feet.

Golder Associates, Inc.

Telephone:

BORING NUMBER 1105

PROJECT NUMBER 1302968-01
PROJECT NAME Lehigh Rockpile Drill
LOCATION Cupertino, CA
DRILLING METHOD HSA
GROUND ELEVATION
TOP OF CASING ----
LOGGED BY LF

DATE STARTED 2/13/15
DATE COMPLETED 2/13/15
CASING TYPE/DIAMETER ----
SCREEN TYPE/SLOT ----
GRAVEL PACK TYPE ----
GROUT TYPE/QUANTITY ----
DRILLING COMPANY Gregg Drilling

REMARKS Borehole 1105 is located on rockpile (most North on Figure). Hit clay at ~63 feet, unable to drill past 66 feet.

REMARKS CONTINUED

SAMPLING METHOD	Recovery (ft)	USCS	DEPTH (ft. BGL)	GRAPHIC LOG	LITHOLOGIC DESCRIPTION
		GM	0		(FILL, GM) SILTY GRAVEL, angular to subangular; light to dark gray.
		CL-ML	5		(FILL; CL-ML) gravelly sandy CLAY to sandy SILT, medium plastic fines, medium to coarse sand, subangular gravel; dark gray; moist.
		ML	10		(FILL; ML) gravelly SILT, low plastic fines, fine to coarse subangular gravel, some coarse sand; brown; moist.
		GM	20		(FILL, GM) SILTY GRAVEL, fine to coarse angular to subangular gravel, low plastic fines; whitish-brown; moist.
		ML	30		(FILL; ML) gravelly SILT, low to medium plastic fines, subangular gravel; brown; moist.
		ML	35		(FILL; ML) gravelly SILT, low plastic fines, angular to subangular gravel, some coarse angular to subangular sand, slightly weathered Franciscan clasts; reddish-orangish-brown; moist. at 35 feet: driller noticed material became more stiff; drill bit became hot and started smoking.

LEHIGH ROCKPILE TEMPLATE GINT STD US LAB_LEHIGHROCKPILEDRILL.GPJ LOG A EWNN01.GDT 3/20/15

PROJECT NUMBER 1302968-01 **DATE STARTED** 2/13/15

PROJECT NAME Lehigh Rockpile Drill **DATE COMPLETED** 2/13/15

SAMPLING METHOD	Recovery (ft)	USCS	DEPTH (ft. BGL)	GRAPHIC LOG	LITHOLOGIC DESCRIPTION
		ML			(FILL; ML) gravelly SILT, low plastic fines, angular to subangular gravel, some coarse angular to subangular sand, slightly weathered Franciscan clasts; reddish-orangish-brown; moist. *(continued)*
			45		(FILL; ML) gravelly SILT, low plastic fines, anuglar to subangular gravel; brown; moist.
		ML	50		
			55		
			60		(FILL; ML-SM) gravelly sandy SILT, low plastic fines, fine to coarse sand, subangular to subrounded gravel; brown; moist.
		SM-ML			
		CH			(NATIVE; CH) gravelly CLAY, possible pond sediment, medium to high plastic fines, subangular to subrounded gravel, some coarse subangular sand; brown to dark brownish-gray to black; moist.
SS	3/6 5/6		65		
		CL-ML			(NATIVE; ML-CL) CLAYEY SILT to SILTY CLAY, possible pond sediment, low plastic fines, some fine sand, trace coarse subangular sand; light brownish-gray mottled dark gray.
					Bottom of borehole at 66.0 feet.

LEHIGH ROCKPILE TEMPLATE GINT STD US LAB_LEHIGHROCKPILEDRILL.GPJ LOG A EWNN01.GDT 3/20/15

Golder Associates, Inc.

Telephone:

BORING NUMBER 1106A

PROJECT NUMBER 1302968-01 **DATE STARTED** 2/13/15

PROJECT NAME Lehigh Rockpile Drill **DATE COMPLETED** 2/13/15

LOCATION Cupertino, CA **CASING TYPE/DIAMETER** ----

DRILLING METHOD HSA **SCREEN TYPE/SLOT** ----

GROUND ELEVATION **GRAVEL PACK TYPE** ----

TOP OF CASING ---- **GROUT TYPE/QUANTITY** ----

LOGGED BY LF **DRILLING COMPANY** Gregg Drilling

REMARKS Borehole 1106A location is downslope on rockpile (east of previous boreholes). Driller notes gravel at ~18 feet.

REMARKS CONTINUED Possible pond sediment at ~25 feet. Possibly hit weathered Franciscan bedrock at ~66 feet.

SAMPLING METHOD	Recovery (ft)	USCS	DEPTH (ft. BGL)	GRAPHIC LOG	LITHOLOGIC DESCRIPTION
		GM	0		(FILL; GM) sandy SILTY GRAVEL, angular to subangular gravel, low plastic fines, fine to coarse sand; brown; moist.
		GP	10		(FILL; GP) poorly graded GRAVEL, coarse subangular gravel, some silt; brown; moist.
		GM	15		(FILL; GM-GC) SILTY GRAVEL to CLAYEY GRAVEL, low plastic fines, subangular gravel; brown; moist.
		SM	20		(FILL; SM) SILTY SAND, fine sand, low plastic fines, some medium to coarse subangular sand, some fine to coarse subangular gravel; brown; moist.
		CL-ML	25		(FILL/COLLUVIUM (?); ML-CL) gravelly SILT to gravelly CLAY, low to medium plastic fines, fine to coarse subangular gravel; brown; moist.
			30		
			35		

LEHIGH ROCKPILE TEMPLATE GINT STD US LAB_LEHIGHROCKPILEDRILL.GPJ LOG A EWNN01.GDT 3/20/15

Golder Associates, Inc.

Telephone:

BORING NUMBER 1106A

PROJECT NUMBER 1302968-01 **DATE STARTED** 2/13/15

PROJECT NAME Lehigh Rockpile Drill **DATE COMPLETED** 2/13/15

SAMPLING METHOD	Recovery (ft)	USCS	DEPTH (ft. BGL)	GRAPHIC LOG	LITHOLOGIC DESCRIPTION
		ML			(FILL/COLLUVIUM (?); ML) gravelly SILT, low plastic fines, fine subangular gravel; brown; moist.
		ML	45		(FILL/COLLUVIUM (?); ML) gravelly SILT, low palstic fines, fine subangular gravel, some fine to coarse subangular sand; brown; moist.
		GM	50		(FILL/COLLUVIUM (?); GM) SILTY GRAVEL, fine angular to subangular gravel, low plastic fines, some coarse subangular gravel; brown; moist.
		ML	55		
			60		(FILL/COLLUVIUM (?); ML) gravelly SILT, low plastic fines, fine to coarse subangular gravel, some coarse subangular sand; brown; moist
SS	12/18		65		
		SM			(NATIVE; SM/GP) SILTY SAND and GRAVEL, heavily weathered; wet.
SS	6/18	CL-ML	70		(NATIVE; ML-CL) gravelly SILT to gravelly CLAY, heavily weathered, possibly Franciscan bedrock; wet.
		GM			(NATIVE; GM) sandy SILTY GRAVEL, fine to coarse angular to subangular gravel, possibly Franciscan bedrock; brown and dark green; wet.
SS	12/18		75		
		SM			(NATIVE; SM) gravelly SILTY SAND, fine to coarse sand, low plastic fines, angular to subangular gravel, weathered, possibly Franciscan bedrock; reddish-brown mottled brown; wet.
SS	3/80		80		Bottom of borehole at 80.0 feet.

LEHIGH ROCKPILE TEMPLATE GINT STD US LAB_LEHIGHROCKPILEDRILL.GPJ LOG A EWNN01.GDT 3/20/15

Golder Associates, Inc.

Telephone:

BORING NUMBER 1107

PROJECT NUMBER 1302968-01 **DATE STARTED** 2/13/15

PROJECT NAME Lehigh Rockpile Drill **DATE COMPLETED** 2/13/15

LOCATION Cupertino, CA **CASING TYPE/DIAMETER** ----

DRILLING METHOD HSA **SCREEN TYPE/SLOT** ----

GROUND ELEVATION **GRAVEL PACK TYPE** ----

TOP OF CASING ---- **GROUT TYPE/QUANTITY** ----

LOGGED BY LF **DRILLING COMPANY** Gregg Drilling

REMARKS Borehole 1107 is located on rockpile (most East on Figure). Hit a burried retaining wall at 7 feet and can't drill further.

REMARKS CONTINUED

SAMPLING METHOD	Recovery (ft)	USCS	DEPTH (ft. BGL)	GRAPHIC LOG	LITHOLOGIC DESCRIPTION
		GM	5		(FILL; ML-GM) gravelly SILT to SILTY GRAVEL, low plastic fines, fine to coarse angular to subangular gravel, some coarse angular to subangular sand; dark gray; moist. at 7 feet: hit retaining well; can't drill futher. Bottom of borehole at 7.0 feet.

LEHIGH ROCKPILE TEMPLATE GINT STD US LAB_LEHIGHROCKPILEDRILL.GPJ LOG A EWNN01.GDT 3/20/15

Golder Associates, Inc.

Telephone:

BORING NUMBER 1107R

PROJECT NUMBER 1302968-01 **DATE STARTED** 2/13/15

PROJECT NAME Lehigh Rockpile Drill **DATE COMPLETED** 2/13/15

LOCATION Cupertino, CA **CASING TYPE/DIAMETER** ----

DRILLING METHOD HSA **SCREEN TYPE/SLOT** ----

GROUND ELEVATION **GRAVEL PACK TYPE** ----

TOP OF CASING ---- **GROUT TYPE/QUANTITY** ----

LOGGED BY LF **DRILLING COMPANY** Gregg Drilling

REMARKS Borehole 1107R is 3 feet east of 1107. Hit cobbles 10 feet and unable to drill past.

REMARKS CONTINUED

SAMPLING METHOD	Recovery (ft)	USCS	DEPTH (ft. BGL)	GRAPHIC LOG	LITHOLOGIC DESCRIPTION
		GM	5		(FILL; GM) SILTY GRAVEL, coarse subangular gravel; dark gray; moist.
			10		at 10 feet: stuck on cobble; can't drill further.
					Bottom of borehole at 10.0 feet.

LEHIGH ROCKPILE TEMPLATE GINT STD US LAB_LEHIGHROCKPILEDRILL.GPJ LOG A EWNN01.GDT 3/20/15

APPENDIX I

Golder Associates 2021

Slope Stability Analyses, Permanente Creek Restoration Plan

GOLDER
MEMBER OF WSP

TECHNICAL MEMORANDUM

DATE July 22, 2021 **Project No.** 179018610

TO Erika Guerra
Lehigh Hanson

FROM Robert Paul C. Erickson, PE; William L. Fowler, PG, CEG **EMAIL robertpaul_erickson@golder.com, bill_fowler@golder.com**

RE: SLOPE STABILITY ANALYSES, PERMANENTE CREEK RESTORATION PLAN, LEHIGH SOUTHWEST CEMENT COMPANY AND HANSON PERMANENTE CEMENT, INC. PERMANENTE QUARRY, CUPERTINO, CALIFORNIA

Ms. Guerra,

Golder Associates Inc. (Golder) is submitting this technical memorandum to Lehigh Southwest Cement Company and Hanson Permanente Cement, Inc. (Lehigh) to present the results of our slope stability analyses of the proposed Rock Pile and mining overburden removal to the design finished grade related to Permanente Creek Restoration Plan, herein referred to as the Restoration Plan (Waterways, 2018)[1], at the Permanente Quarry in Cupertino, California. This work was performed in support of our response to comments dated June 25, 2021 compiled by ESA and submitted to the County of Santa Clara regarding the Permanente Creek Restoration Plan (PCRP).

The following sections provide a brief description of the analyses that were performed, the results and conclusions, and relevant slope stability analyses model outputs are provided as Attachment 1.

1.0 MODEL DEVELOPMENT

Golder analyzed cross-section C-C', shown on Sheets 19 and 21 of the Restoration Plan, 90% design submittal (Waterways, 2019). This cross-section location is considered critical for slope stability because it consists of, nominally, the greatest height of the rockpile overburden material (250 feet measured from toe to crest) and captures the steepest inclinations of both the existing rockpile (approximately 1.1H to 1.2H:1V) and underlying native metabasalt (aka greenstone) (approximately 1H: 1V). The geometry of the existing site conditions is based on topographic data per a survey collected by Lehigh in May 2011. The Restoration Plan provides additional information regarding the interpretation of the depth to the underlying native bedrock. The topographic data provided to Golder was truncated at the existing haul road on the north side of the creek at approximately elevation 1070 feet (El. 1070), therefore, model geometry north of the haul road was estimated based on measurements from Google Earth.

In lieu of piezometer data along cross-section C-C', Golder assumed a phreatic surface based on our understanding of the general subsurface water conditions along the south rim of the quarry as informed by long

[1] Waterways Consulting, Inc. 2019. Permanente Creek Restoration Plan Grading Plan 90% Design. Santa Clara County Grading Permit Submittal, October 31, 2019.

Golder Associates Inc.
1000 Enterprise Way, Suite 190, Roseville, California, USA 95678 T: +1 916 786-2424 F: +1 916 786-2434

Golder and the G logo are trademarks of Golder Associates Corporation

term installation and data collection from vibrating wire piezometers installed between the quarry and Permanente Creek. The analyses performed here assumed the depth to water is approximately 75 feet below the existing haul road and declines through the native bedrock to a depth of approximately 20 feet below the existing culvert in the creek (near original creek thalweg elevation).

2.0 ANALYSES

Golder performed 2-dimensional, limit equilibrium slope stability analysis along cross-section C-C' using Slide2 Modeler, Version 9.012[2]. The analyses presented here used Spencer's method of analysis because it satisfies static horizontal and vertical equilibrium as well as moment equilibrium. These analyses evaluated circular failures only because the interpretation of the subsurface conditions indicate a block type failure is unlikely (i.e., no weak horizontal stratum). Critical slip surfaces and corresponding FOS were evaluated for local failures through upper and lower portions of the respective slopes as well as global failures that span from the ultimate crest to ultimate toe of the final slope configuration.

Golder analyzed the following four cases for slope stability:

1. The existing rockpile overburden given existing conditions.
2. The interpreted native bedrock following excavation and removal of the rockpile overburden and underlying thin surficial deposits.
3. The interpreted native bedrock surface in the creek bottom following excavation to the expected upper limit of the design finished subgrade of the creek per the Restoration Plan.
4. The interpreted native bedrock surface in the creek bottom following excavation to the expected lower limit of the design finished subgrade of the creek per the Restoration Plan.

As a limited sensitivity analysis, Golder evaluated each of the above four cases considering the assume phreatic surface described in Section 1 as well as under dry conditions to bracket the range of factors of safety (FOS).

3.0 GEOTECHNICAL PARAMETERS

The geotechnical parameters used in slope stability analyses are summarized in Table 1 and described below.

Table 1: Summary of Geotechnical Parameters

Material	Unit Weight (pcf)	Cohesion (psf)	Effective Friction Angle (degrees)
Rockpile Overburden	125	0	40
Metabasalt/Greenstone	165	6,480	30

Notes: pcf = pounds per cubic foot
psf = pounds per square foot

[2] Rocscience Inc. 2020. Slide 2 Modeler, 2D Limit Equilibrium Analysis for Slopes. Build Version 9.012. Build date December 11, 2020.

Golder assumed the rockpile overburden has a unit weight of 125 pounds per cubic foot (pcf) with 0 cohesion and an effective friction angle (Φ') of 40 degrees. Its assumed friction angle corresponds to the rockpile's angle of repose and these assumed shear strength parameters yield a minimum static FOS of 1.0 which is reasonable considering the rockpile has performed well and appears stable since its placement.

Numerous previous analyses were performed by Golder[3] to back calculate, test, and develop shear strength parameters for the native greenstone at the site. These investigations and analyses determined the characteristics of the greenstone vary across the site with poorer quality greenstone generally observed in the northern portion of the quarry and better-quality rock located along the southern and southeastern portions of the site. The best geologic analog for the Rock Pile area is the nearby southern quarry rim which is located about 1500 feet west-northwest of the Rock Pile. The two areas are on trend with respect to the structural fabric of the quarry, and it is our opinion that they likely are underlain by the same general package of Franciscan bedrock comprised of a mixture of metabasalt and graywacke with associated interlayered limestone blocks.

Golder performed a detailed investigation and analyses of the south quarry area for the purpose of final pitslope design in 2008. The results of this work are included as Chapter 9 of our geotechnical report published in support of the updated 2011 Reclamation Plan. Four coreholes were installed in the south quarry rim and approximately 1500 feet of core were recovered and analyzed. Rock mass properties used for the pitslope design were developed from geotechnical core logging, point load testing, and laboratory testing of the core. Mohr-Coulomb strengths for the rock units were estimated from Hoek-Brown strengths using the computer program RocData, by Rocscience. Based on this previous work, Golder assumed the metabasalt/greenstone unit has a unit weight of 165 pounds per cubic foot (pcf) with 45 psi cohesion and an effective friction angle (Φ') of 30 degrees.

4.0 RESULTS

The results of slope stability analyses are summarized in Table 2 and relevant model outputs are provided as Attachment 1.

[3] Golder Associates Inc. 2011. Geotechnical Evaluations and Design Recommendations (Revised), Permanente Quarry Reclamation Plan Update, Santa Clara County, California. December 2011.

Table 2: Summary of Slope Stability Analyses

Case	Failure Mode	FOS	
		Hypothetical Dry Conditions	Assumed Phreatic Surface
1 – Existing Conditions	Upper Slope	1.13	1.13
	Lower Slope	1.15	1.15
	Global	1.37	1.37
2 – Excavate Rockpile	Local (Upper Slope)	2.09	1.98
	Global	2.32	2.05
3 – Excavate to Upper Limit of Finished Grade	Local (Upper Slope)	2.09	1.97
	Lower Slope	5.58	5.13
	Global	2.14	1.87
4 – Excavation to Lower Limit of Finished Grade	Local (Upper Slope)	2.09	1.98
	Lower Slope	4.92	4.37
	Global	2.13	1.83

5.0 CONCLUSIONS AND CONSIDERATIONS

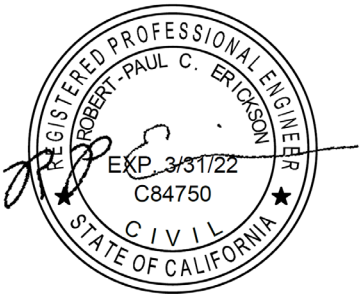
The results of the analyses presented here indicate the proposed excavation of the existing rockpile as well as excavation to both the upper and lower limits of the finished subgrade of the creek per the Restoration Plan will exceed a static FOS of 1.8. These conclusions are based on the interpreted extent of the native metabasalt/greenstone beneath the rockpile as described in the Restoration Plan, the condition (and corresponding geotechnical parameters) of the native metabasalt/greenstone Golder assumed for the analyses, and the phreatic surface Golder assumed for the analyses.

As outlined in our response to comments, and our previous documents published in support of the Permanente Creek Restoration Plan, a qualified professional engineer or geologist is required to inspect and map the native bedrock that is exposed beneath the rockpile overburden to confirm, or modify, the assumptions made to perform these analyses. If the observed conditions are different than those assumed here, additional analyses may be required.

6.0 CLOSING

Please contact the undersigned if you have questions or require clarifications regarding the information provided in this memorandum.

Golder Associates Inc.



Robert Paul C. Erickson, PE
Senior Consultant
RPCE/WLF/rpce

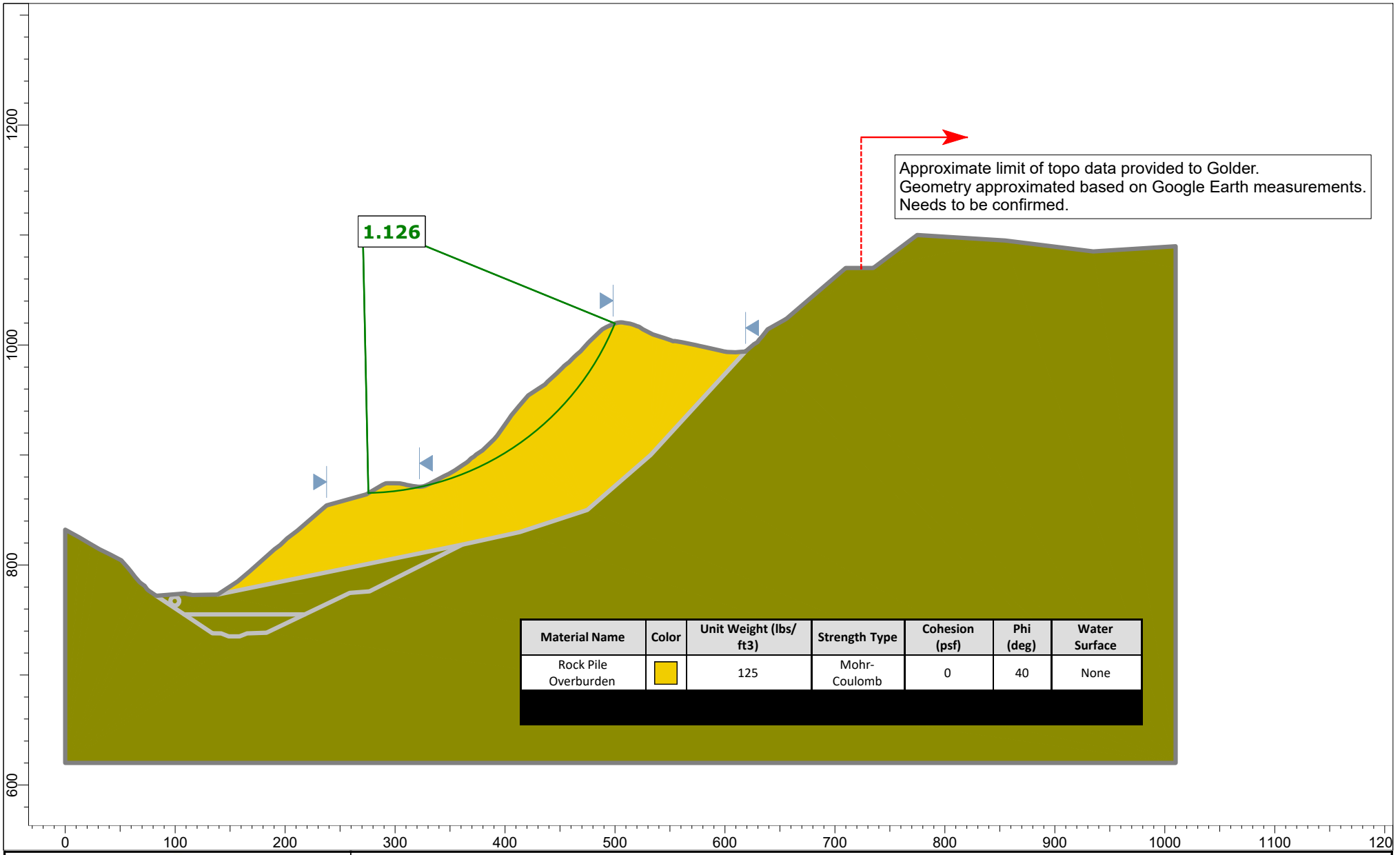
William L. Fowler, PG, CEG
Principal Engineering Geologist

Attachments: Attachment 1 – Slope Stability Analyses Model Outputs

https://golderassociates.sharepoint.com/sites/0637109940-lehighpermgwmonitoring-ca/shared documents/creek restoration/lehigh permanente creek restoration slope stability memo - 20210722.docx

ATTACHMENT 1

Slope Stability Analyses Model Outputs

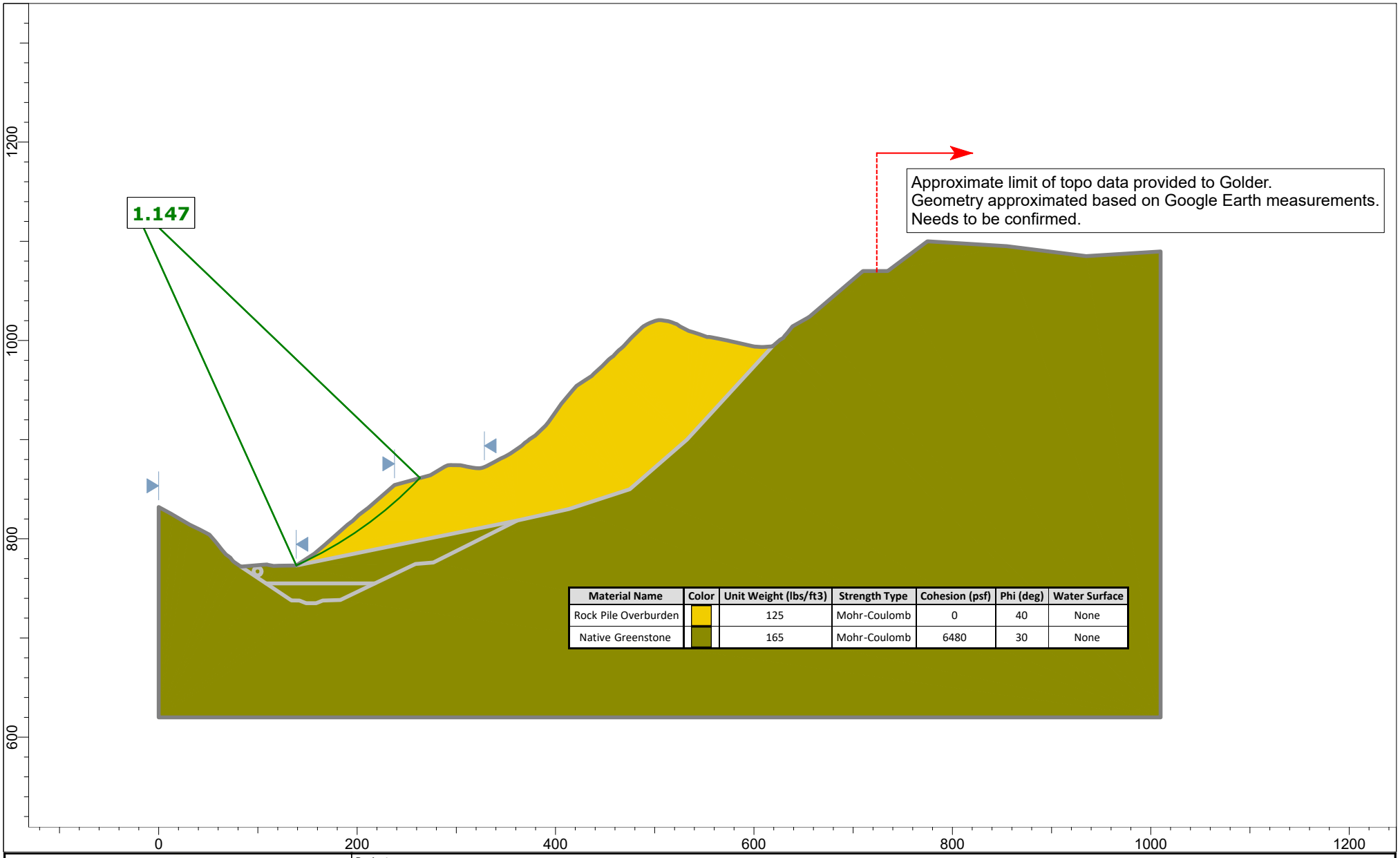


Material Name	Color	Unit Weight (lbs/ ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface
Rock Pile Overburden		125	Mohr-Coulomb	0	40	None

GOLDER

SLIDEINTERPRET 9.012

Project SLIDE - An Interactive Slope Stability Program		
Analysis Description		
Drawn By	*Scale* 1:1444	*Company*
Date 7/9/2021, 4:25:49 PM		*File Name* Section C-C'_20210715.slmd

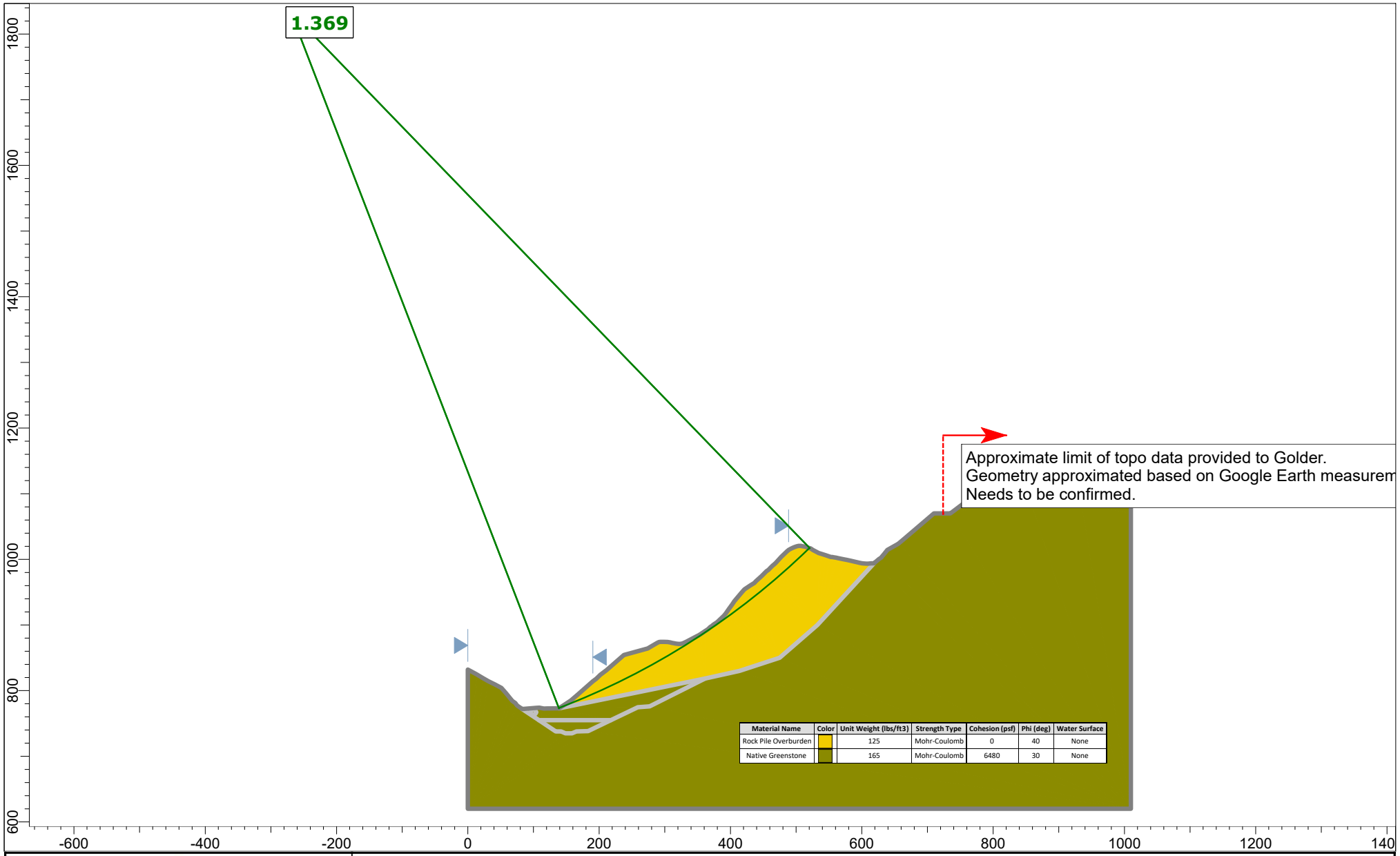


Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface
Rock Pile Overburden		125	Mohr-Coulomb	0	40	None
Native Greenstone		165	Mohr-Coulomb	6480	30	None

GOLDER

SLIDEINTERPRET 9.012

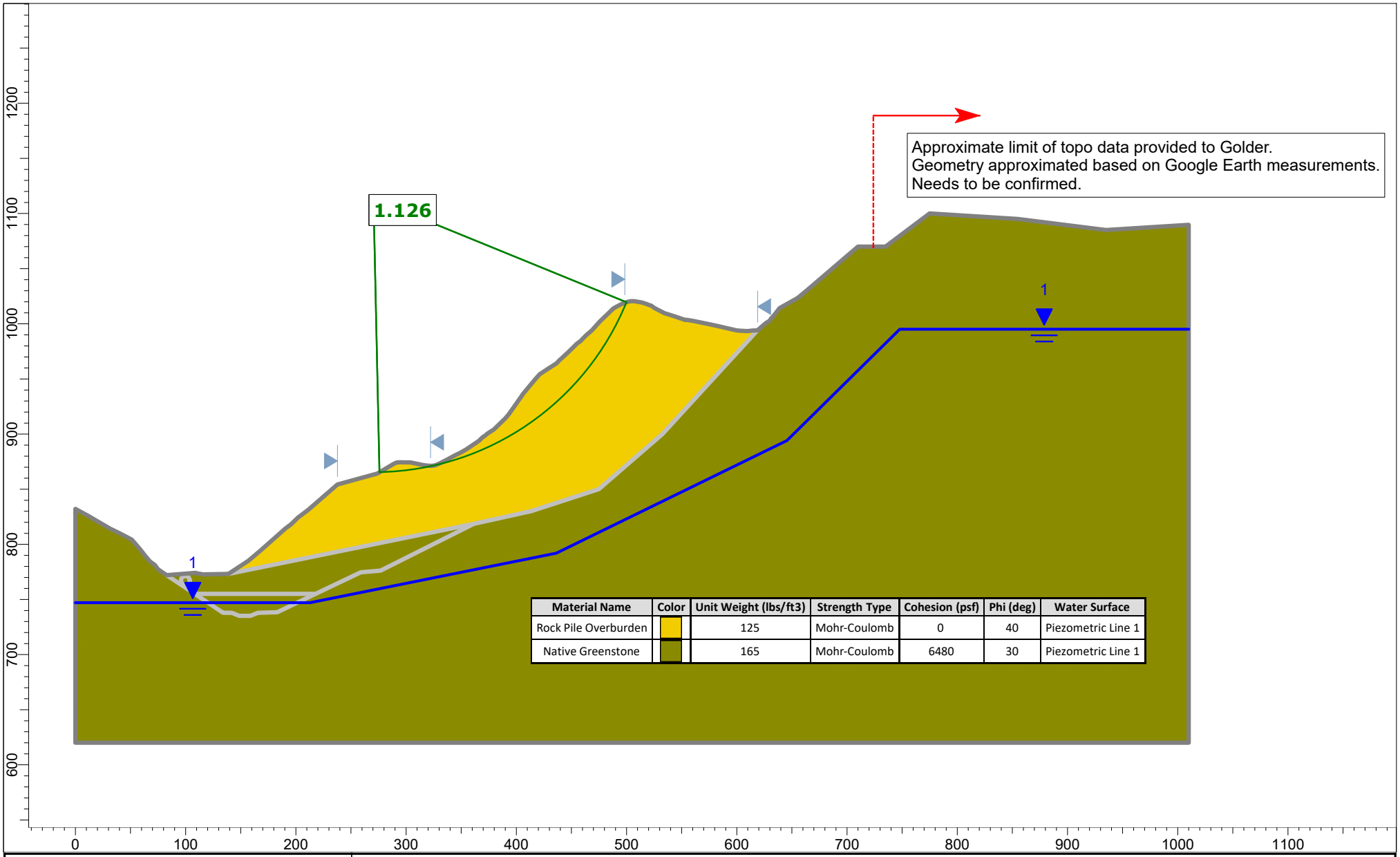
Project	SLIDE - An Interactive Slope Stability Program		
Analysis Description			
Drawn By		*Scale* 1:1605	*Company*
Date	7/9/2021, 4:25:49 PM		*File Name* Section C-C'_20210715.slmd



GOLDER

SLIDEINTERPRET 9.012

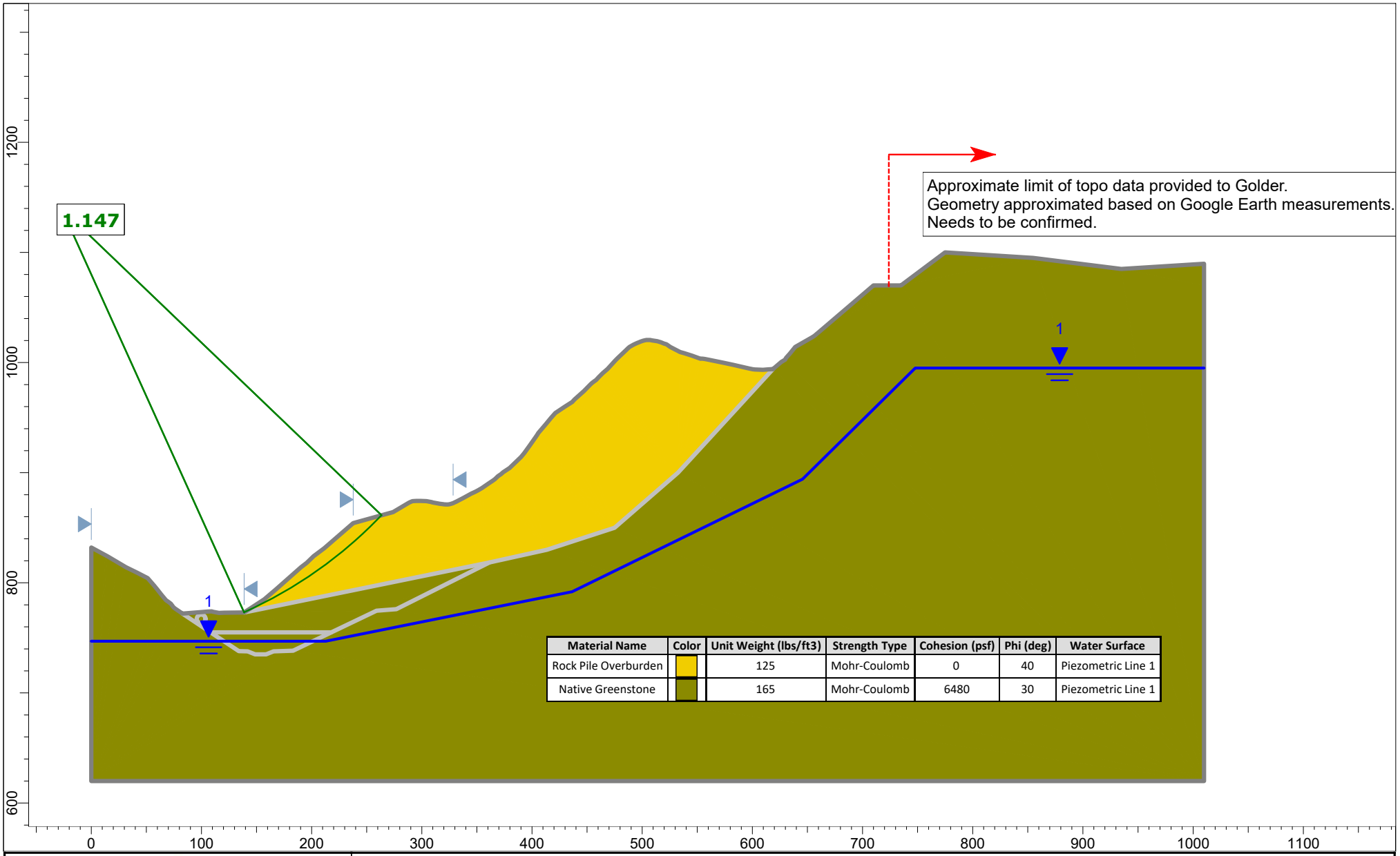
Project	SLIDE - An Interactive Slope Stability Program	
Analysis Description		
Drawn By	*Scale* 1:2423	*Company*
Date 7/9/2021, 4:25:49 PM		*File Name* Section C-C'_20210715.slmd



GOLDER

SLIDEINTERPRET 9.012

Project	SLIDE - An Interactive Slope Stability Program		
Analysis Description			
Drawn By		*Scale* 1:1444	*Company*
Date	7/9/2021, 4:25:49 PM		*File Name* Section C-C'_20210715.slmd

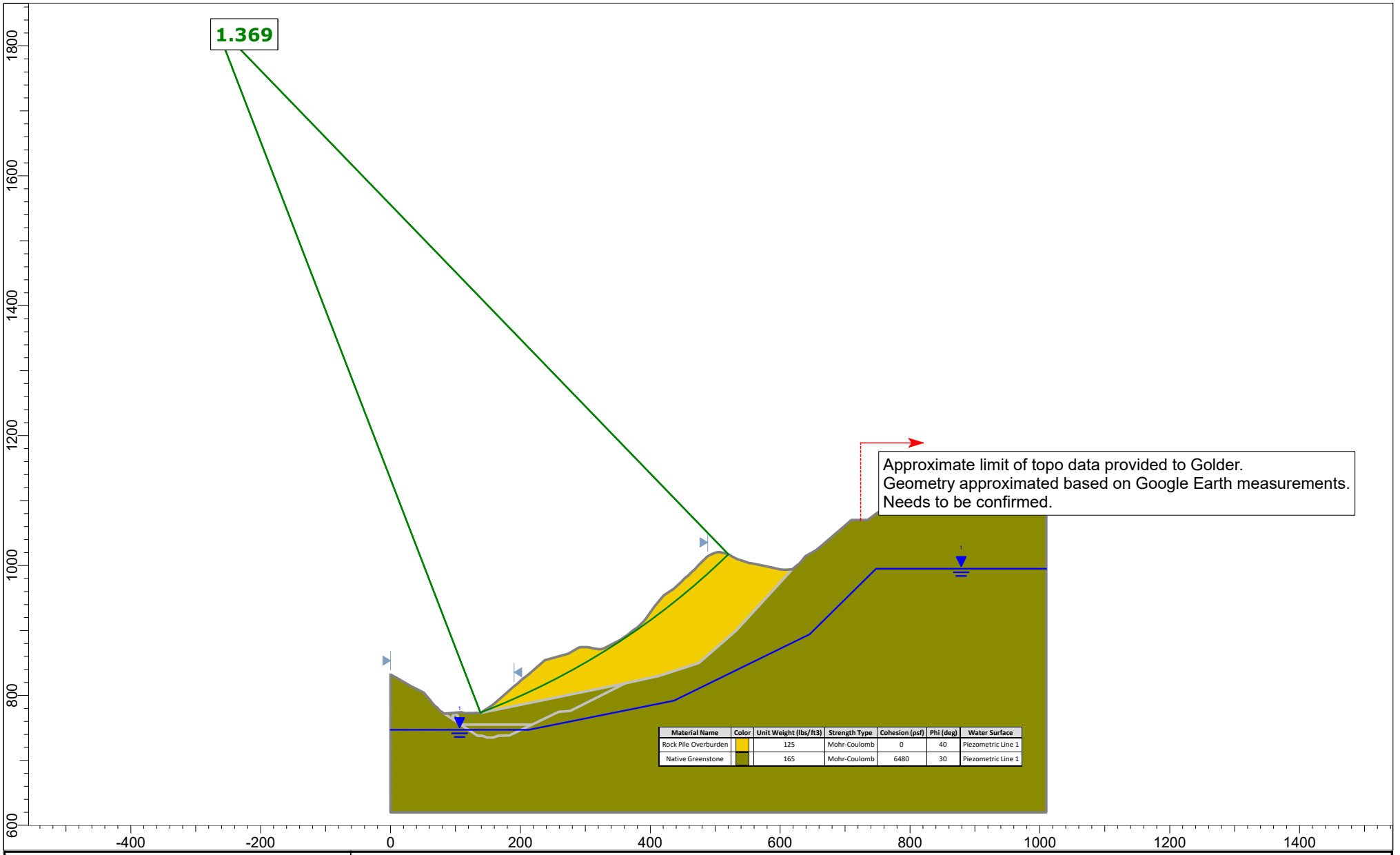


Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface
Rock Pile Overburden		125	Mohr-Coulomb	0	40	Piezometric Line 1
Native Greenstone		165	Mohr-Coulomb	6480	30	Piezometric Line 1

GOLDER

SLIDEINTERPRET 9.012

Project SLIDE - An Interactive Slope Stability Program		
Analysis Description		
Drawn By	*Scale* 1:1444	*Company*
Date 7/9/2021, 4:25:49 PM		*File Name* Section C-C'_20210715.slmd

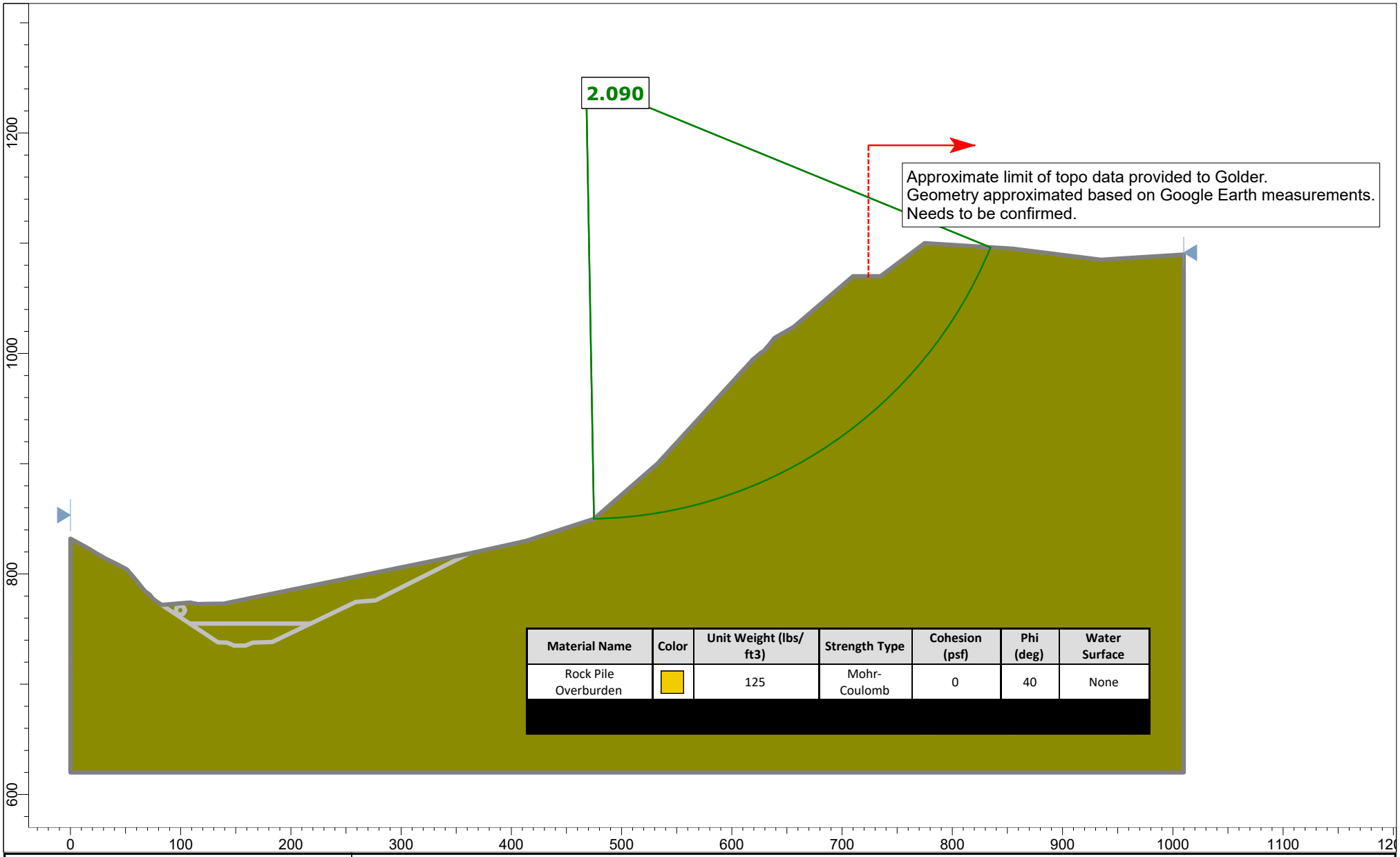


Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface
Rock Pile Overburden		125	Mohr-Coulomb	0	40	Piezometric Line 1
Native Greenstone		165	Mohr-Coulomb	6480	30	Piezometric Line 1

GOLDER

SLIDEINTERPRET 9.012

Project SLIDE - An Interactive Slope Stability Program		
Analysis Description		
Drawn By	*Scale* 1:2446	*Company*
Date 7/9/2021, 4:25:49 PM		*File Name* Section C-C'_20210715.slmd

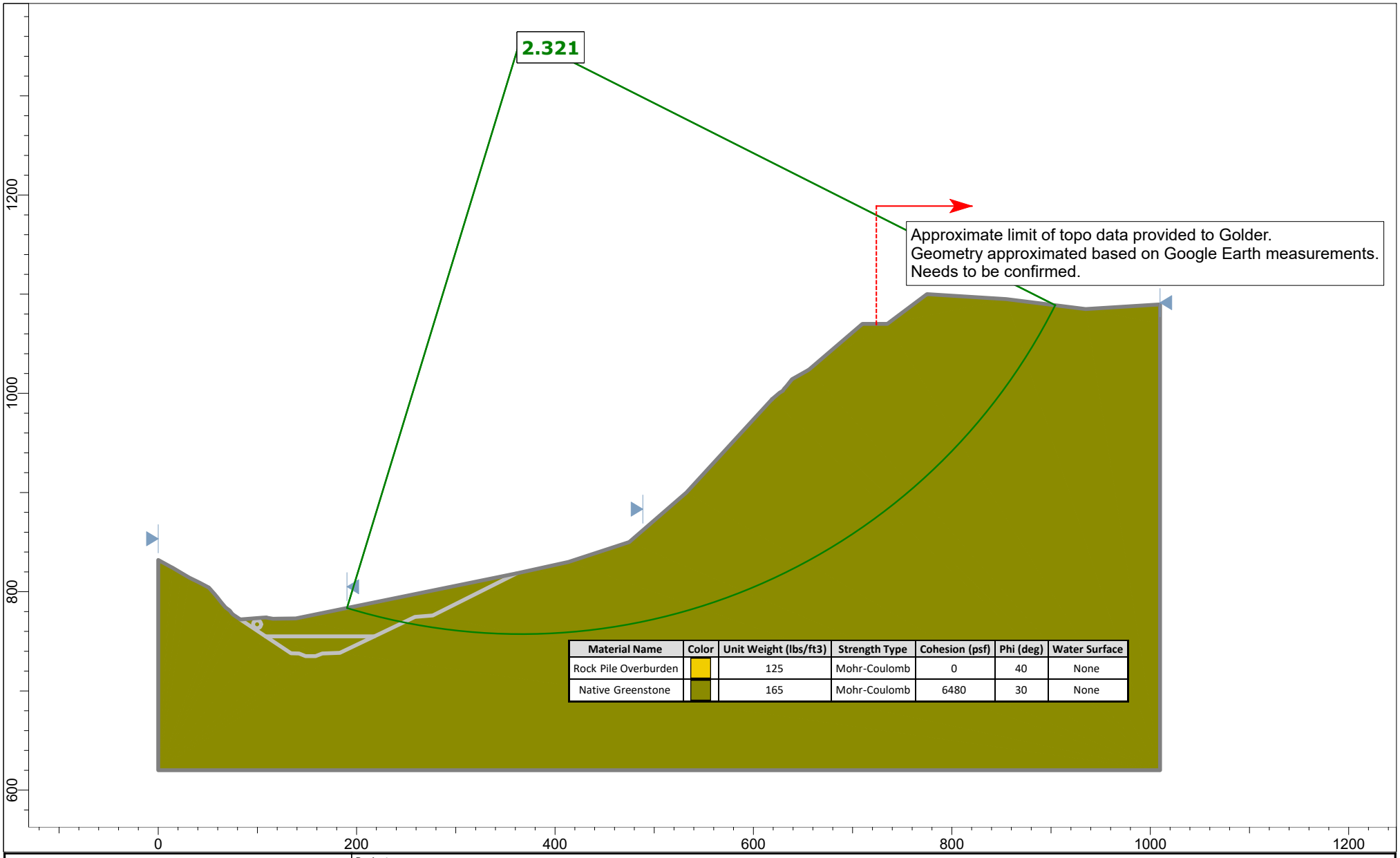


Material Name	Color	Unit Weight (lbs/ ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface
Rock Pile Overburden		125	Mohr-Coulomb	0	40	None

GOLDER

SLIDEINTERPRET 9.012

Project	SLIDE - An Interactive Slope Stability Program		
Analysis Description			
Drawn By		*Scale* 1:1444	*Company*
Date	7/9/2021, 4:25:49 PM		*File Name* Section C-C'_20210715.slmd

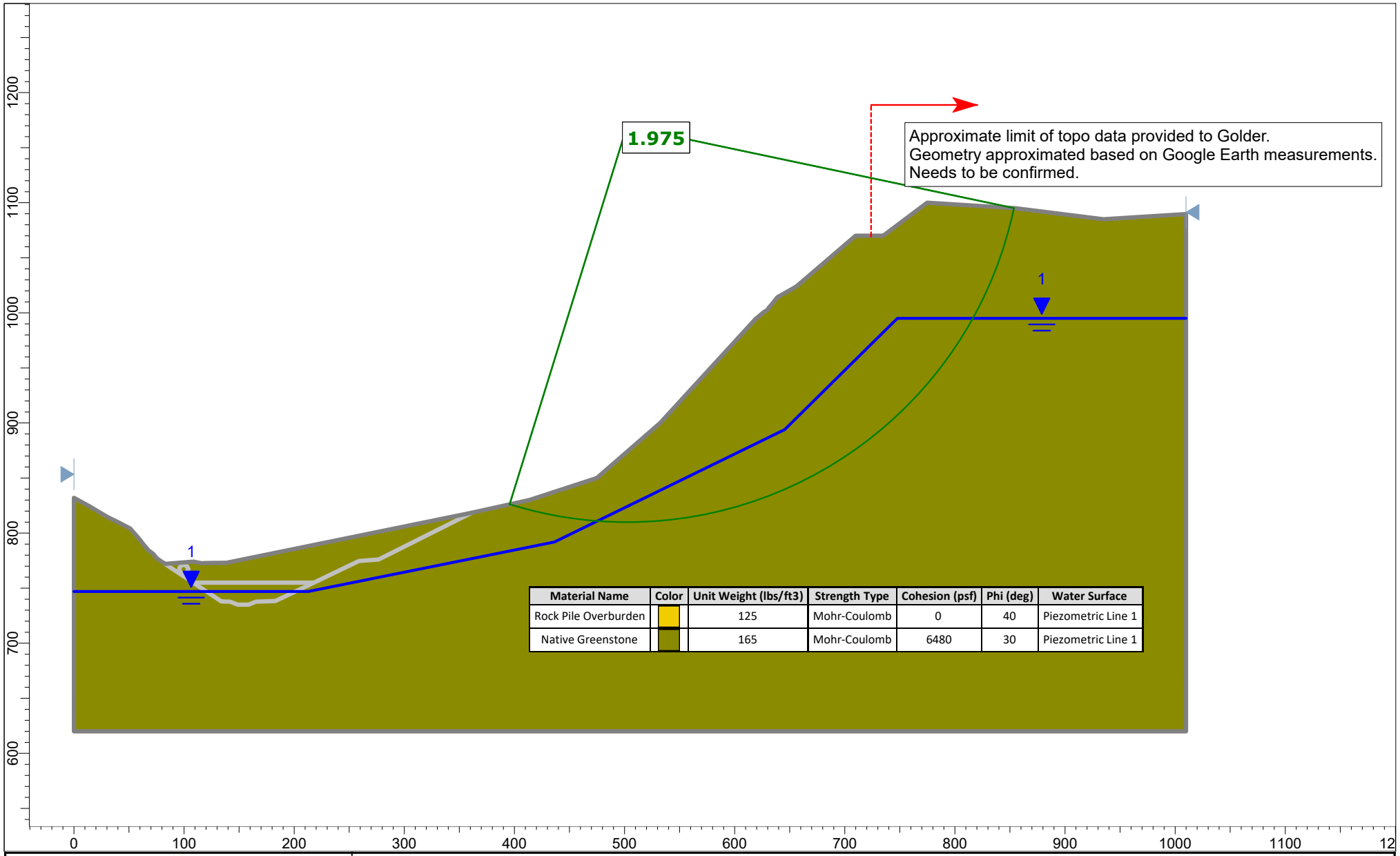


Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface
Rock Pile Overburden		125	Mohr-Coulomb	0	40	None
Native Greenstone		165	Mohr-Coulomb	6480	30	None

GOLDER

SLIDEINTERPRET 9.012

Project SLIDE - An Interactive Slope Stability Program		
Analysis Description		
Drawn By	*Scale* 1:1605	*Company*
Date 7/9/2021, 4:25:49 PM		*File Name* Section C-C'_20210715.slmd

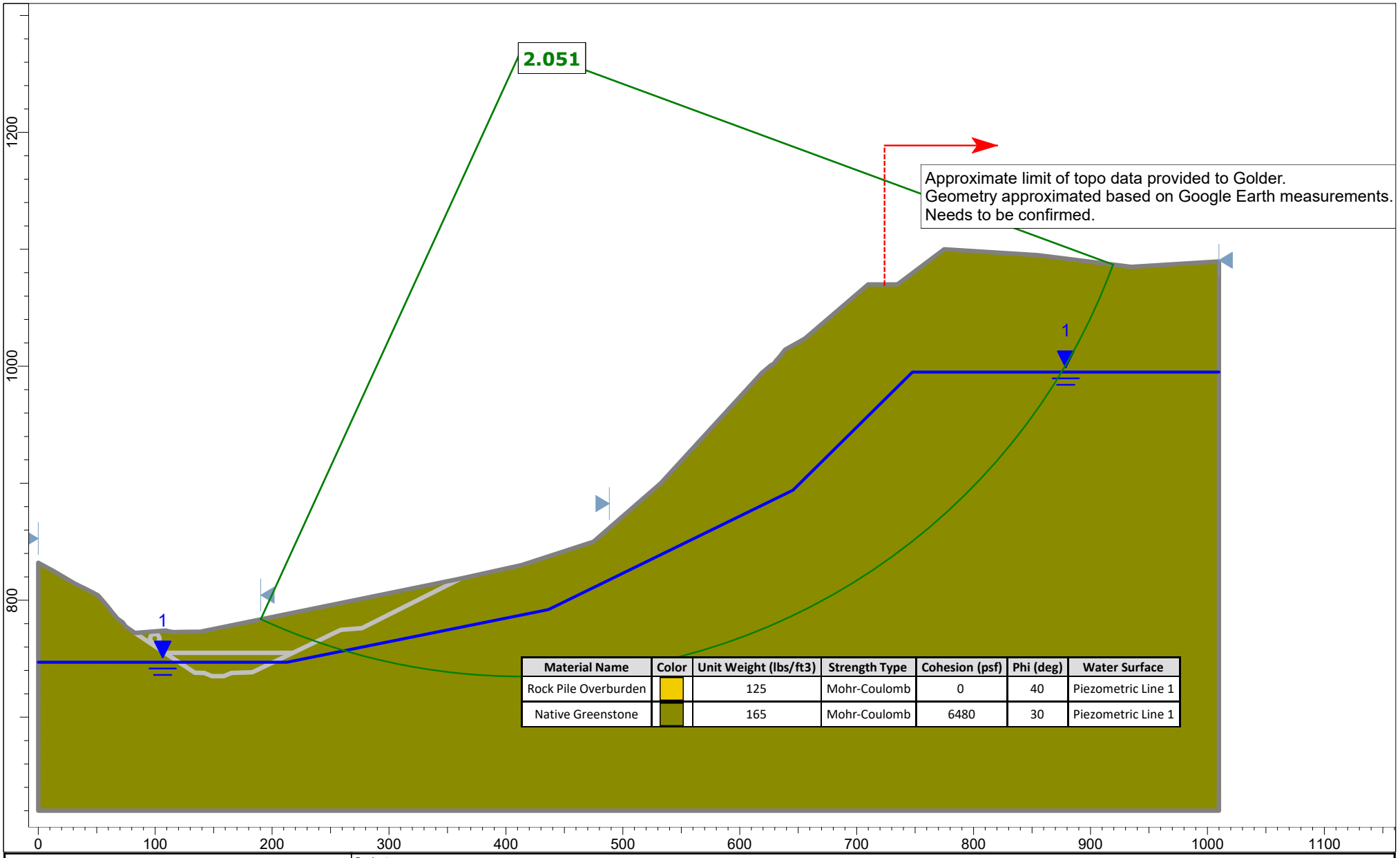


Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface
Rock Pile Overburden		125	Mohr-Coulomb	0	40	Piezometric Line 1
Native Greenstone		165	Mohr-Coulomb	6480	30	Piezometric Line 1

GOLDER

SLIDEINTERPRET 9.012

Project SLIDE - An Interactive Slope Stability Program		
Analysis Description		
Drawn By	*Scale* 1:1444	*Company*
Date 7/9/2021, 4:25:49 PM		*File Name* Section C-C'_20210715.slmd

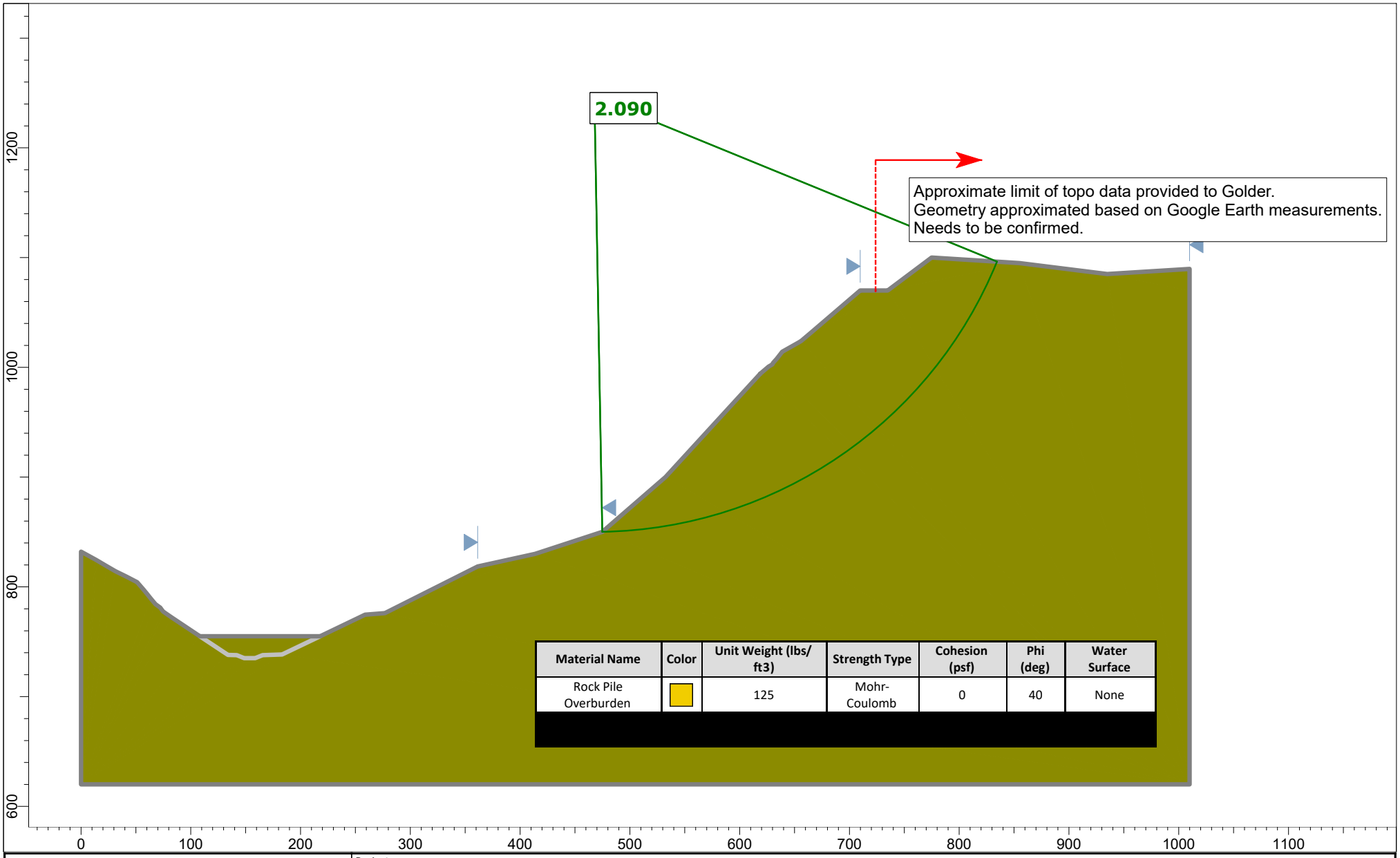


Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface
Rock Pile Overburden		125	Mohr-Coulomb	0	40	Piezometric Line 1
Native Greenstone		165	Mohr-Coulomb	6480	30	Piezometric Line 1

GOLDER

SLIDEINTERPRET 9.012

Project	SLIDE - An Interactive Slope Stability Program		
Analysis Description			
Drawn By		*Scale* 1:1361	*Company*
Date	7/9/2021, 4:25:49 PM		*File Name* Section C-C'_20210715.slmd

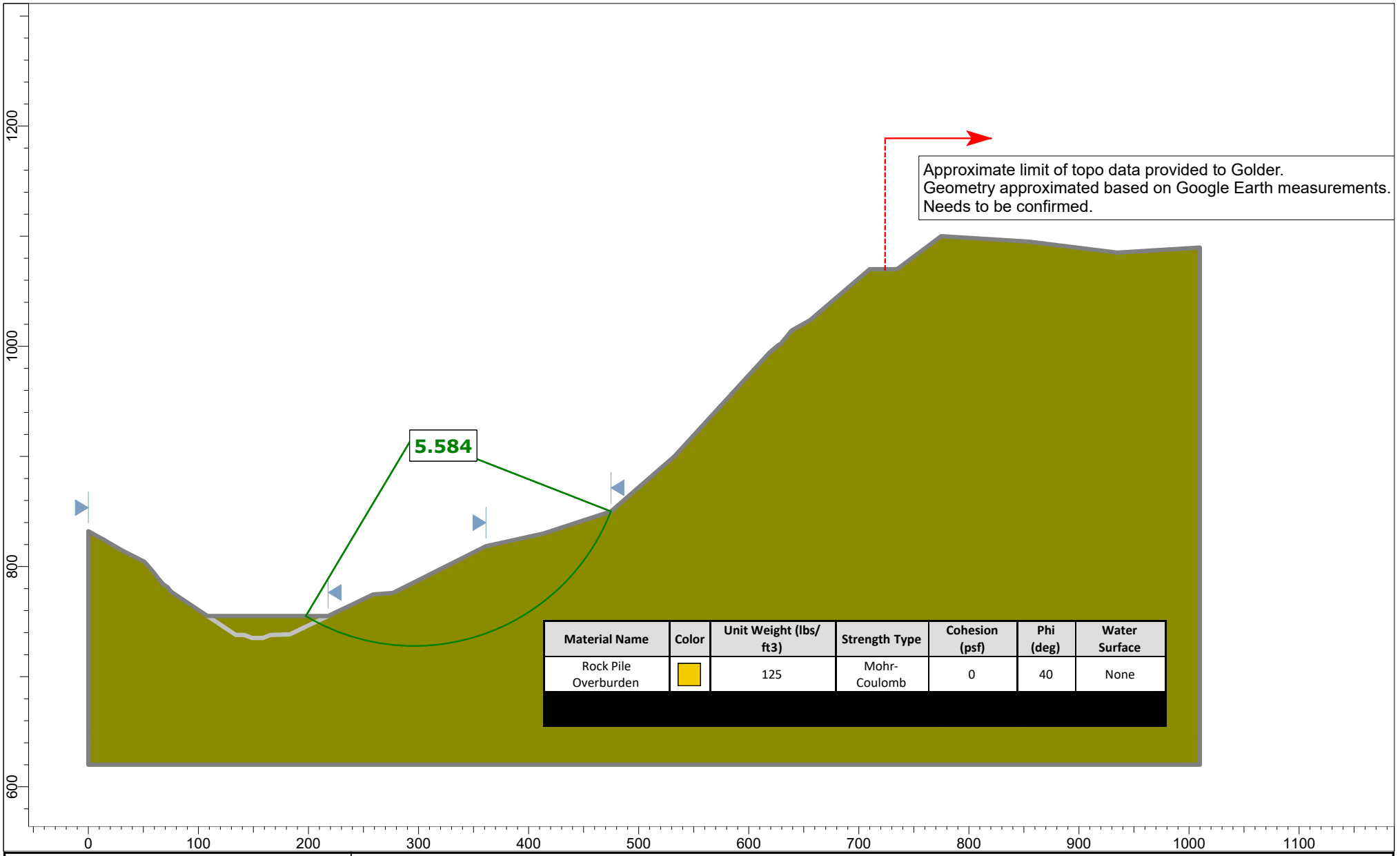


Material Name	Color	Unit Weight (lbs/ ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface
Rock Pile Overburden		125	Mohr-Coulomb	0	40	None

GOLDER

SLIDEINTERPRET 9.012

Project SLIDE - An Interactive Slope Stability Program		
Analysis Description		
Drawn By	*Scale* 1:1450	*Company*
Date 7/9/2021, 4:25:49 PM		*File Name* Section C-C'_20210715.slmd

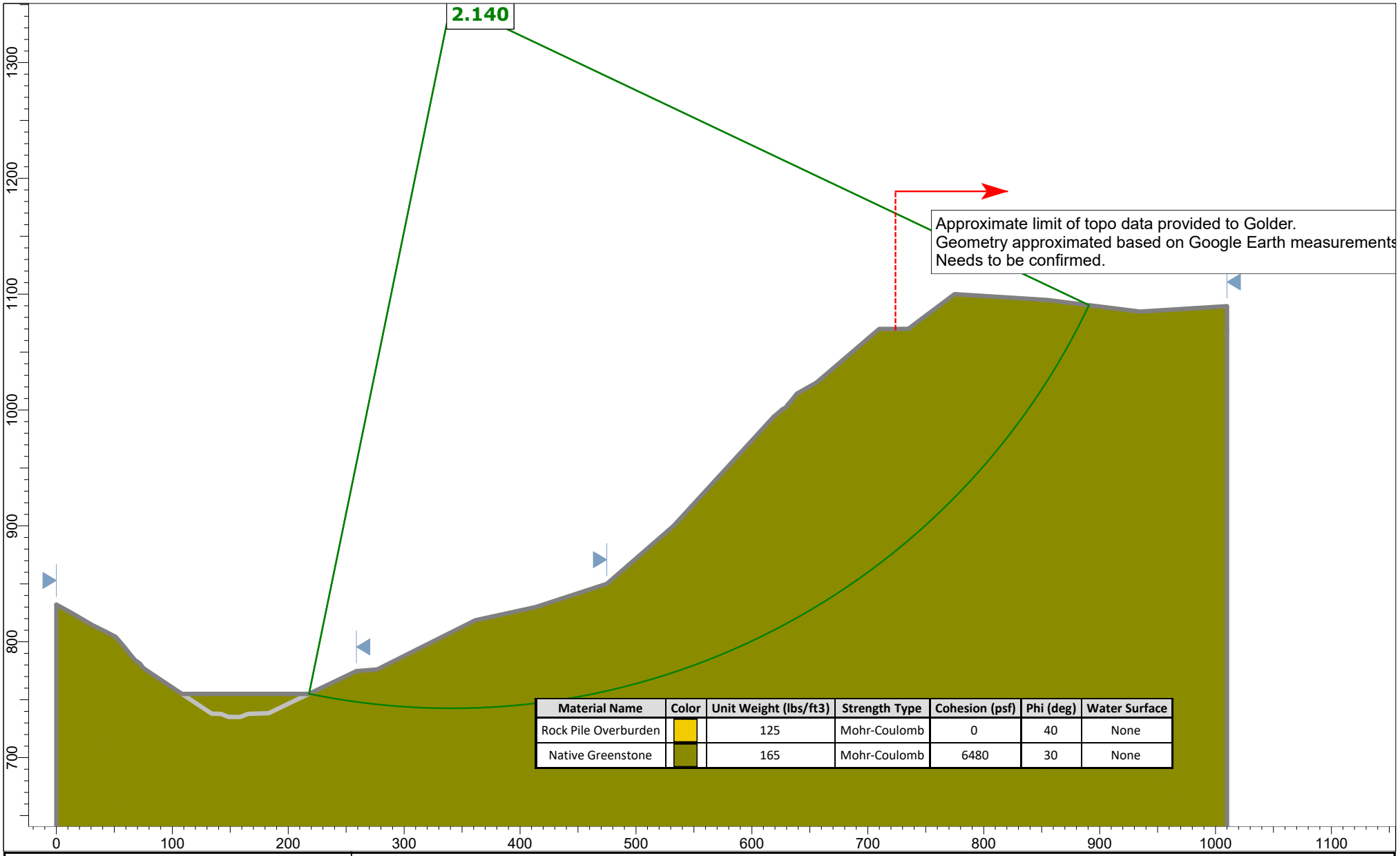


Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface
Rock Pile Overburden		125	Mohr-Coulomb	0	40	None

GOLDER

SLIDEINTERPRET 9.012

Project	SLIDE - An Interactive Slope Stability Program		
Analysis Description			
Drawn By		*Scale* 1:1444	*Company*
Date	7/9/2021, 4:25:49 PM		*File Name* Section C-C'_20210715.slmd

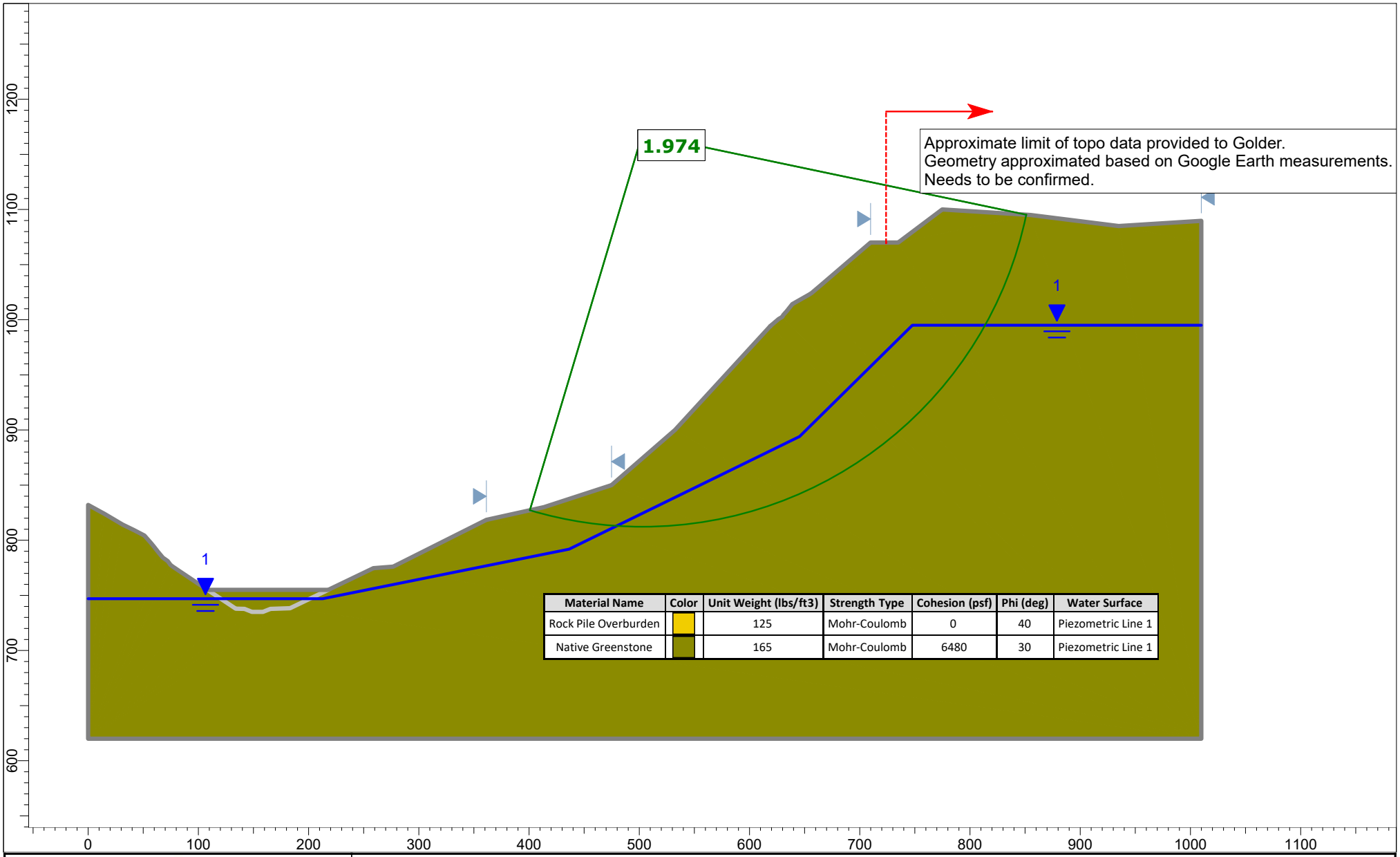


Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface
Rock Pile Overburden		125	Mohr-Coulomb	0	40	None
Native Greenstone		165	Mohr-Coulomb	6480	30	None

GOLDER

SLIDEINTERPRET 9.012

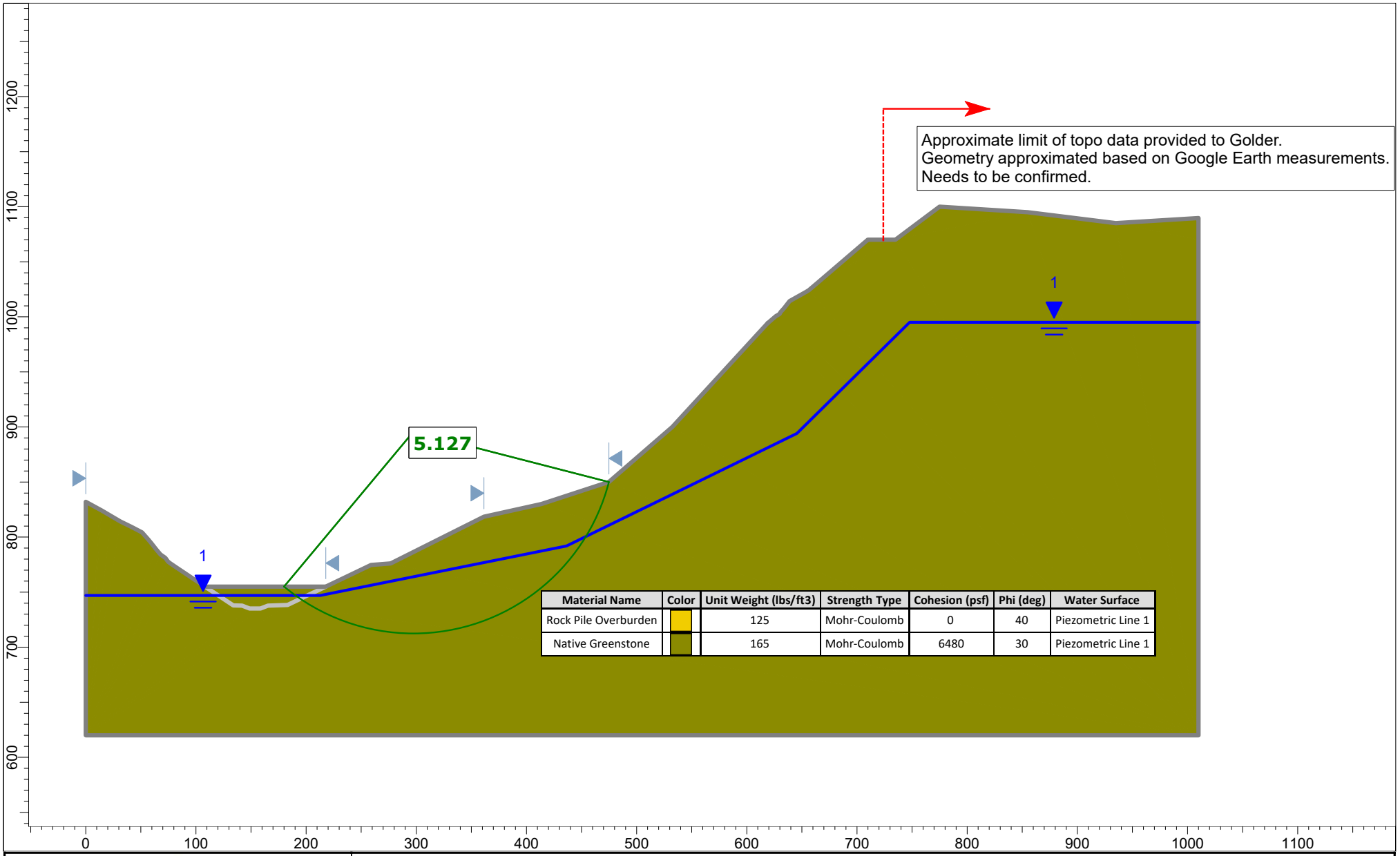
Project	SLIDE - An Interactive Slope Stability Program		
Analysis Description			
Drawn By		*Scale* 1:1373	*Company*
Date	7/9/2021, 4:25:49 PM		*File Name* Section C-C'_20210715.slmd



GOLDER

SLIDEINTERPRET 9.012

Project	SLIDE - An Interactive Slope Stability Program		
Analysis Description			
Drawn By		*Scale* 1:1444	*Company*
Date	7/9/2021, 4:25:49 PM		*File Name* Section C-C'_20210715.slmd

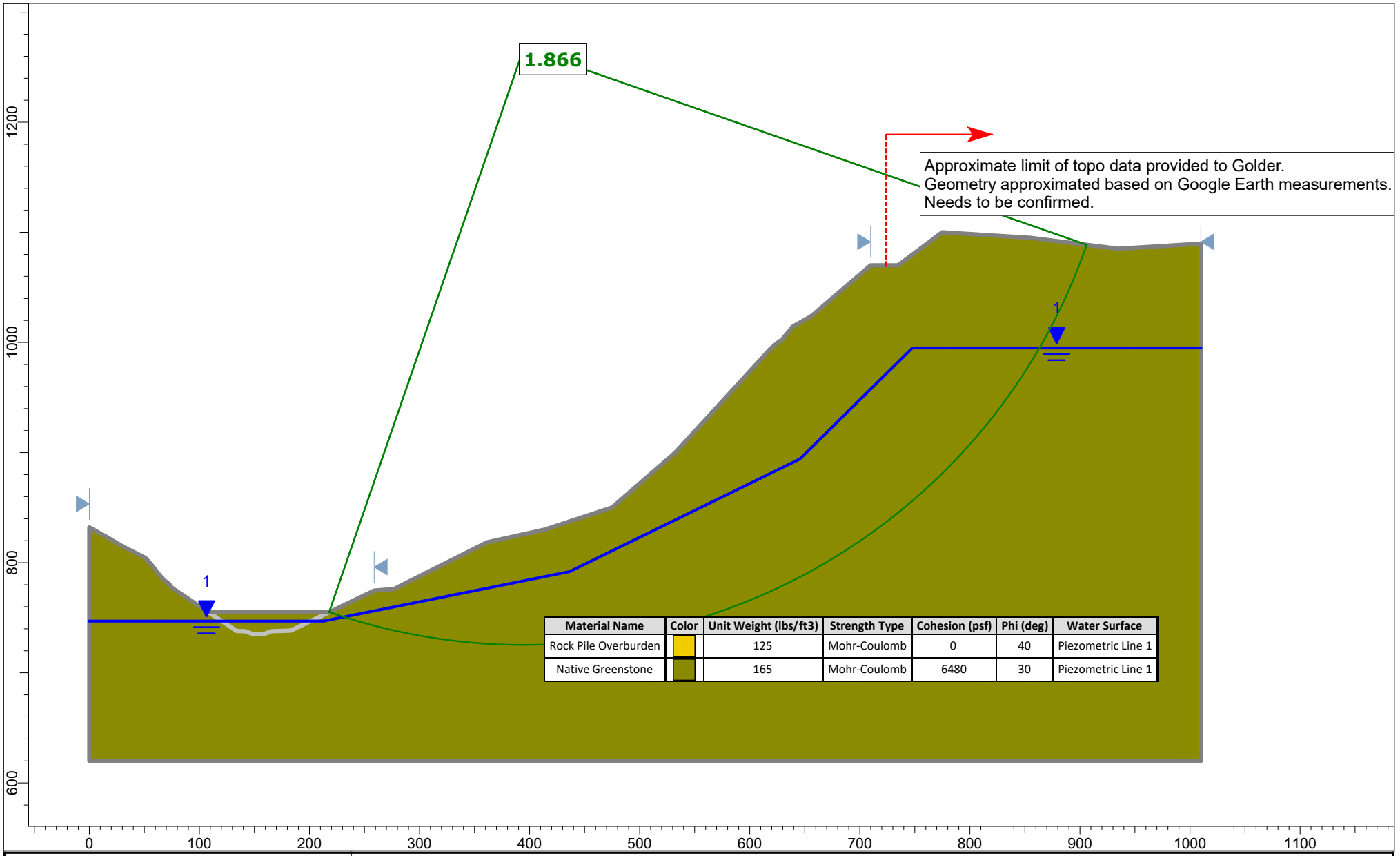


Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface
Rock Pile Overburden		125	Mohr-Coulomb	0	40	Piezometric Line 1
Native Greenstone		165	Mohr-Coulomb	6480	30	Piezometric Line 1

GOLDER

SLIDEINTERPRET 9.012

Project	SLIDE - An Interactive Slope Stability Program		
Analysis Description			
Drawn By		*Scale* 1:1444	*Company*
Date	7/9/2021, 4:25:49 PM	*File Name*	Section C-C'_20210715.slmd

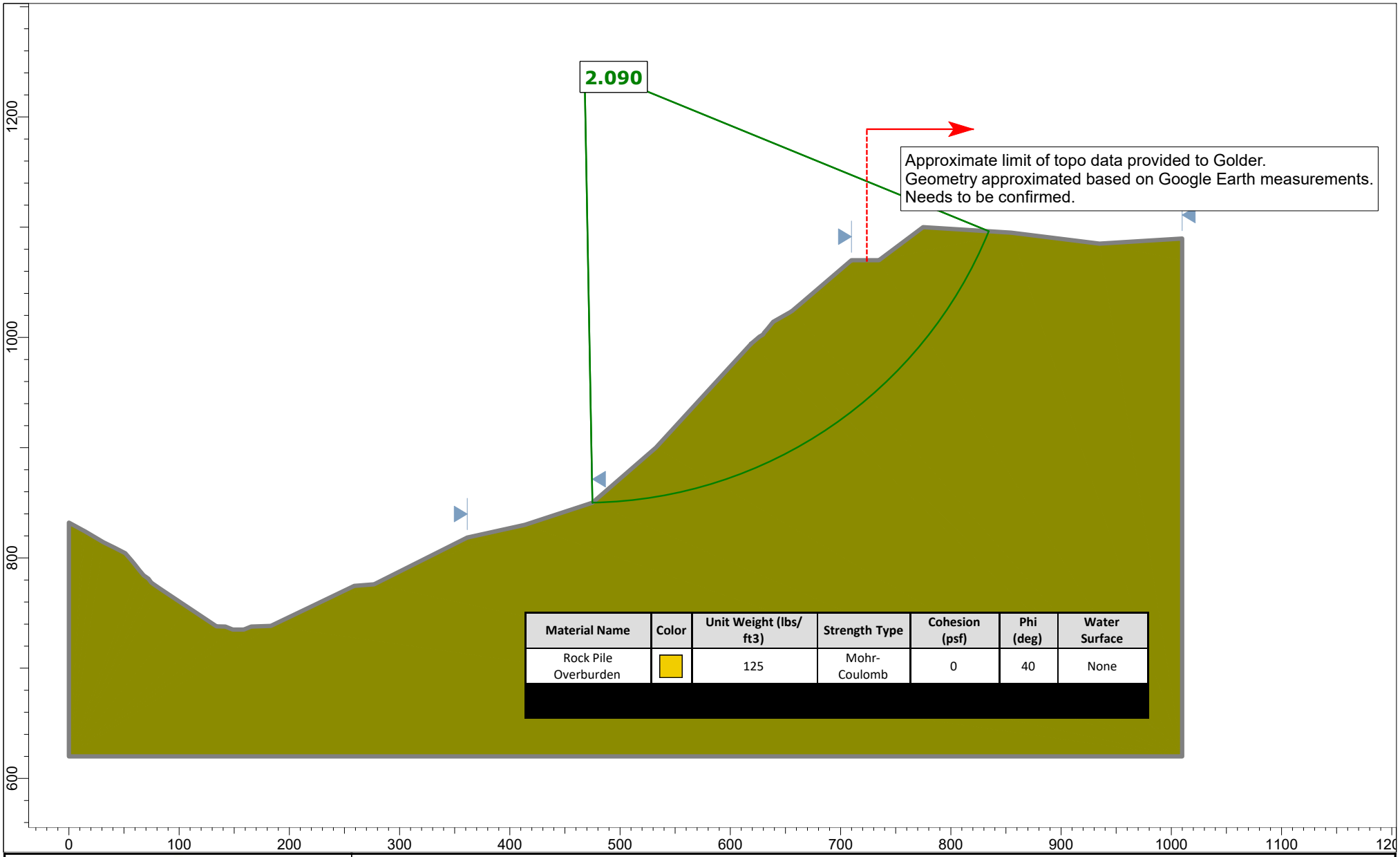


Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface
Rock Pile Overburden		125	Mohr-Coulomb	0	40	Piezometric Line 1
Native Greenstone		165	Mohr-Coulomb	6480	30	Piezometric Line 1

GOLDER

SLIDEINTERPRET 9.012

Project	SLIDE - An Interactive Slope Stability Program		
Analysis Description			
Drawn By		*Scale* 1:1444	*Company*
Date	7/9/2021, 4:25:49 PM		*File Name* Section C-C'_20210715.slmd

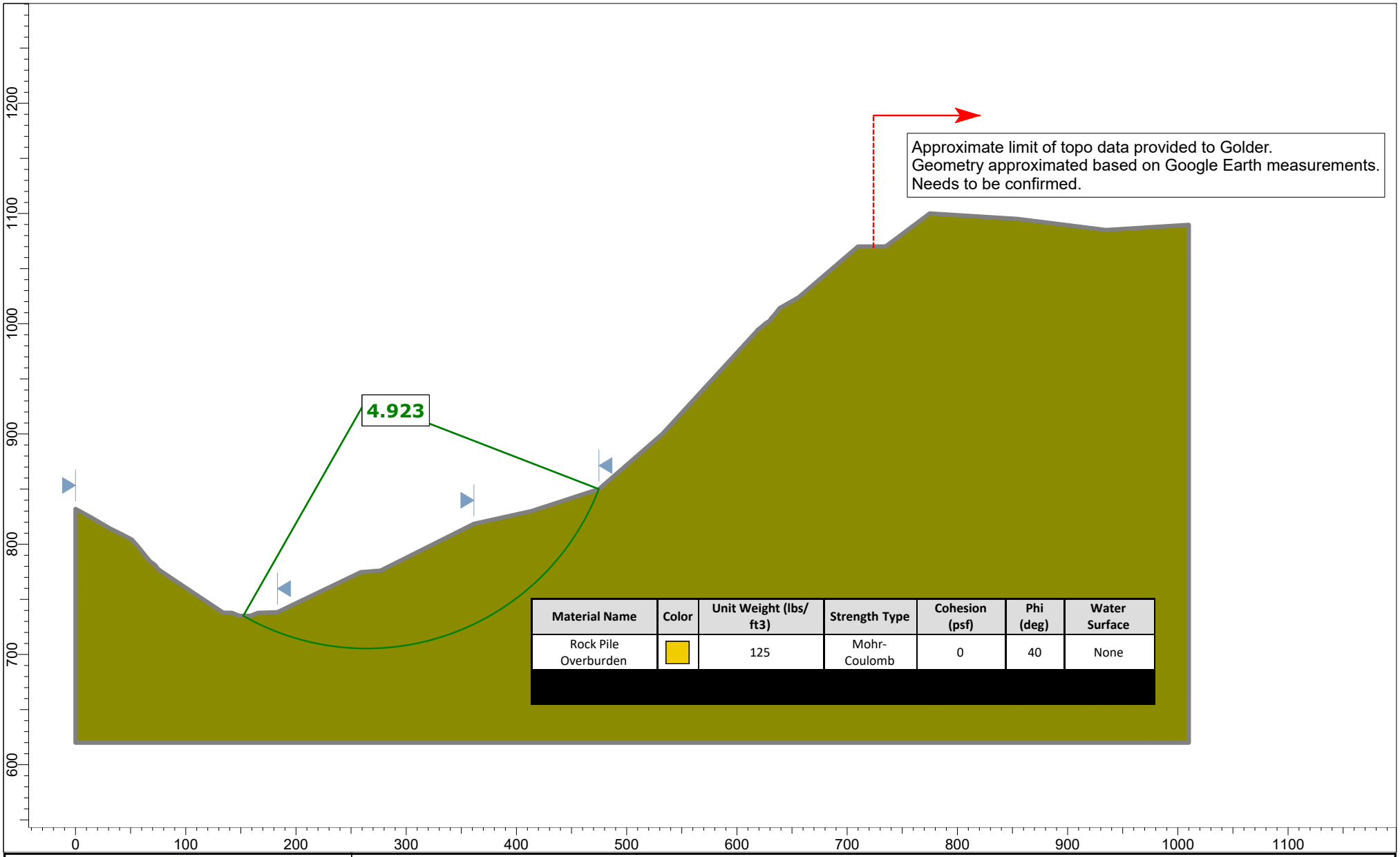


Material Name	Color	Unit Weight (lbs/ ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface
Rock Pile Overburden		125	Mohr-Coulomb	0	40	None

GOLDER

SLIDEINTERPRET 9.012

Project	SLIDE - An Interactive Slope Stability Program		
Analysis Description			
Drawn By		*Scale* 1:1444	*Company*
Date	7/9/2021, 4:25:49 PM		*File Name* Section C-C'_20210715.slmd

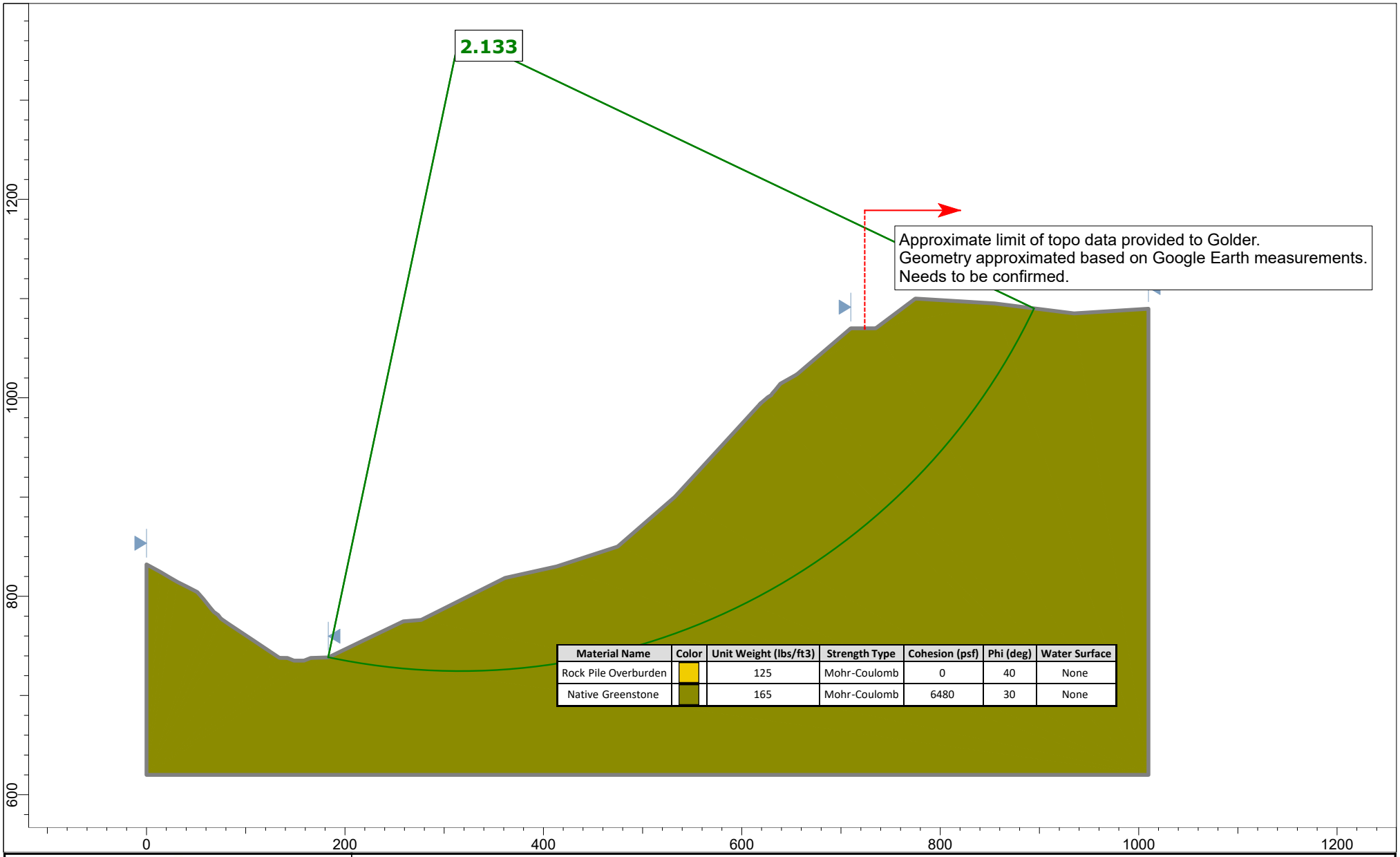


Material Name	Color	Unit Weight (lbs/ ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface
Rock Pile Overburden		125	Mohr-Coulomb	0	40	None

GOLDER

SLIDEINTERPRET 9.012

Project: SLIDE - An Interactive Slope Stability Program		
Analysis Description:		
Drawn By:	Scale: 1:1444	Company:
Date: 7/9/2021, 4:25:49 PM		File Name: Section C-C'_20210715.slmd

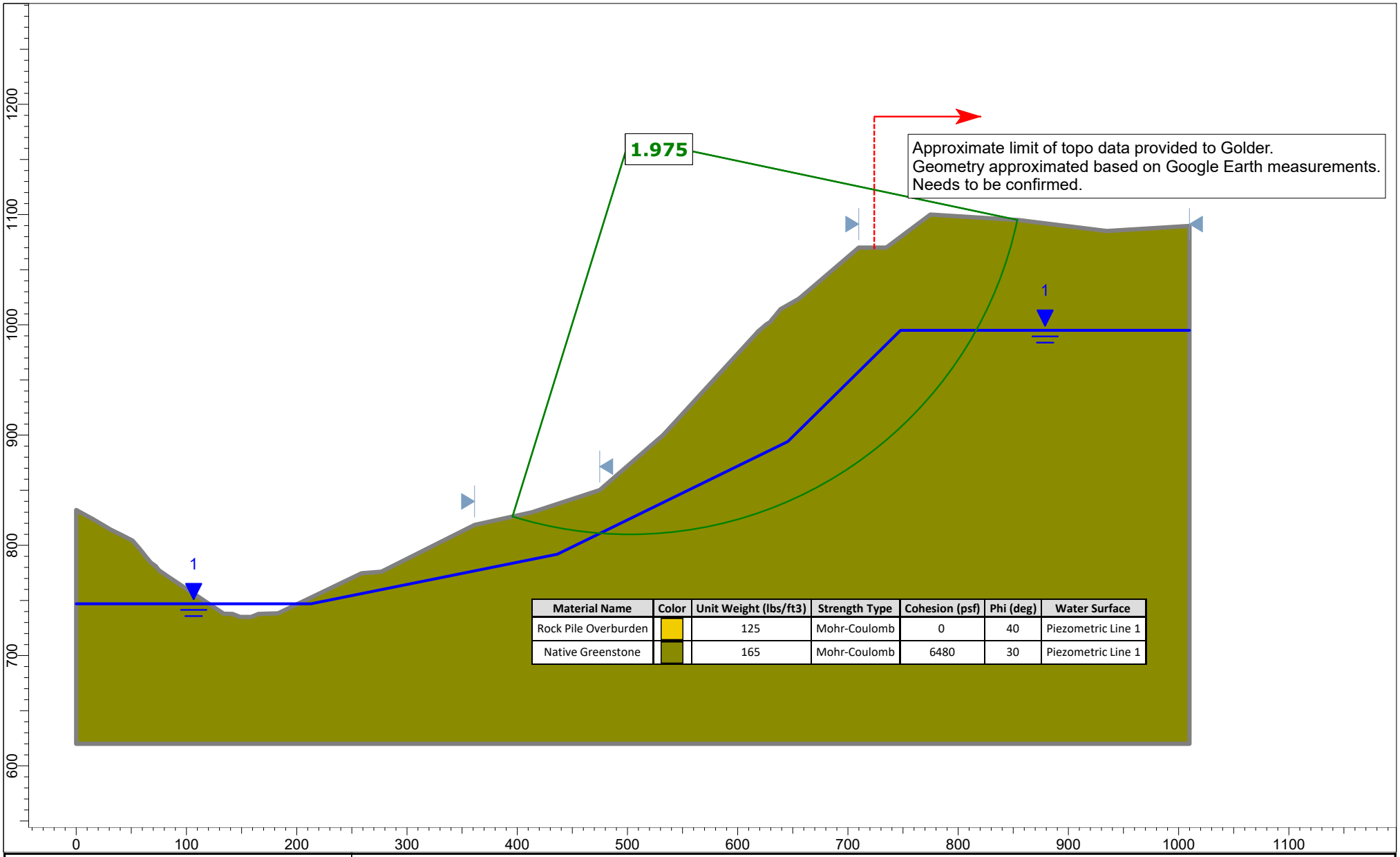


Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface
Rock Pile Overburden		125	Mohr-Coulomb	0	40	None
Native Greenstone		165	Mohr-Coulomb	6480	30	None

GOLDER

SLIDEINTERPRET 9.012

Project	SLIDE - An Interactive Slope Stability Program		
Analysis Description			
Drawn By		Scale 1:1605	Company
Date	7/9/2021, 4:25:49 PM		File Name Section C-C'_20210715.slmd

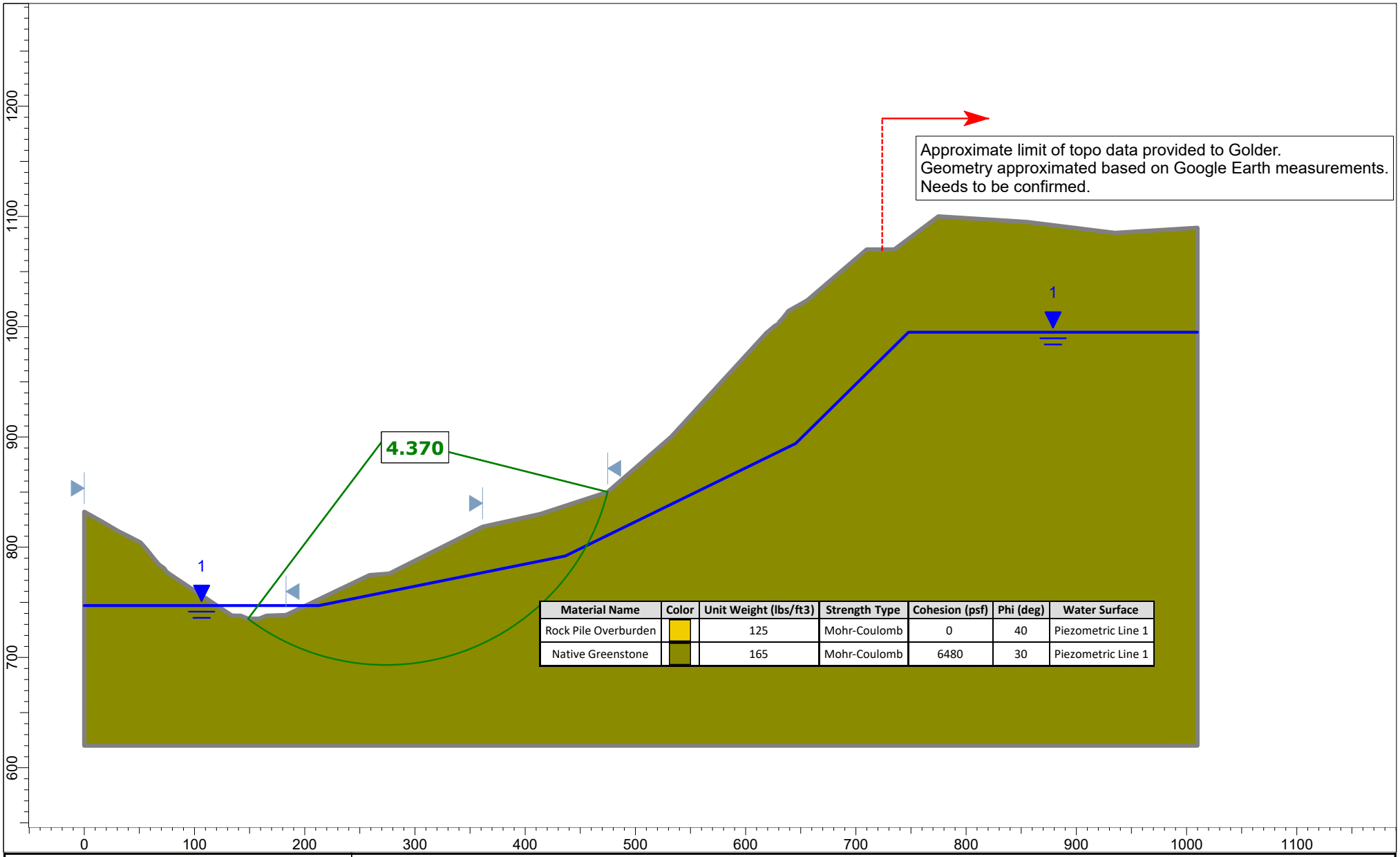


Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface
Rock Pile Overburden		125	Mohr-Coulomb	0	40	Piezometric Line 1
Native Greenstone		165	Mohr-Coulomb	6480	30	Piezometric Line 1

GOLDER

SLIDEINTERPRET 9.012

Project SLIDE - An Interactive Slope Stability Program		
Analysis Description		
Drawn By	*Scale* 1:1444	*Company*
Date 7/9/2021, 4:25:49 PM		*File Name* Section C-C'_20210715.slmd

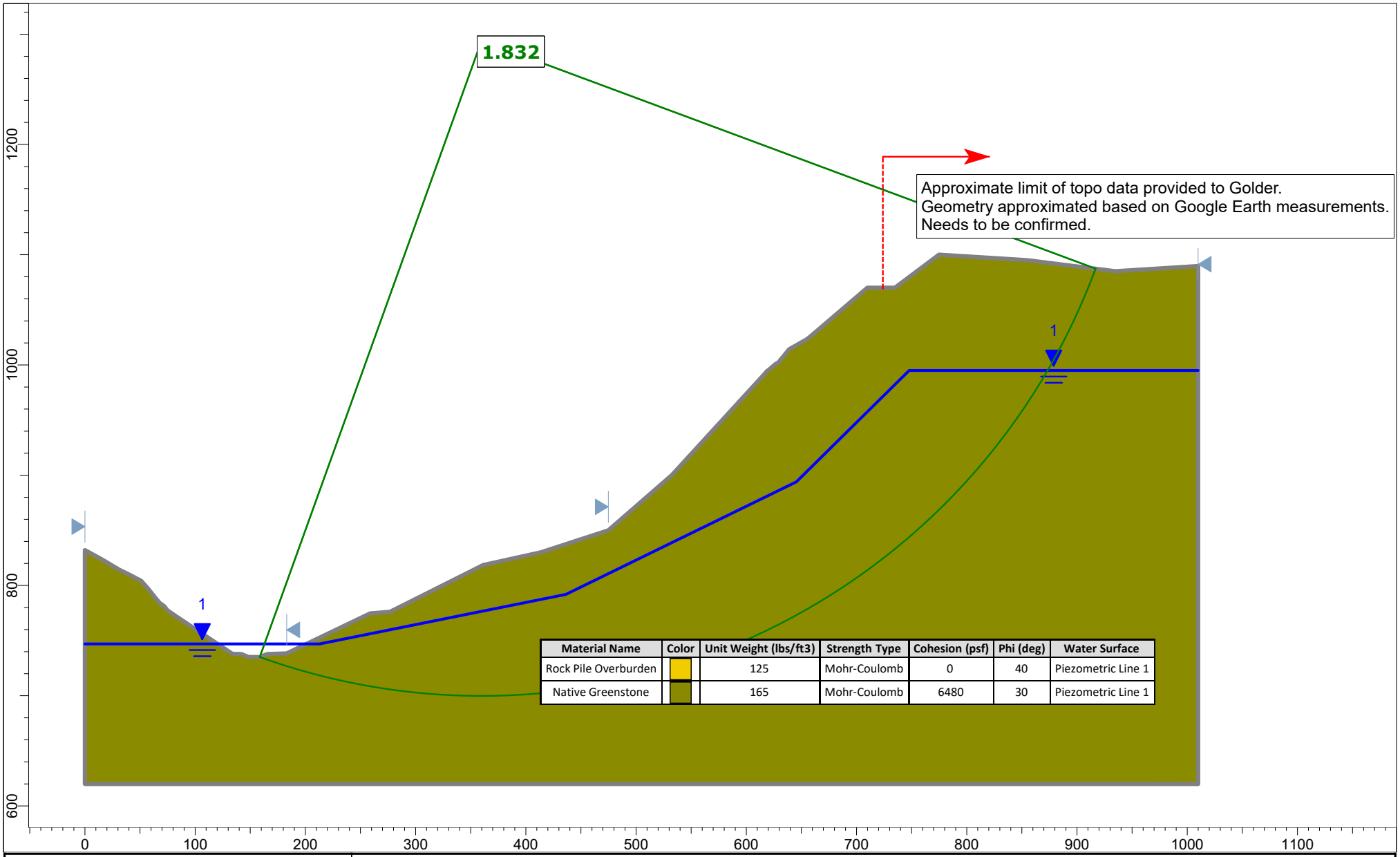


Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface
Rock Pile Overburden		125	Mohr-Coulomb	0	40	Piezometric Line 1
Native Greenstone		165	Mohr-Coulomb	6480	30	Piezometric Line 1

GOLDER

SLIDEINTERPRET 9.012

Project	SLIDE - An Interactive Slope Stability Program		
Analysis Description			
Drawn By		*Scale* 1:1444	*Company*
Date	7/9/2021, 4:25:49 PM		*File Name* Section C-C'_20210715.slmd



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface
Rock Pile Overburden		125	Mohr-Coulomb	0	40	Piezometric Line 1
Native Greenstone		165	Mohr-Coulomb	6480	30	Piezometric Line 1

GOLDER

SLIDEINTERPRET 9.012

Project	SLIDE - An Interactive Slope Stability Program		
Analysis Description			
Drawn By		*Scale* 1:1444	*Company*
Date	7/9/2021, 4:25:49 PM		*File Name* Section C-C'_20210715.slmd

Sampling, Analysis, and Management Plan for Soil and Sediment Material from Maintenance Projects

Description:
Soil and sediment material that is generated from maintenance projects conducted at the Lehigh Permanente Facility (Site) will be sampled, analyzed, and managed according to this standard operating procedure (SOP). This document is intended to provide instructions to adequately manage soil and sediment from maintenance operations by specifying screening guidelines, testing requirements, and placement to conform to applicable Federal, State and Local regulations.

Regulatory Framework:
The San Francisco Bay Regional Water Quality Control Board (Water Board) issued Waste Discharge Requirements, Order No. R2-2018-0028, (WDRs) to Lehigh for the Permanente Facility. The WDR regulates discharges to land and governs wastes and activities that generate waste at the site that have the potential to impact groundwater and hydrogeologically connected surface waters. Operations and maintenance of Waste Management Units (WMUs) at the Facility, including the Eastern Material Storage Area (EMSA) and Western Material Storage Area (WMSA), must be conducted in accordance to California Code of Regulations (CCR) 27 (Title 27), section 13263 of the California Water Code (CWC) and the approved plans required by Waste Discharge Requirement Order No. R2-2018-0028. The purpose of the procedures set forth herein is to ensure that material placement resulting from soil and sediment removal from maintenance operations is consistent with the requirements established by the WDRs.

- **Responsibility**— Environmental Department
- **Applicability**— Sampling and sediment of creek sediment originated from culvert cleanout activities
- **Affected Area**— Culverts in Permanente Creek
- **Frequency**— As needed
- **Attachments**— Attachment A – Environmental Screening Levels
- **Safety**—Basic Plant mandated PPE is required

Procedure:
Soil or sediment samples will be collected by Lehigh personnel and sent to laboratory for analysis. Samples will be analyzed for parameters listed on Table 1 and results compared against the most recent, applicable Water Board's Tier 1 Environmental Screening Levels (ESLs) for soils and groundwater as modified (Attachment A contains the 2019 ESLs for metals, the primary constituents of concern), as described below.

The documentation required includes:

1. Reports of removed material volume, date of removal, and location
2. Field data sheets and testing results
3. Temporary storage location, including survey coordinates, if needed
4. Final placement location, including survey coordinates

5. Report with December Self-Monitoring Report.

Sampling Guidelines:

Samples will be collected and analyzed in a manner sufficient to characterize the material. Sampling and laboratory analysis will be conducted in compliance with the following requirements:

1. All analysis will be performed in accordance with EPA and California approved methods
2. Analysis of samples will be completed and reported by an analytical laboratory accredited by the California State Environmental Laboratory Accreditation Program and the National Environmental Laboratory Accreditation Program;
3. The laboratory detection limits for Modified Waste Extraction Test (WET) results must be below the applicable Tier 1 ESLs for groundwater;
4. The laboratory reporting limits will be reported on a dry-weight basis; and
5. The results of the laboratory analysis will be reported in a standard laboratory data package, including a summary of the quality control and quality assurance sample results and chain of custody documentation.

Discrete soil samples will be collected unless regulatory approval is obtained for collection of composite samples for a specific project or if the project is greater than acres (Table 2). Samples will be collected with dedicated sampling equipment (e.g., plastic scoops) when possible. Any non-dedicated sampling equipment will be decontaminated between sampling locations. Field data sheets documenting sampling collection date, time, location, personnel, weather conditions, and sample identification will be completed. Each sample will be logged on a chain-of-custody record, which will accompany the samples through collection and delivery to the analytical laboratory. Table 1 includes the analytical parameters and sampling schedule.

Table 1: Laboratory Analytical Parameters

Analysis	EPA Analytical Method	Frequency
California Title 22 Metals (TTLC)	USEPA 6010B, 6020B, and/or 7471A	All
Modified WET California Title 22 Metals with DI Water	USEPA 6010B, 6020B, 1631E and/or 7471A	As necessary per TTLC results; minimum 1 out of 4 samples
VOCs	USEPA 82600/624	1 of 10 samples; minimum 1 sample per project

Sampling, Analysis, and Management Plan for Soil and Sediment Material from Maintenance Projects

Analysis	EPA Analytical Method	Frequency
SVOCs	USEPA 8270/625/SIM	1 of 10 samples; minimum 1 sample per project
PCBs and Pesticides (surface water only)	USEPA 8080/8081/608	1 of 10 samples; minimum 1 sample per project
TPH as diesel, motor oil, and gasoline	EPA 8015	1 of 10 samples; minimum 1 sample per project
Cyanide	EPA 335.4/10-204-00	1 of 10 samples; minimum 1 sample per project

All samples will be analyzed for total metals via TTLC and a subset for leachability per the modified WET procedure. The WET results will be used to determine if metal concentrations in the soil or sediment have the potential to leach to groundwater. The WET results will be compared to the modified Tier 1 ESLs for groundwater. An additional subset of samples will be analyzed for other potential constituents of concern. These parameters, as well as the TTLC metal results, will be compared to the Tier 1 ESLs for soil.

The sampling schedule varies depending on the volume of soil or sediment to be displaced as part of the maintenance project. The frequency is listed on Table 2 and is based on the California Environmental Protection Agency, Department of Toxic Substances Control (DTSC) Information Advisory Clean Imported Fill Material Fact Sheet (https://dtsc.ca.gov/information-advisory-clean-imported-fill-material-fact-sheet).

Table 2: Sampling Frequency for Evaluation of Material

Area of Individual Area	**Sampling Requirements per Area**
2 acres or less	Minimum of 4 samples
2 to 4 acres	Minimum of 1 sample every ½ acre
Greater than 10 acres	Minimum of 8 samples with 4 subsamples per location
Volume of Stockpiled Material	**Samples per Volume**
Up to 1,000 cubic yards	1 sample per 250 cubic yards
1,000 to 5,000 cubic yards	4 samples for first 1000 cubic yards +1 sample per each additional 500 cubic yards

Greater than 5,000 cubic yards	12 samples for first 5,000 cubic yards + 1 sample per each additional 1,000 cubic yards

Results Evaluation and Material Placement:

The sampling results will be tabulated and reviewed. Based on the findings, the following scenarios will be followed.

1. If the results are below applicable Tier 1 ESLs, the removed soil and sediment material may be considered for backfill or cover material on site with regulatory notification and approval.
2. If the metal concentrations do not meet the applicable Tier 1 ESLs, but are below TTLC and/or STLC thresholds, additional characterization may be completed to determine the appropriate placement based on the following:
    a. If the material is determined to be a Group B mining waste similar to the material already present in the WMUs, the material will be placed and managed within a WMU (e.g., WMSA) in accordance with the Operations, Maintenance, and Contingency (OM&C) Plan.
    b. If the material is characteristically distinct from the Group B waste present in the WMUs, contains concentrations above applicable Tier 1 ESLs, and concentrations below TTLC and/or STLC thresholds, Lehigh will consult with the Water Board regarding the management and potential on and offsite disposal of these materials.
3. While not anticipated, if the results are above TTLC and/or STLC thresholds, the WATER BOARD will be notified and additional characterization will be completed to confirm the results and aid in determining appropriate management and disposal options. Upon completion of the additional characterization, Lehigh will seek the Water Board's concurrence on the management and disposal of these materials.

Dewatering Analysis and Placement Requirements:

1. Dewatering – If dewatering is conducted, additional characterization of the material may be conducted after dewatering has been implemented and soil is no longer saturated.
2. The water from the dewatering operations will be collected and sent to the on-site water treatment system(s) via the reclaim water system.
3. The soil or sediment will be moved to a selected dewatering location if necessary. Once the material is dewatered and characterized, the material will be managed and disposed of as appropriate based on this SOP.

Sampling, Analysis, and Management Plan for Soil and Sediment Material from Maintenance Projects

Attachment A: Screening Values

Metal	CAS No.	Tier 1 ESL Soil (mg/kg)	TTLC (mg/kg)	Tier 1 ESL Groundwater (µg/L)*	STLC (µg/L)
		Total Metal		WET Results	
Antimony	7440-36-0	11	500	6.0	1500
Arsenic	7440-38-2	0.067****	50	10****	500
Barium	7440-39-3	390	10000	1000	100000
Beryllium	7440-41-7	5.0	75	2.7	75
Cadmium	7440-43-9	1.9	100	0.25	1000
Chromium	7440-47-3	160	2500	50.0	5000***
Cobalt	7440-48-4	23	8000	3.0	80000
Copper	7440-50-8	180	2500	3.1	25000
Lead	7439-92-1	32	1000	2.5	5000
Mercury	7439-97-6	13	20	0.025	200
Molybdenum	7439-98-7	6.9	3500	100	350000
Nickel	7440-02-0	86	2000	8.2	20000
Selenium	7782-49-2	2.4	100	5.0**	1000
Silver	7440-22-4	25	500	0.19	5000
Thallium	7440-28-0	0.78	700	2.0	7000
Vanadium	7440-62-2	18	2400	19	24000
Zinc	7440-66-6	340	5000	81	250000

Notes:

ESLs based on January 2019 (Rev. 1) Water Board ESL Workbook Tier 1 values for soil and groundwater unless otherwise noted.

* DI WET results to be compared to Tier 1 GW ESL.

** Freshwater Ecotox used instead of Saltwater Ecotox for the Aquatic Habitat Goal that comprises the GW Tier 1 ESL for selenium.

*** If the soluble chromium as determined by the TCLP is less than 5mg/L, and the soluble chromium as determined by the STLC test equals or exceeds 560mg/L, and the waste is not otherwise identified as a RCRA hazardous waste, then the waste is a non-RCRA hazardous waste.

**** Arsenic background levels are known to be above these screening levels.

APPENDIX J

Golder Associates 2022

Water Quality Evaluation, Permanente Creek Restoration Project

TECHNICAL MEMORANDUM

DATE August 26, 2022 **Project No.** 31405507

TO Carolina Addison
Lehigh Hanson, Inc.

FROM George Wegmann, PG, CHg;
Bill Fowler, PG, CEG **EMAIL** **gwegmann@wsp.com**

WATER QUALITY EVALUATION, PERMANENTE CREEK RESTORATION PROJECT, LEHIGH SOUTHWEST CEMENT COMPANY AND HANSON PERMANENTE CEMENT, INC., PERMANENTE QUARRY, CUPERTINO, CALIFORNIA

1.0 INTRODUCTION

Golder Associates USA Inc. (Golder), a member of WSP, prepared this memorandum for Lehigh Southwest Cement Company and Hanson Permanente Cement, Inc. (Lehigh) to present the results of our assessment regarding the significance of potential water related impacts associated with specific elements of the proposed Permanente Creek Restoration Project (PCRP) adjacent to the Permanente Cement Plant and North Quarry (Permanente Site). The specific elements include:

- The type of onsite material(s) used for backfill or other restoration-related activities where those materials that may come in contact with the Permanente Creek watercourse, and recommendations related thereto;
- Expected geology of the restored creek channel that will come in contact with the Permanente Creek watercourse.

This evaluation is based on available geochemical characterization data and the conceptual site geochemical model prepared in accordance with applicable permits for the Permanente Site (*e.g.,* San Francisco Regional Water Quality Control Board (Water Board) Order No. R2-2018-002 (WDRs), and additional information or studies prepared in response to Water Code section 13267 Orders or as part of, site operations and reclamation-related activities. The scope of work for this evaluation included (1) a desktop data review of previous studies, (2) summarizing more recent rock unit characterization and creek sediment sampling, and (3) completing a site reconnaissance of the project area to evaluate the geologic conditions in conjunction with the proposed restoration design.

1.1 Background

The Permanente Site is located in Santa Clara County, California, west of the City of Cupertino. In response to a Cleanup and Abatement Order issued by the Water Board (Order No. 99-018) and as a result of a 2016 Amended Consent Decree entered into by Lehigh and the Sierra Club, Lehigh has committed to undertake the PCRP. Details regarding the scope of the PCRP are set forth in 2016 Amended Consent Decree and the 90% design documents prepared by Lehigh's consultant, Waterways, which were recently updated to incorporate regulatory agency and Santa Clara County comments to date, and submitted to the County on August 26, 2022 (90% Design drawings). The portion of Permanente Creek involved in the PCRP is located south/southeast of the Permanente Site, and the project involves, among other activities, removing material/sediment from Permanente Creek, laying back slopes, widening reaches, and ensuring stream bank stability and ecological/geomorphic function.

Golder Associates USA Inc.
425 Lakeside Drive, Sunnyvale, California, USA 94085 T: +1 408 220-9223 F: +1 408 220-9224

The headwaters of Permanente Creek are located approximately 2 miles west/southwest of the Permanente Site. Approximately 4.2 miles of Permanente Creek are adjacent or traverse through Lehigh's Permanente Site in a south/south-eastern/eastern "L" shaped direction, portions of which are included in the PCRP, including stretches of the Creek upstream of the Cement Plant that have been re-aligned into an open culverted channel or placed in underground culverts, or are subject to dam infrastructure (Pond 13). Flow in Permanente Creek continues in an eastern direction as it leaves the Permanente Site, flowing through the highly urbanized area Cities of Los Altos and Mountain View and into Mountain View Slough or Stevens Creek through the Stevens Creek Diversion Channel operated by the Santa Clara Valley Water District, which ultimately can reach the San Francisco Bay. The downstream hydrology of the Permanente Creek watershed has been substantially altered for flood protection purposes.

The Cement Plant and North Quarry at the Permanente Site have been operational since 1939 and has been a major source of cement for Santa Clara County. The facility contains two mining waste rock (also called "overburden") storage areas, the East Material Storage Area (EMSA) and West Material Storage Area (WMSA), largely comprised of soil and rocks excavated from the North Quarry, some of which may be accessed for onsite use as part of the PCRP as backfill. The North Quarry sits between the two storage areas, while the Cement Plant is located southwest of the EMSA (Attachment A, Figure 1).

1.2 Regional Geologic Setting

Most of the Site is underlain by complexly deformed and faulted rocks of the Franciscan Assemblage. The eastern portion of the Site, including portions of the Cement Plant and the EMSA, are underlain by Plio-Pleistocene rocks of the Santa Clara Formation, which in turn overlie the Franciscan bedrock. Overlying the bedrock are modern alluvial deposits associated with Permanente Creek, and relatively shallow surficial deposits comprised of soil and colluvium. The Miocene-age Monterey Formation lies just east of the Site in fault contact with the Franciscan basement rocks along the Monte Vista Fault System.

1.2.1 Bedrock Geologic Units

The bedrock materials exposed in the North Quarry are part of the Permanente Terrane of the Franciscan Assemblage. The Franciscan Assemblage is comprised of highly deformed and variably metamorphosed, marine sedimentary rocks with submarine basalt (greenstone) and limestone and, to a lesser extent, graywacke. The Franciscan is considered a tectonic mélange that was formed in the subduction zone between the Pacific tectonic plate and the North American plate. This plate boundary is now a transform, strike-slip plate boundary defined by the San Andreas Fault zone located about two miles southwest of the North Quarry. The Franciscan Complex contains complexly deformed marine sedimentary rocks and basalt, which were metamorphosed and altered during subduction and subsequent thrust faulting. The Santa Clara Formation, a late Tertiary-Pleistocene assemblage of conglomerate, sandstone, siltstone, and claystone sits unconformably on the Franciscan Complex in the eastern portion of the site. Surficial deposits of unconsolidated alluvial deposits, fill material, colluvium, landslide deposits, and surface soils overlie the bedrock units.

The geology of the Permanente Creek Basin is shown on Figure 2 (Attachment A) based on our site reconnaissance and two main geologic map sources: Cupertino and Mindego Hills quadrangles (Dibblee and Minch 2007a and b); and the San Francisco Bay Landslide Mapping Team (USGS 1997). Previous researchers have also mapped the basin (Brabb 1970, Pulver 1979a and b).

1.2.2 Surficial Geologic Units

Some of the south-facing slopes that flank Permanente Creek are mantled with varying thicknesses of overburden, which is a heterogeneous mixture of fines, sand, gravel and cobble-sized fragments (*i.e.,* greenstone, graywacke, and soil materials) but with small percentages of limestone. This same overburden

comprises most of the WMSA and EMSA. Regarding the south-facing slopes, they are generally described as side-cast fills that mantle existing canyon slopes and fill small drainages and swales that formerly reported to Permanente Creek. The overburden deposits are of highly variable thickness and exist adjacent to the Rock Pile Area[1] (see 90% Design drawings at Sheet C19) and Material Removal Area (see 90% Design drawings at Sheets C23 & C24); this material will be removed and relocated as part of the PCRP.

Modern unconsolidated alluvial deposits are present along the active stream channel of Permanente Creek. These deposits are comprised of a poorly sorted mixture of cobbles, gravels, sand, silt and clay. Deposits range from a few inches thick in the upper reaches of the watershed where erosion has cut the channel down into bedrock over thousands of years, to tens of feet thick where the channel widens and deepens as it approaches the flatter terrain of the Santa Clara Valley.

Colluvial and slope wash deposits are common throughout the steep terrain of the Santa Cruz Mountains. In general, the natural slopes in the region are overlain with approximately one to two feet of soil and colluvial materials, which thicken to several feet or more in the larger natural swales in the region. Colluvium is generally described as predominantly clayey sand with gravel to clayey gravel, with some gravelly clay. The alluvial and colluvial deposits contain a mixture of fines, sand, gravel and cobble-sized fragments (*i.e.*, greenstone, graywacke, and soil materials) but with small percentages of limestone.

1.2.3 Creek Bed Geology Summary

Most of the PCRP area is underlain by complexly deformed and faulted rocks of the Franciscan Assemblage as depicted on Figure 2 (Attachment A). The eastern portion of the project area, including portions by the Cement Plant and the EMSA, are underlain by Plio-Pleistocene rocks of the Santa Clara Formation. Overlying the bedrock are modern alluvial deposits associated with Permanente Creek (restricted to the eastern portion of the property), and relatively shallow surficial deposits comprised of soil and colluvium.

Figure 3 (Attachment A) depicts the profile of Permanente Creek, which can broadly be classified into depositional reaches and bedrock reaches (delineated as Reach A, Reach B, etc.). The processes that define these reaches are the rate that sediment is supplied to the channel and the rate at which the channel can convey the supplied sediment. The rate of sediment supply is controlled by hillslope processes and the rate that sediment is delivered to the channel. The rate of sediment transport is controlled by the channel geometry and the hydraulic characteristics of the reach.

The furthest upstream portion of Permanente Creek, upstream of the PCRP area, is characterized by alluvium in the form of travertine reinforced step pool morphology that partially covers a bedrock channel that is comprised of greenstone and limestone. The sediment supplied here is likely to come from natural processes and is partially supplied from an alluvial fan originating from Wild Violet Creek. Carbonate-rich water percolates from the south bank of the channel in this reach, indicating that the source of the carbonate-rich spring is likely within the Wild Violet drainage. Geologic maps (Dibblee and Minch) indicate that the limestone unit of the Franciscan complex outcrops within the Wild Violet drainage. The debris from this alluvial fan is being transported downstream and has deposited small terraces along both valley walls. These terraces are possibly abandoned by the modern hydraulic regime of the Creek and may be coupled to the debris flows originating from Wild Violet Creek.

Travertine is a form of limestone precipitate that forms when calcium carbonate-rich water undergoes changes that cause the mineral to transition from solution to a solid state. This transition is largely controlled by physical

[1] The Rock Pile area is comprised of stockpiled material for aggregate production, which is ongoing. The character of the Rock Pile is variable but generally consists of fine to coarse-grained gravel to angular cobble-sized rock fragments of limestone.

processes, such as changes in pressure, temperature, or pH, but it can be influenced by biological processes and hydraulic variability as well (Fuller, et al. 2010). Golder observed two types of travertine formation in Permanente Creek. One in which stalactites grew out of the southern stream bank downstream of the confluence with Wild Violet Creek, and the other along large portions of the channel where naturally formed step-pools were reinforced by travertine deposition to form travertine dams (Attachment A, Figure 3). These dams display a history of repeated formation and breaching, as evidenced by the clasts of travertine conglomerate from older dams being incorporated into modern dams, as well as the relict abutments of older travertine dams remaining on the channel margins. This natural process has been taking place throughout geologic time along Permanente Creek.

The primary geologic units within the PCRP area are mainly greenstone (including shear zones) and the Santa Clara Formation. Greenstone bedrock is present at Reaches 10-17 and 20-22 and Santa Clara Formation bedrock along reaches 1-9 (Attachment A, Figure 3). Limestone bedrock is present along Reaches 18 and 19, including south of the creek, and comprises less than 15% of the bedrock present along the PCRP area. Importantly, with regard to the material removal activities planned to occur in Reach 18, the bedrock surface within the creek channel has been unaltered by historical site activities (*i.e.,* no mining activities have occurred in the creek), and the PCRP activities will follow the contours of natural bedrock, and will not alter or change the bedrock surface or its profile as part of restoration construction activities (see 90% Design drawings at Sheet C23). The focus of the Project along the limestone bedrock reaches will be to remove loose material mantled on top of the bedrock.

2.0 DATA SUMMARY

2.1 Material Characterization

Historical mining activities have contributed surficial materials to Permanente Creek in addition to deposition from naturally occurring geologic and geomorphic processes. As part of site operations, regulatory efforts, and reclamation-related activities, a geochemical dataset has been compiled since 2008 to characterize the predominate Permanente Quarry rock types. The data includes work completed as part of the development of National Pollutant Discharge Elimination System (NPDES) permitting[2] and WDRs[3,4] as follows: (1) analysis on acid rock drainage (ARD) potential by acid base accounting (ABA) testing methods, (2) chemical and mineralogical composition by quantitative X-Ray Diffraction (XRD) and, (3) Total Threshold Limit Concentration (TTLC) and leaching potential via the California modified waste extraction test (WET) with deionized water and wall washing samples. The results have been previously summarized in several reports, including the Permanente Site's Conceptual Site Model (CSM) Update prepared in accordance with the WDRs,[5] and are discussed below along with supplemental information.

Golder previously completed sampling and testing of the following major units: limestone, greenstone, graywacke, Santa Clara Formation, and undisturbed soil/colluvium as summarized in the CSM Update.[6] In summary:

[2] NPDES No. CA0030210, Regional Water Board Order No. R2-2019-0024, previously Order No. R2-2014-0010, as amended by Order No. R2-2017-0030.

3 SLR, 2014, EMSA and WMSA Material Characterization, Permanente Quarry, Santa Clara, California.

4 Golder Associates, August 2014, WMSA and EMSA Runoff and Seep Investigation Report, Lehigh Southwest Cement Company and Quarry, 24001 Stevens Creek Boulevard, Cupertino, CA

5 Golder Associates, 2020, CSM Update and Proposed SMP, Lehigh Southwest Cement Company and Quarry, 24001 Stevens Creek Boulevard, Cupertino, CA. June 2020.

[6] Golder Associates, 2020 CSM Update and SMP, Lehigh Permanente. December 2020.

- No acid rock drainage potential was identified in the tested samples as would be expected based on the carbonate nature of the rock.
- The leachate testing indicates that greenstone and graywacke are not a significant source of metals.
- Greenstone samples reported higher leachate nickel concentrations as compared to limestone; however, the concentrations are below the San Francisco Bay Regional Water Quality Control Board Environmental Screening Levels (ESLs) based on the California primary maximum contaminant for Freshwater Aquatic levels.
- Molybdenum and selenium leachate concentrations were generally greater in limestone samples compared to the other samples from greenstone and graywacke. Selenium leachate from the limestone has been detected above the Freshwater Aquatic ESL of 5 µg/L consistent with limestone wall washing results.[7]
- The selenium data supports the premise that the oxidation of sulfides in the limestone is the primary mechanism of generating leachable selenium.[8,9]

2.1.1 Sequential Leach Testing via Modified WET Method

In 2020, rock samples were analyzed using the modified WET method and were then subjected to four additional cycles of sequential leaching repeating the same method for a total of five leaching cycles to aid in evaluating long-term leachability. Limestone and greenstone, the predominate rock units, were selected for this analysis. The test results were compared to STLC thresholds and ESLs. Full tabulated leaching results are included as Table 1, Attachment B and time-series plots of the sequential leachate concentrations of the different materials is included as Attachment C. The results of the sequential leach testing are summarized as follows:

Limestone Samples

- STLC limits were not exceeded for any of the samples.
- Limestone leachate concentrations decreased over the leaching sequence for the following constituents: sulfate, chloride, total alkalinity, bicarbonate, antimony, calcium, magnesium, molybdenum, selenium, and vanadium.
- Limestone leachate concentrations were stable or at detection limits over the leaching sequence for the following constituents: carbonate, hydroxide, arsenic, beryllium, cadmium, chromium, cobalt, copper, iron, lead, manganese, mercury, potassium, silver, sodium, thallium, and zinc.
- Sulfate, calcium, and magnesium concentrations were elevated in leachates from the medium-grade non-weathered limestone sample during leaches 1-3 compared to the other limestone samples.
- Barium leachate concentrations gradually increased for all limestone samples over the leaching period.

Greenstone Samples

- STLC limits were not exceeded for any of the samples.
- Greenstone leachate concentrations decreased over the leaching sequence for the following constituents: total alkalinity, bicarbonate, antimony, magnesium, potassium, selenium, and sodium.

---

[7] Golder Associates, 2011 Hydrogeologic Investigation, Lehigh Permanente. 2011.

8 Diener, A., Neuman, T., Kramar, U., Schild, D. 2012. Structure of Selenium Incorporated in Pyrite and Machinawite as Determined by XAFS Analysis. Journal of Contaminant Hydrology: 133 (30-39).

9 Presser, T. S. 1994. Geologic Origin and Pathways of Selenium from the California Coast Ranges to the West-Central San Joaquin Valley. Selenium in the Environment.

- Greenstone leachate concentrations were stable or at detection limits over the leaching sequence for the following constituents: chloride, sulfate, carbonate, hydroxide, arsenic, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, iron, lead, manganese, mercury, molybdenum, nickel, silver, thallium, vanadium, and zinc.
- Total alkalinity, bicarbonate, arsenic, barium, magnesium, potassium, and sodium concentrations were higher in the non-weathered greenstone sample leachate compared to the weathered greenstone sample.
- The vanadium concentration was higher in the weathered greenstone leachate compared to the non-weathered greenstone sample across all leaching cycles.
- Aluminum concentrations in the weathered greenstone sample leachate increased between leaches 1-4 and plateaued after leach 4.

Overall, concentrations generally decrease with each leaching cycle, indicating that readily leachable parameters are depleted within a few flushing cycles and that the short-term metal leaching potential for the materials is low, and below regulatory thresholds. Furthermore, the greenstone samples exhibited less leachable concentrations than the limestone samples.

2.1.2 Material Characterization Summary

The leachate results indicate that greenstone and graywacke are not a significant source of metals to water. Limestone material is a potential source of selenium, though the potential is lesser in combined quantities and in a dynamic environment of a moving stream/creek. Specific observations include:

- Greenstone samples reported higher leachate nickel concentrations compared to limestone; however, the concentrations are below ESLs.
- Molybdenum and selenium leachate concentrations were predominantly greater in limestone samples as compared to the samples from greenstone and graywacke.
- Selenium leachate from the limestone was detected several times slightly above the Freshwater Aquatic ESL of 5 µg/L. The generation of leachable selenium decreases with subsequent leach tests.

The data supports the premise that the oxidation of sulfides in the limestone is the primary mechanism of generating leachable selenium—the primary constituent of concern. Following sulfide oxidation, water flow and/or infiltration is the primary transport mechanism for selenium transport. Greenstone and graywacke do not generate leachable materials at levels that would negatively affect groundwater or surface waters. Sampling and geochemical analysis of the greenstone and graywacke indicates a low potential to leach selenium and other metals at levels above surface or ground water quality standards, and that it is suitable to be used as fill material consistent with Water Board/WDR standards.

2.2 Background Water Samples and Bedrock Influence on Creek Water Quality

Water quality from the upstream headwaters has been monitored as part of the National Pollutant Discharge Elimination System (NPDES) permit sampling program. The upstream surface water results for selenium are consistently less than 1 ug/L. As noted in Section 1.2, bedrock limestone and associated travertine deposits are present in these areas. The results further support the premise that selenium production from oxidized limestone already present in the creek channel is finite. For this reason, we expect that the PCRP as designed, which proposes to remove material and follow the existing bedrock contours for the restored creek channel grade and elevation, will not contribute to increased in-stream concentrations of constituents of concern.

3.0 DISCUSSION AND RECOMMENDATIONS

For areas of the project where fill material is needed, it is recommended that onsite material comprised predominantly of greenstone or graywacke be used where needed for backfill, as both exhibit a low metals leaching potential under natural site conditions. Furthermore, greenstone is the prevalent native material at the Site and already encompasses the majority of the Permanente Creek basin. Based on the available data, we do not expect detrimental water quality impacts from the creek restoration activities (causing exceedance of applicable water quality standards) provided on-site materials adhere to the recommendations herein.

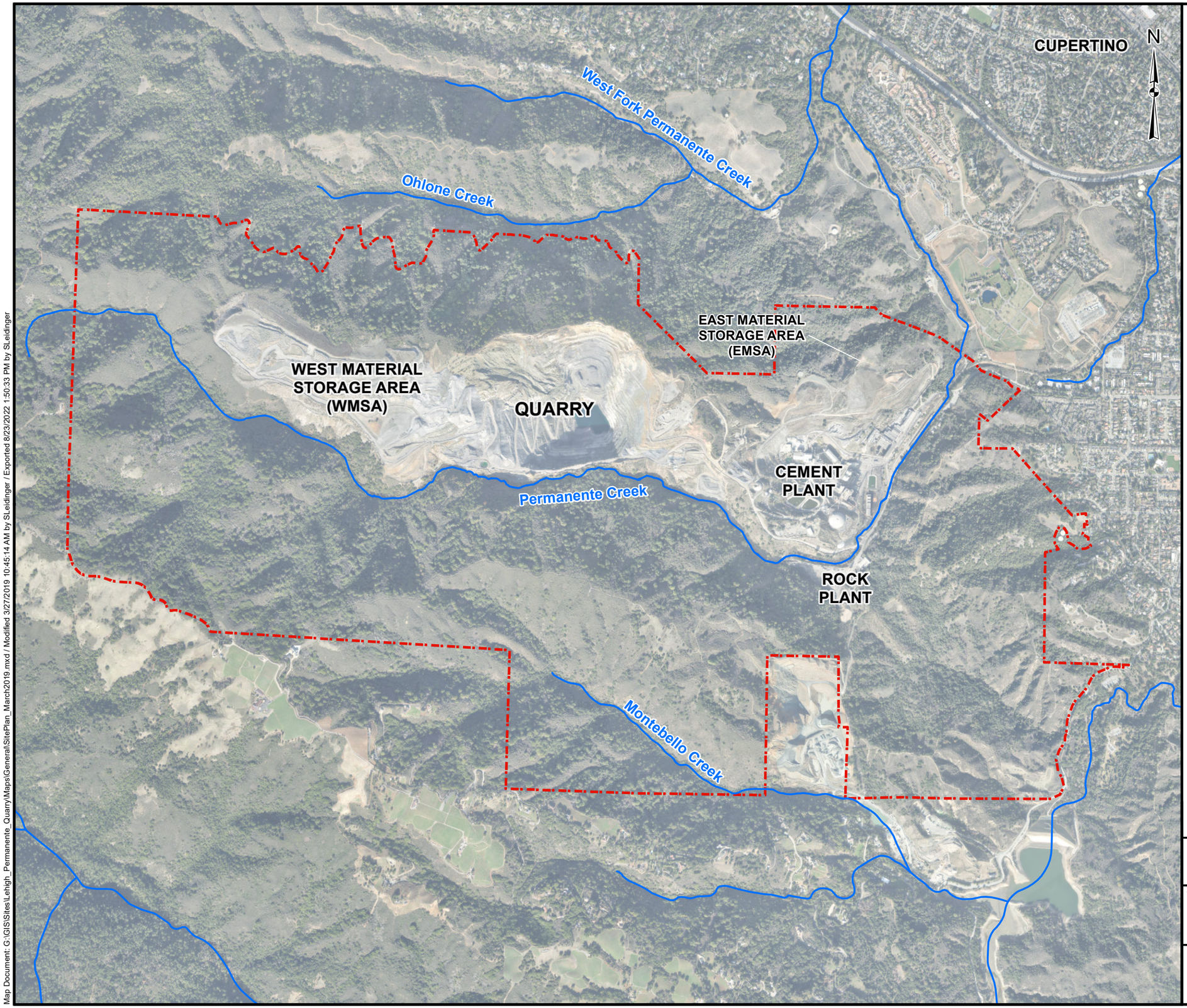
Further, the predominant areas where limestone is to naturally remain, e.g., Reach 18, will consist of non-disturbed bedrock, which, as demonstrated by upstream conditions, is not expected to contribute metals to the water column. Therefore, significant changes in the natural system will not occur and new source material will not be exposed to potentially undergo oxidation and mobilization of selenium based on the limestone bedrock present. As noted in Section 2.3, the water quality upstream of the PCRP is not impaired even though limestone bedrock and travertine deposits are present. As the bedrock surface in Reach 18 is inferred to have been exposed and undisturbed for a similar timeframe as the reaches upstream of the PCRP, impairment to water quality is not expected from the limestone bedrock section. Furthermore, as noted above, the production rate of leachable selenium from limestone decreases as the mobile fraction of selenium is depleted from the system. This process will be further expedited by removing potential sources (e.g., limestone material) via the PCRP, and the PCRP is not expected to interfere with those gains.

Attachments A: Figures 1-3
B: Data Summary Table 1
C: Time-Series Graphs

PCRP_Golder_creek_memo_fnl

ATTACHMENT A

Figures 1-3



LEGEND

- Stream
- Property Boundary

NOTES

1) Locations based on conversion from local coordinates or Google Earth placement.

REFERENCES

1)Service Layer Credits: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community
2)Coordinate System: NAD 1983 StatePlane California III FIPS 0403 Feet
3)

1,200 0 1,200
Feet

PROJECT

PERMANENTE QUARRY
SANTA CLARA COUNTY, CALIFORNIA

TITLE

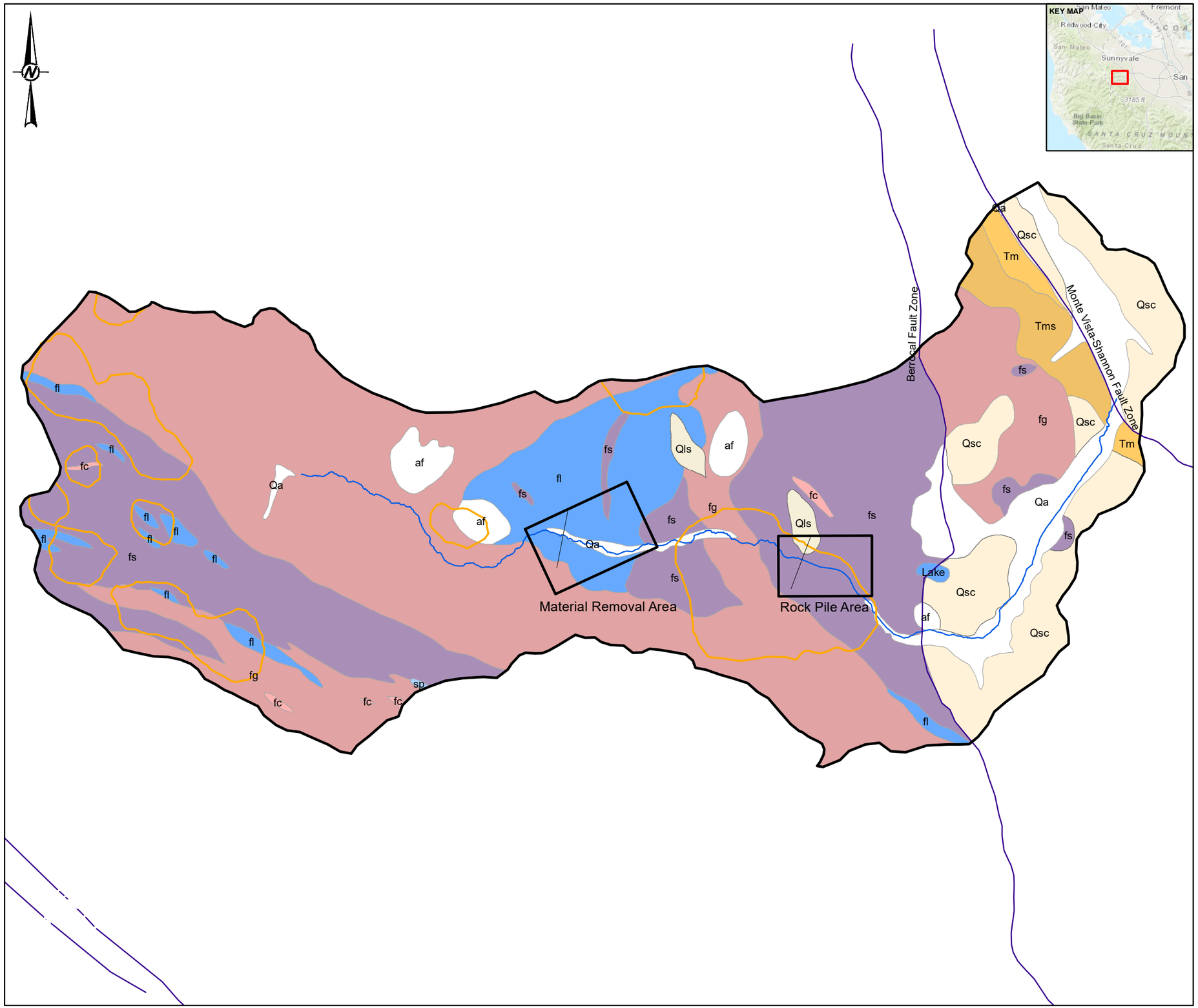
SITE OVERVIEW

PROJECT No.		063-7109	FILE No.	SitePlan_March2019.mxd	
DESIGN	SHL	10/31/2013	SCALE: AS SHOWN		REV. 0
GIS	SHL	3/27/2019			
CHECK	GW	3/27/2019			
REVIEW	GW	3/27/2019			

wsp GOLDER

FIGURE 1

Map Document: G:\GIS\Sites\Lehigh_Permanente_Quarry\Maps\General\SitePlan_March2019.mxd / Modified 3/27/2019 10:45:14 AM by SLeidinger / Exported 8/29/2022 1:50:33 PM by SLeidinger



LEGEND

- Areas of Interest
- Cross Sections
- Permanente Creek
- PermCrkBasin_V2
- Faults

Geologic Units

UnitNam

- Lake
- af
- Qa
- Qls
- Qsc
- Tm
- Tms
- sp
- fg
- fs
- fc
- fl

0 2,000 4,000

1 IN = 1,667 FT FEET

NOTE(S)

REFERENCE(S)

1. USGS (LANDSLIDES, 1997; FAULTS, 2000, 2002)
2. CALIFORNIA DIVISION OF MINES AND GEOLOGY (EARTHQUAKES, 1982)
3. WATERWAYS CONSULTING, INC. (PERMANENTE CREEK, 2018)
4. CALIFORNIA DEPARTMENT OF FORESTRY (GEOLOGY AND LANDSLIDES, 1979)
5. COORDINATE SYSTEM: NAD 1983 STATE PLANE CALIFORNIA III (FT)
6. SERVICE LAYER CREDITS: SOURCES: ESRI, HERE, GARMIN, INTERMAP, INCREMENT P CORP., GEBCO, USGS, FAO, NPS, NRCAN, GEOBASE, IGN, KADASTER NL, ORDNANCE SURVEY, ESRI JAPAN, METI, ESRI CHINA (HONG KONG), SWISSTOPO, © OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY

CLIENT

PERMANENTE QUARRY
SANTA CLARA COUNTY, CALIFORNIA

PROJECT

TITLE

GEOLOGIC MAP OF PERMANENTE CREEK BASIN

CONSULTANT

WSP GOLDER

YYYY-MM-DD	2019-10-02
DESIGNED	RPH/BVJ
PREPARED	RPH/BVJ
REVIEWED	BF/CJ/RPH
APPROVED	BF

PROJECT NO.	PHASE	REV.	FIGURE
		0	2

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

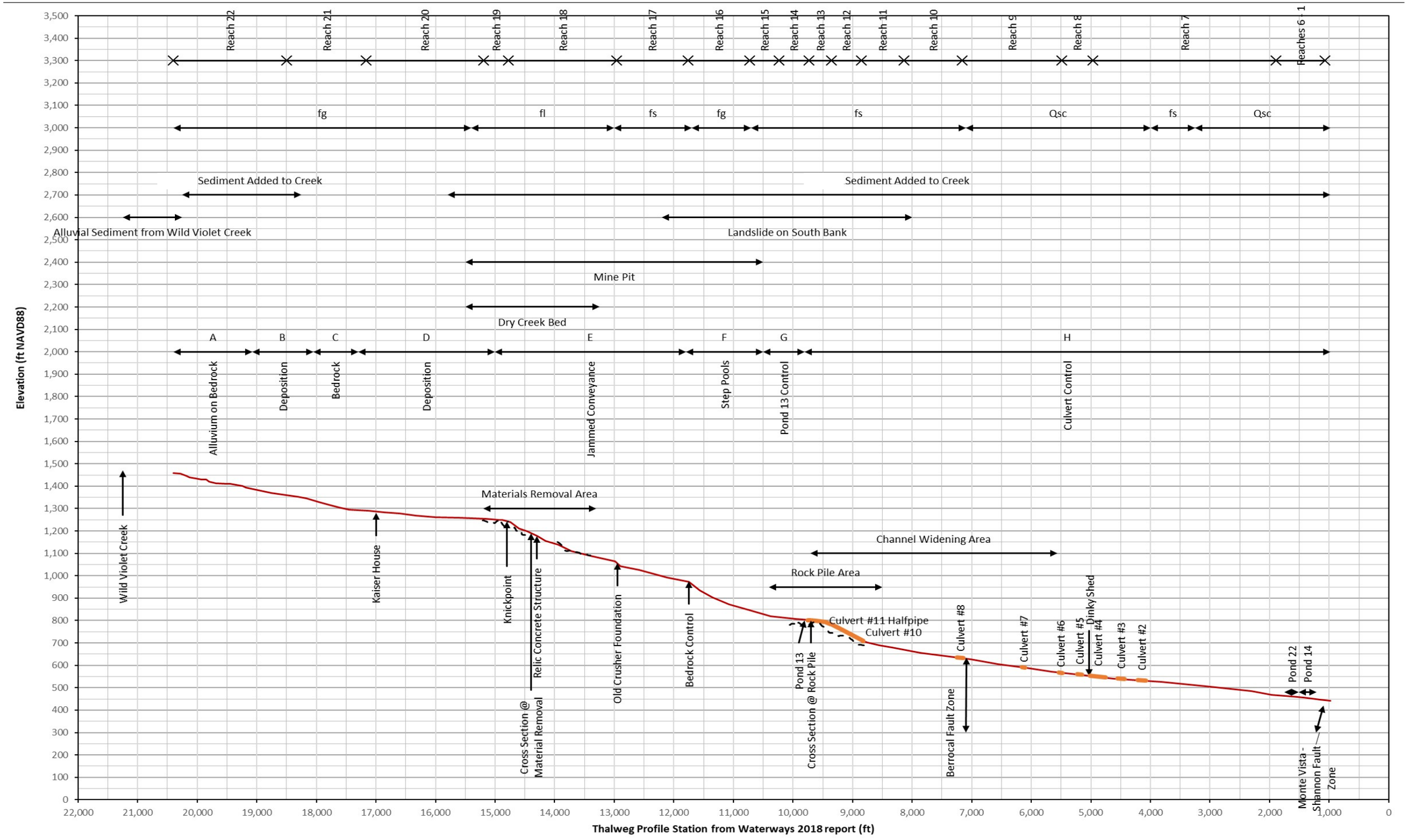


Figure 3: Permanente Creek Profile with geomorphic and geologic delineations. Stationing from Waterways (2019).

ATTACHMENT B

Data Summary Table 1

Table 1: Sequential WET Extraction Chemistry

Analyte	Units	STLC Regulatory Limit	ESL	B-1: High-Grade Limestone, Non-Weathered					B-2: Medium-Grade Limestone, Non-Weathered					B-3: Low-Grade, Limestone Non-Weathered				
				Leach Initial	Leach 1	Leach 2	Leach 3	Leach 4	Leach Initial	Leach 1	Leach 2	Leach 3	Leach 4	Leach Initial	Leach 1	Leach 2	Leach 3	Leach 4
Dissolved Metals																		
Antimony	mg/l	15	0.006	0.0042	0.0025	0.0018 B	0.00123 B	0.0012 B	0.0057	0.0040	0.0032	0.0026	0.0027	0.013	0.0078	0.0052	0.0052	0.0040
Arsenic	mg/l	5	0.01	0.00022 B	0.00047 B	0.0003 B	0.00029 B	<0.001	0.00066 B	0.00088 B	0.00073 B	0.00091 B	0.00080 B	0.0013	0.0011	0.00065 B	0.00073 B	0.00062 B
Barium	mg/l	100	1	0.41	0.70	0.42	0.70	0.96	0.0288 B	0.11	0.13	0.27	0.45	0.15	0.29	0.17	0.32	0.45
Beryllium	mg/l	0.75	0.0027	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025
Cadmium	mg/l	1	0.00025	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025	0.00011 B	<0.00025	<0.00025	<0.00025	<0.00025
Chromium	mg/l	5	0.05	<0.002	0.00157 B	0.0007 B	0.00079 B	0.00079 B	<0.002	0.0031	0.00062 B	0.00077 B	0.0017 B	<0.002	0.0028	0.00059 B	0.00138 B	0.00121 B
Cobalt	mg/l	80	0.003	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025	0.000209 B	0.000062 B	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025
Copper	mg/l	25	0.009	0.0012 B	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.0011 B	<0.002	<0.002	<0.002	<0.002
Lead	mg/l	5	0.0025	<0.0005	<0.0005	<0.0005	<0.0005	0.00028 B	<0.0005	<0.0005	<0.0005	<0.0005	0.0001 B	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Mercury	mg/l	0.2	0.000025	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Molybdenum	mg/l	350	0.1	0.14	0.024 B	0.020 B	<0.1	<0.1	0.27	0.070 B	0.048 B	0.026 B	0.021 B	1.1	0.21	0.10	0.038 B	<0.1
Nickel	mg/l	20	0.052*	<0.001	<0.001	<0.001	<0.001	<0.001	0.0017	0.00042 B	<0.001	<0.001	<0.001	0.00099 B	0.00069 B	<0.001	<0.001	<0.001
Selenium	mg/l	1	0.005*	0.0017	0.0019	0.0011	0.00086	0.00080	0.0062	0.0051	0.0044	0.0049	0.0044	0.0085	0.0051	0.0043	0.0039	0.0033
Silver	mg/l	5	0.00019	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Thallium	mg/l	7	0.002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.00011 B	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Vanadium	mg/l	24	0.019	0.041	0.016	0.0098	0.0097	0.0098	0.0092	0.012	0.014	0.019	0.019	0.37	0.13	0.083	0.083	0.076
Zinc	mg/l	250	0.081	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015
Wet Chemistry																		
Chloride	mg/l			1.4 B	2.5	0.77 B	0.58 B	0.85 B	<2	0.53	0.56 B	<2	<2	2.3	3.6	<2	<2	0.78 B
Sulfate	mg/l			9.0	5.9	7.9	4.4 B	3.3 B	212	31	26	9.2	7.9	22	12	16	9.1	4.8 B
Total Alkalinity	mg/l			14 B	17 B	15 B	14 B	14 B	16 B	24	20	16 B	17 B	18 B	23	18 B	18 B	17 B
Bicarbonate ($CaCO_3$)	mg/l			14 B	17 B	15 B	14 B	14 B	16 B	24	20	16 B	17 B	18 B	23	18 B	18 B	17 B
Carbonate as $CaCO_3$	mg/l			<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
Hydroxide as $CaCO_3$	mg/l			<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20

Notes:

Soluble Threshold Limit Concentrations (STLC) as per California Code of Regulations Title 22, Section 66261.24(2)(A) ESL listed is lower of freshwater aquatic or primary MCL;

As is based on background level.

* = the ESL and surface water quality objective (California Toxics Rule, 40 CFR section 131.38) are the same.

B = estimated value, below laboratory reporting limit; mg/l = milligrams per Liter

Table 1: Sequential WET Extraction Chemistry

Analyte	Units	STLC Regulatory Limit	ESL	B-4: Non-Cement Grade Limestone, Non-Weathered					B-5-9: High-Grade Limestone, Weathered					B-6: Greenstone, Non-Weathered				
				Leach Initial	Leach 1	Leach 2	Leach 3	Leach 4	Leach Initial	Leach 1	Leach 2	Leach 3	Leach 4	Leach Initial	Leach 1	Leach 2	Leach 3	Leach 4
Dissolved Metals																		
Antimony	mg/l	15	0.006	0.0030	0.0018 B	0.0014 B	0.0012 B	0.0011 B	0.0065	0.0038	0.0025	0.0026	0.0021	0.0030	0.00128 B	0.00085 B	0.00054 B	0.00043 B
Arsenic	mg/l	5	0.01	0.0002 B	0.00031 B	<0.001	0.00023 B	<0.001	0.00047 B	0.00069 B	0.00039 B	0.00054 B	0.00046 B	0.0026	0.0029	0.0021	0.0021	0.0017
Barium	mg/l	100	1	0.13	0.40	0.26	0.44	0.60	0.20	0.38	0.21	0.39	0.63	0.11	0.11	0.099	0.11	0.10
Beryllium	mg/l	0.75	0.0027	0.000082 B	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025
Cadmium	mg/l	1	0.00025	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025
Chromium	mg/l	5	0.05	<0.002	0.0007 B	<0.002	<0.002	<0.002	<0.002	0.0026	<0.002	0.00111 B	0.00108 B	<0.002	<0.002	<0.002	0.00114 B	<0.002
Cobalt	mg/l	80	0.003	<0.00025	0.00005 B	0.000092 B	<0.00025	<0.00025	0.000057 B	<0.00025	<0.00025	<0.00025	0.000059 B	<0.00025	0.000051 B	0.000063 B	0.00027	0.000066 B
Copper	mg/l	25	0.009	<0.002	0.0017 B	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Lead	mg/l	5	0.0025	<0.0005	<0.0005	0.00086	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.00015 B	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Mercury	mg/l	0.2	0.000025	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Molybdenum	mg/l	350	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.23	0.067 B	0.044 B	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/l	20	0.052*	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.00071 B	<0.001	<0.001	0.0012	<0.001
Selenium	mg/l	1	0.005*	0.0013	0.0011	0.00092	0.00082	0.00077	0.0040	0.0035	0.0029	0.0028	0.0027	0.00054	0.00017 B	0.00018 B	<0.00025	<0.00025
Silver	mg/l	5	0.00019	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Thallium	mg/l	7	0.002	0.00011 B	<0.0005	0.0005 B	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Vanadium	mg/l	24	0.019	0.0046	0.00161 B	0.0022	0.0022	0.0023	0.036	0.016	0.012	0.014	0.015	0.013	0.012	0.0095	0.0095	0.0090
Zinc	mg/l	250	0.081	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015
Wet Chemistry																		
Chloride	mg/l			2.1	3.5	0.88 B	1.1 B	1.1 B	1.35 B	2.8	<2	<2	0.84 B	<2	<2	<2	<2	<2
Sulfate	mg/l			25	9.3	12	7.4	5.2	16	9.0	13	7.8	4.4 B	12	6.6	4.9 B	2.7 B	1.7 B
Total Alkalinity	mg/l			15 B	22	16 B	16 B	16 B	17 B	22	17 B	16 B	17 B	27	22	21	18 B	17 B
Bicarbonate ($CaCO_3$)	mg/l			15 B	22	16 B	16 B	16 B	17 B	22	17 B	16 B	17 B	27	22	21	18 B	17 B
Carbonate as $CaCO_3$	mg/l			<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
Hydroxide as $CaCO_3$	mg/l			<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20

Notes:

Soluble Threshold Limit Concentrations (STLC) as per California Code of Regulations Title 22, Section 66261.24(2)(A) ESL listed is lower of freshwater aquatic or primary MCL; As is based on background level.

* = the ESL and surface water quality objective (California Toxics Rule, 40 CFR section 131.38) are the same.

B = estimated value, below laboratory reporting limit; mg/l = milligrams per Liter

Table 1: Sequential WET Extraction Chemistry

Analyte	Units	STLC Regulatory Limit	ESL	B-7-10: Greenstone, Weathered				
				Leach Initial	Leach 1	Leach 2	Leach 3	Leach 4
Dissolved Metals								
Antimony	mg/l	15	0.006	0.00065 B	<0.002	<0.002	<0.002	<0.002
Arsenic	mg/l	5	0.01	<0.001	<0.001	<0.001	<0.001	<0.001
Barium	mg/l	100	1	0.029 B	0.0247 B	0.028 B	0.026 B	0.0226 B
Beryllium	mg/l	0.75	0.0027	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025
Cadmium	mg/l	1	0.00025	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025
Chromium	mg/l	5	0.05	<0.002	<0.002	<0.002	0.00058 B	<0.002
Cobalt	mg/l	80	0.003	<0.00025	0.000067 B	0.000051 B	0.00011 B	0.000087 B
Copper	mg/l	25	0.009	0.00133 B	<0.002	<0.002	0.0013 B	<0.002
Lead	mg/l	5	0.0025	<0.0005	<0.0005	<0.0005	<0.0005	0.00018 B
Mercury	mg/l	0.2	0.000025	<0.001	<0.001	<0.001	<0.001	<0.001
Molybdenum	mg/l	350	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/l	20	0.052*	<0.001	<0.001	<0.001	<0.001	<0.001
Selenium	mg/l	1	0.005*	0.00021 B	0.00013 B	<0.00025	<0.00025	0.00014 B
Silver	mg/l	5	0.00019	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Thallium	mg/l	7	0.002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Vanadium	mg/l	24	0.019	0.016	0.019	0.013	0.014	0.013
Zinc	mg/l	250	0.081	<0.015	<0.015	<0.015	<0.015	<0.015
Wet Chemistry								
Chloride	mg/l			<2	<2	<2	<2	<2
Sulfate	mg/l			4.8 B	1.4 B	1.3 B	<5	<5
Total Alkalinity	mg/l			24	22	22	21	20
Bicarbonate ($CaCO_3$)	mg/l			22	20 B	21	18 B	18 B
Carbonate as $CaCO_3$	mg/l			2.3 B	2.5 B	<20	2.4 B	2.2 B
Hydroxide as $CaCO_3$	mg/l			<20	<20	<20	<20	<20

Notes:

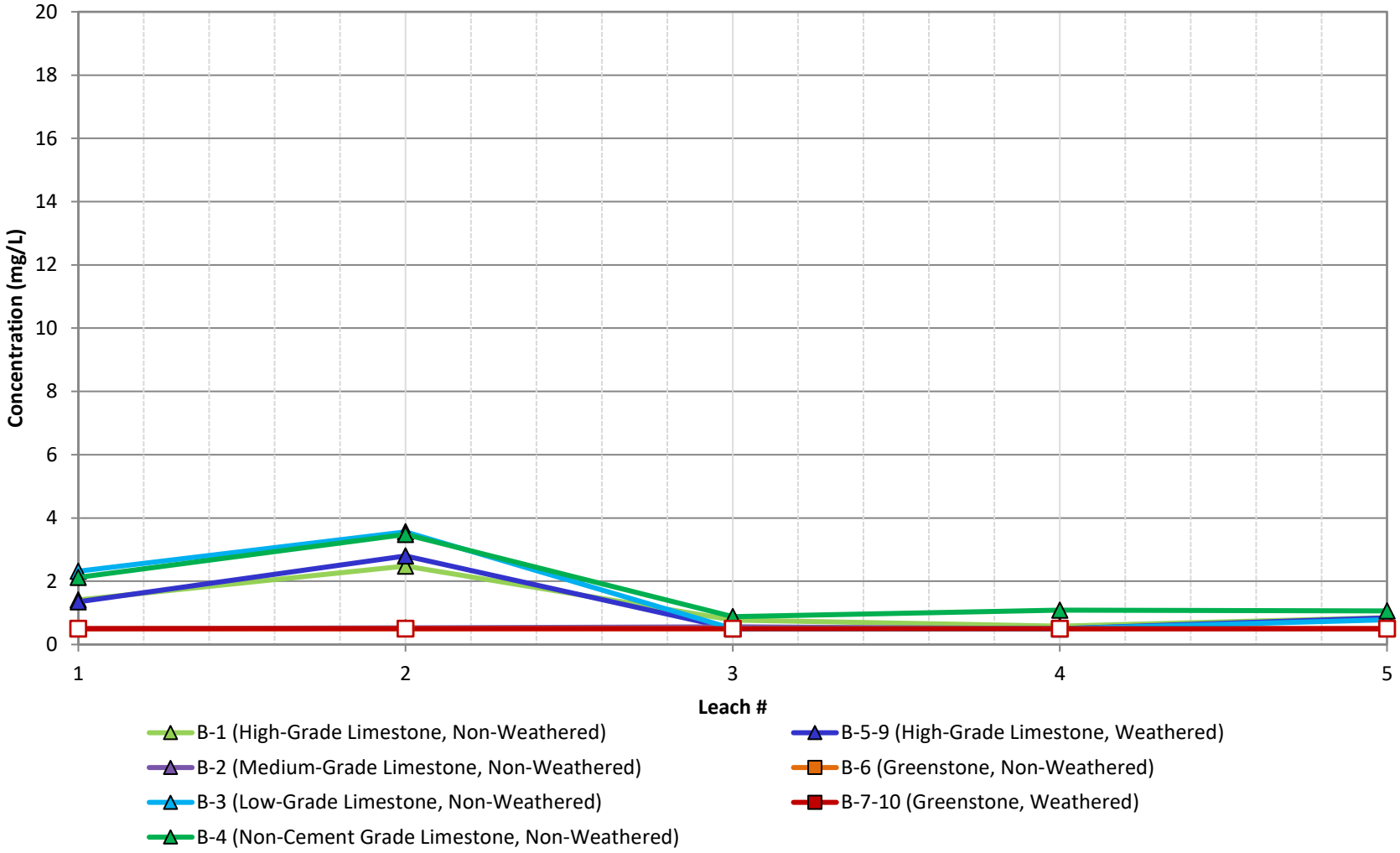
Soluble Threshold Limit Concentrations (STLC) as per California Code of Regulations Title 22, Section 66261.24(2)(A) ESL listed is lower of freshwater aquatic or primary MCL; As is based on background level.

* = the ESL and surface water quality objective (California Toxics Rule, 40 CFR section 131.38) are the same.

B = estimated value, below laboratory reporting limit; mg/l = milligrams per Liter

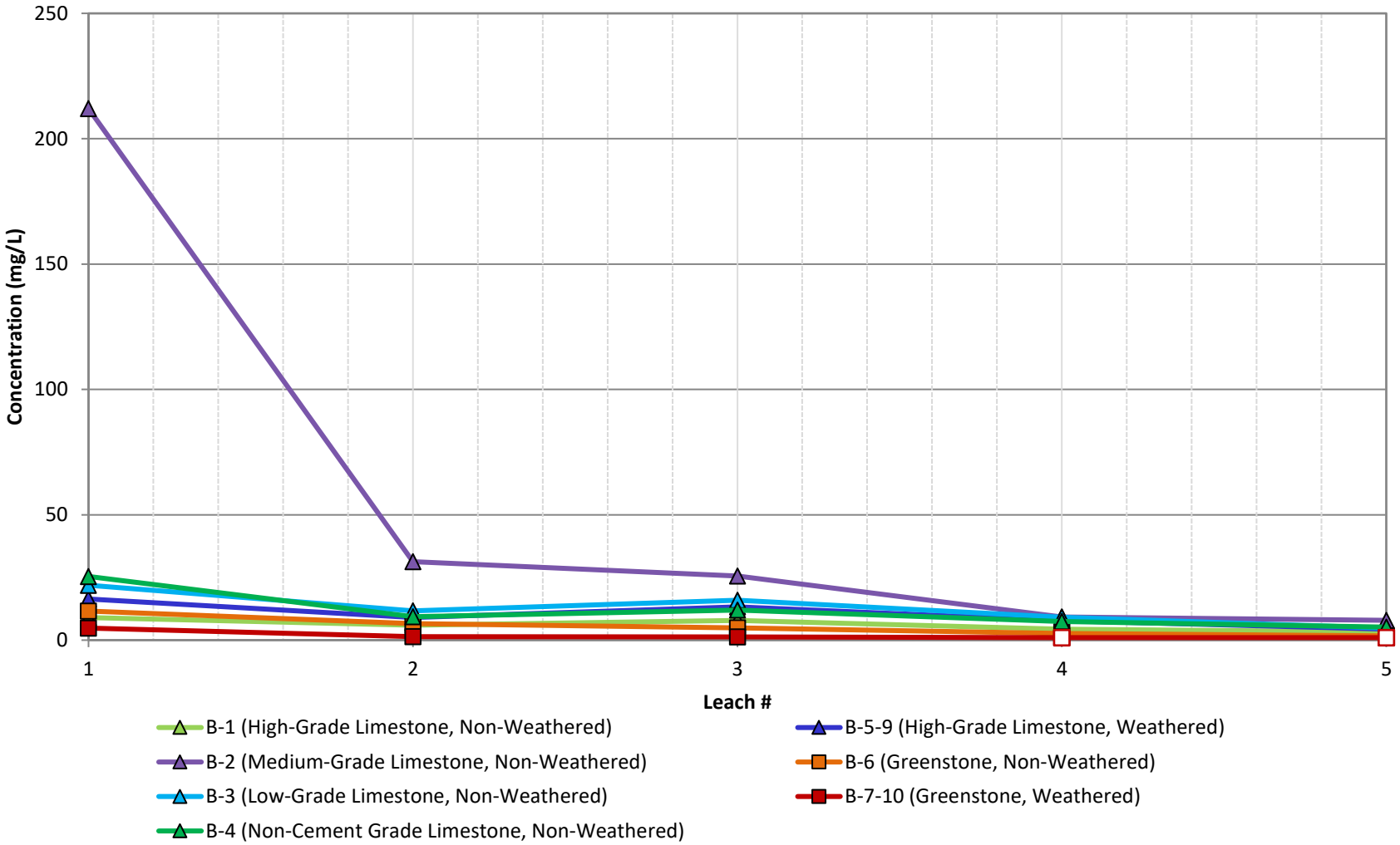
ATTACHMENT C

Time-Series Graphs



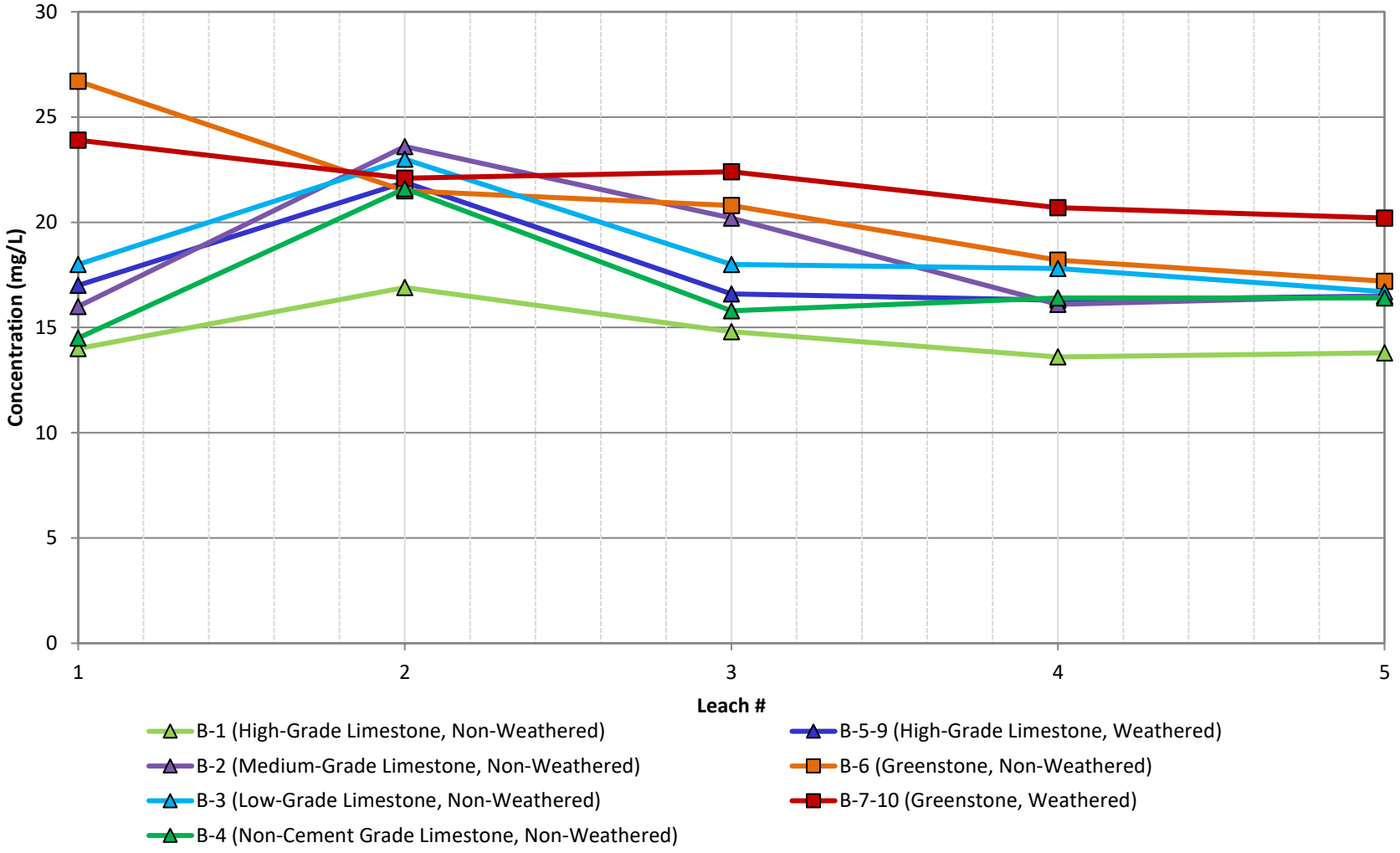
*Open symbols denote values at or below the method detection limit

WSP GOLDER	Title: **Sequential Modified WET- Chloride**		
	Project Name	Project No. 31405507	FIGURE C-1
	Client Name: Lehigh Permanente	Date: 8/4/2022	



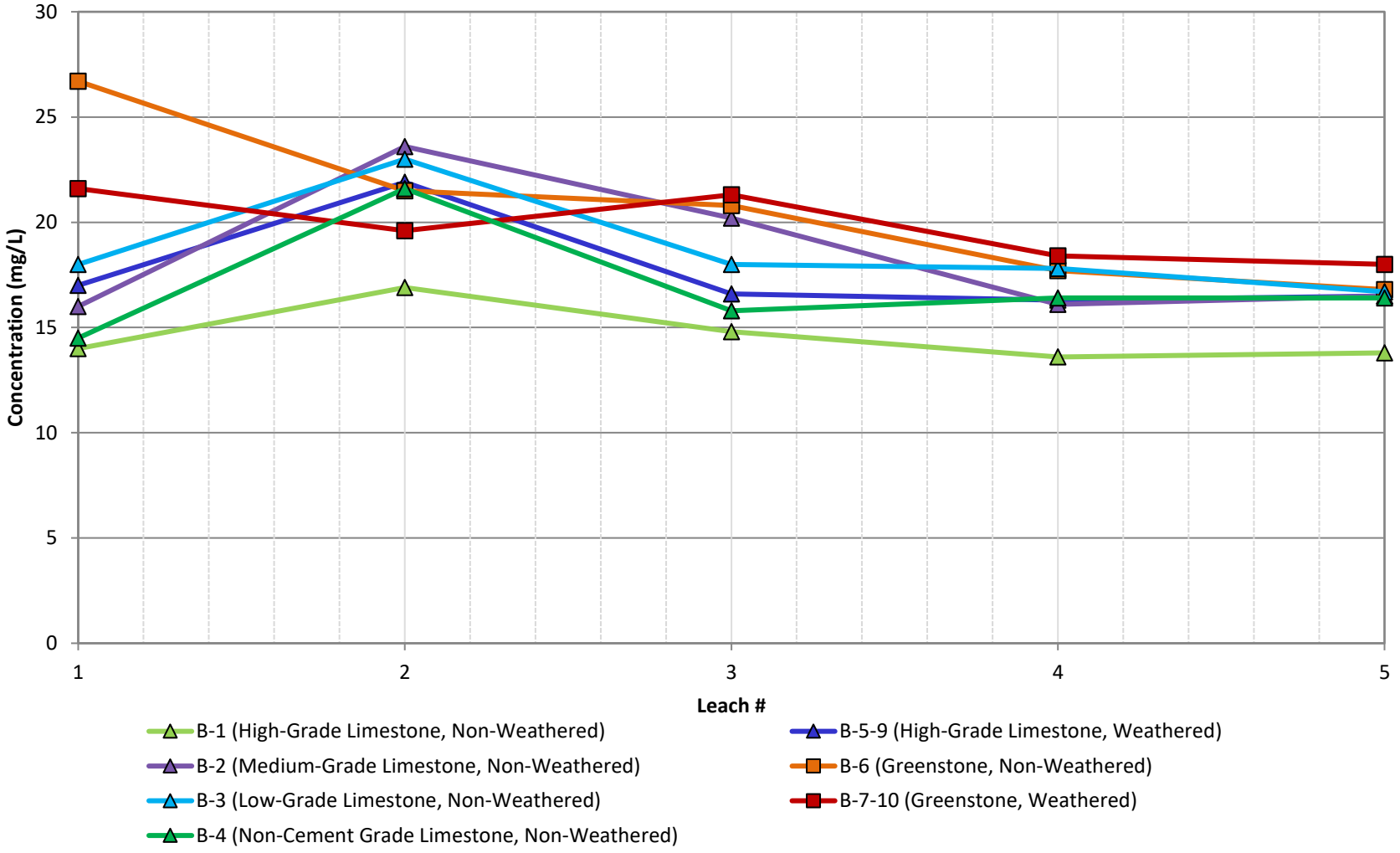
*Open symbols denote values at or below the method detection limit

WSP GOLDER	Title: **Sequential Modified WET- Sulfate**		
	Project Name	Project No. 31405507	FIGURE C-2
	Client Name: Lehigh Permanente	Date: 8/4/2022	



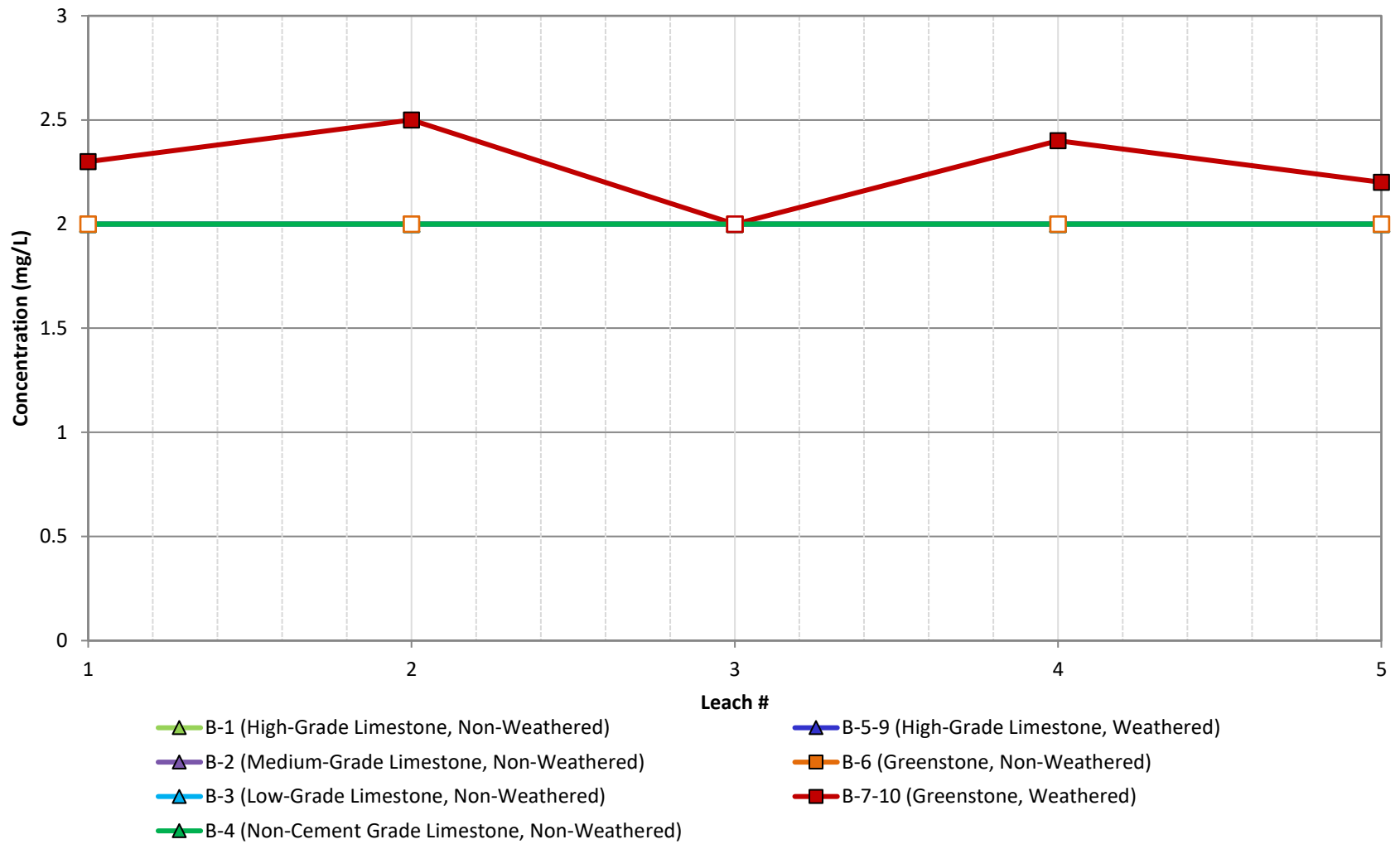
*Open symbols denote values at or below the method detection limit

WSP GOLDER	Title: **Sequential Modified WET- Total Alkalinity**		
	Project Name	Project No. 31405507	FIGURE C-3
	Client Name: Lehigh Permanente	Date: 3/4/2022	



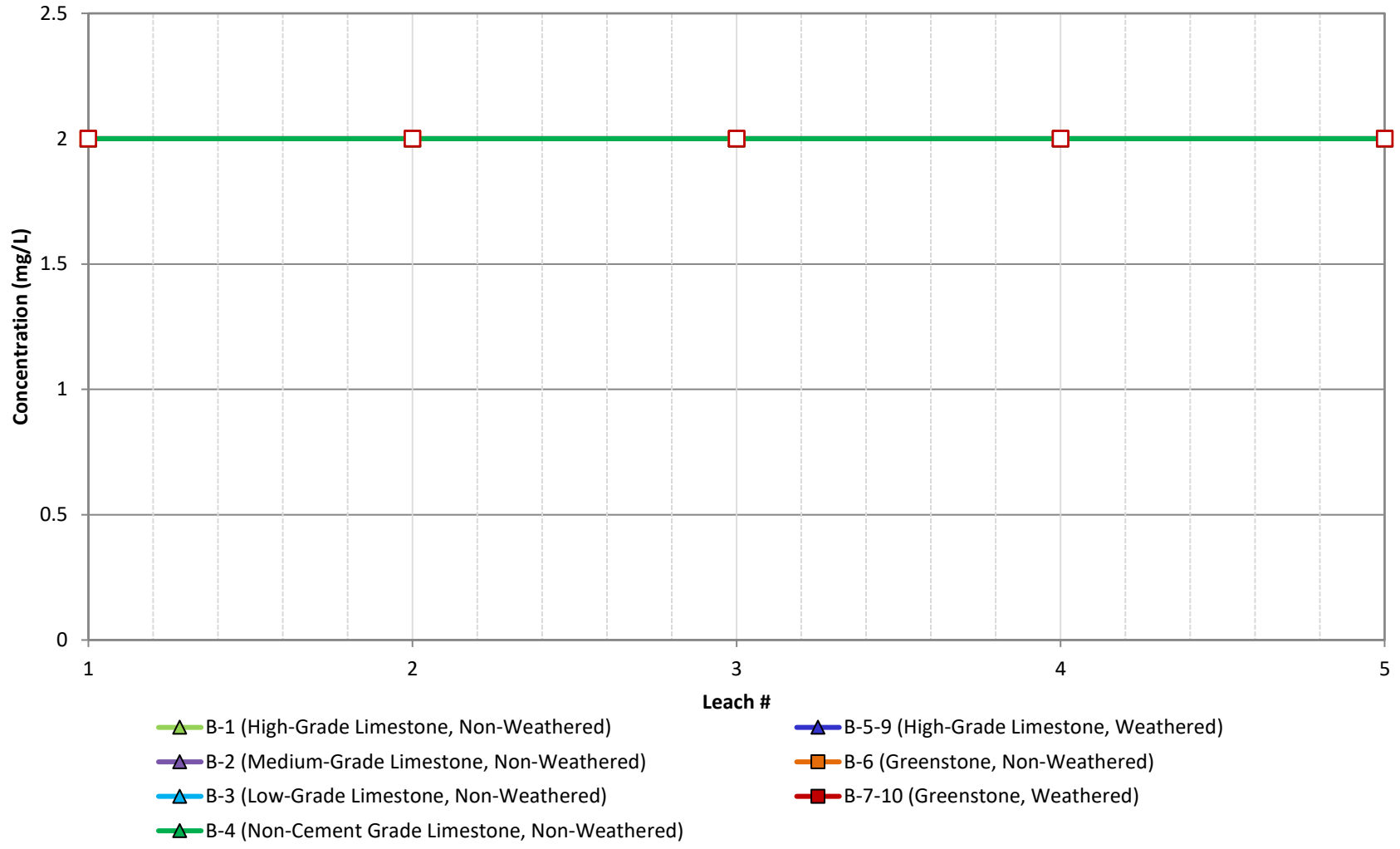
*Open symbols denote values at or below the method detection limit

WSP GOLDER	Title: **Sequential Modified WET- Bicarbonate as CaCO3**		
	Project Name	Project No. 31405507	FIGURE C-4
	Client Name: Lehigh Permanente	Date: 8/4/2022	



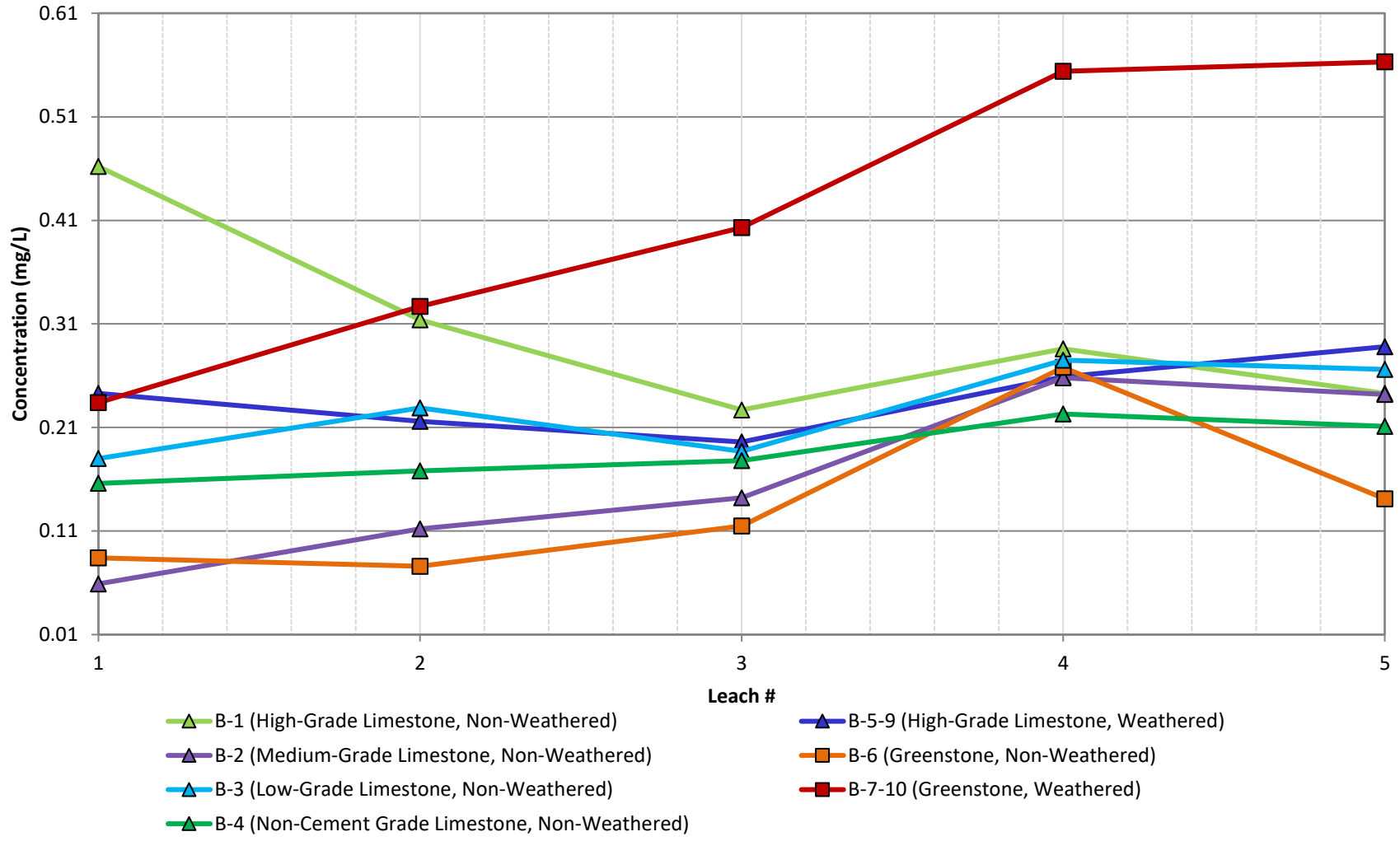
*Open symbols denote values at or below the method detection limit

WSP GOLDER	Title: **Sequential Modified WET- Carbonate as CaCO3**		
	Project Name	Project No. 31405507	FIGURE C-5
	Client Name: Lehigh Permanente	Date: 8/4/2022	



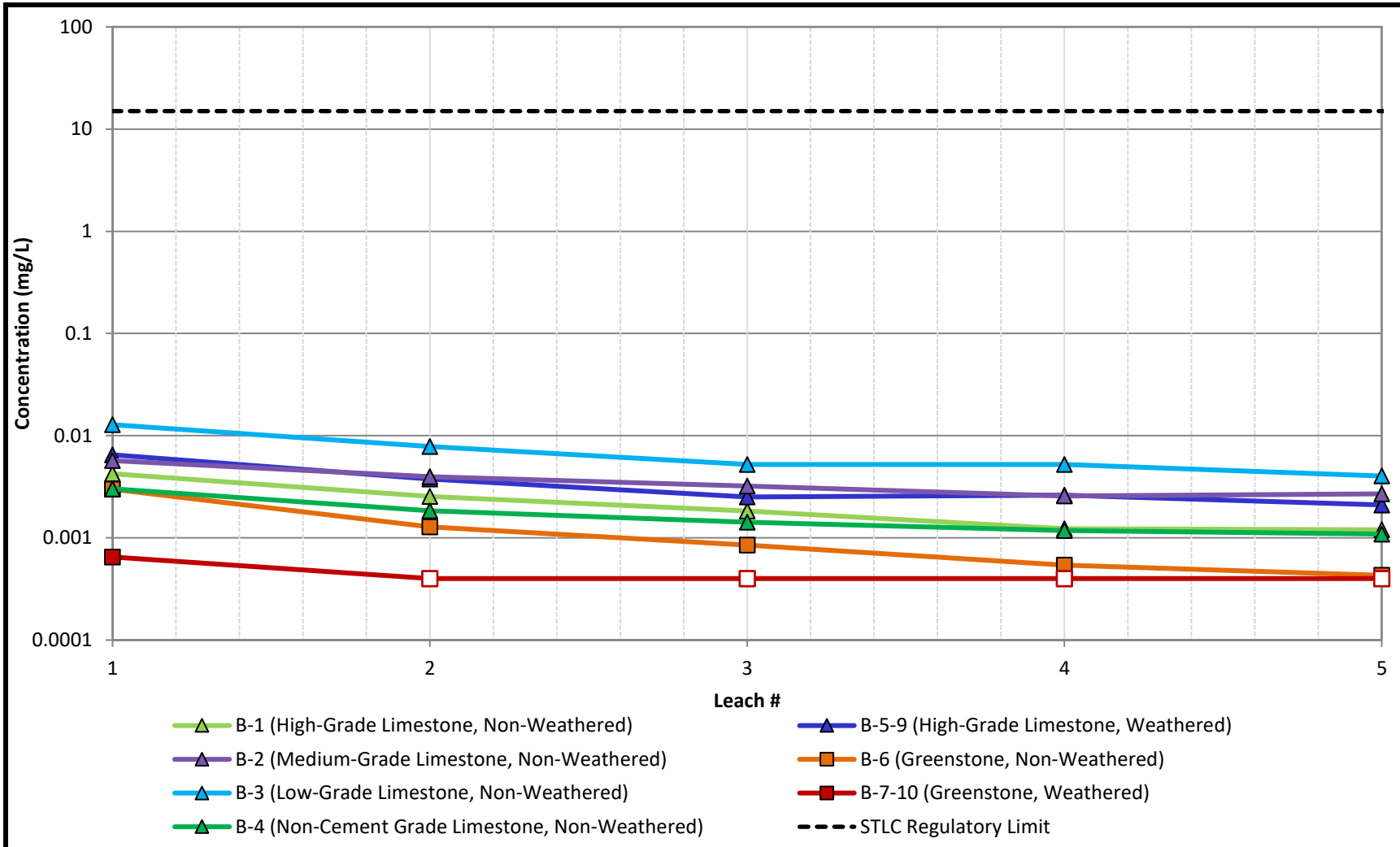
*Open symbols denote values at or below the method detection limit

WSP GOLDER	Title: **Sequential Modified WET- Hydroxide as CaCO3**		
	Project Name	Project No. 31405507	FIGURE C-6
	Client Name: Lehigh Permanente	Date: 8/4/2022	



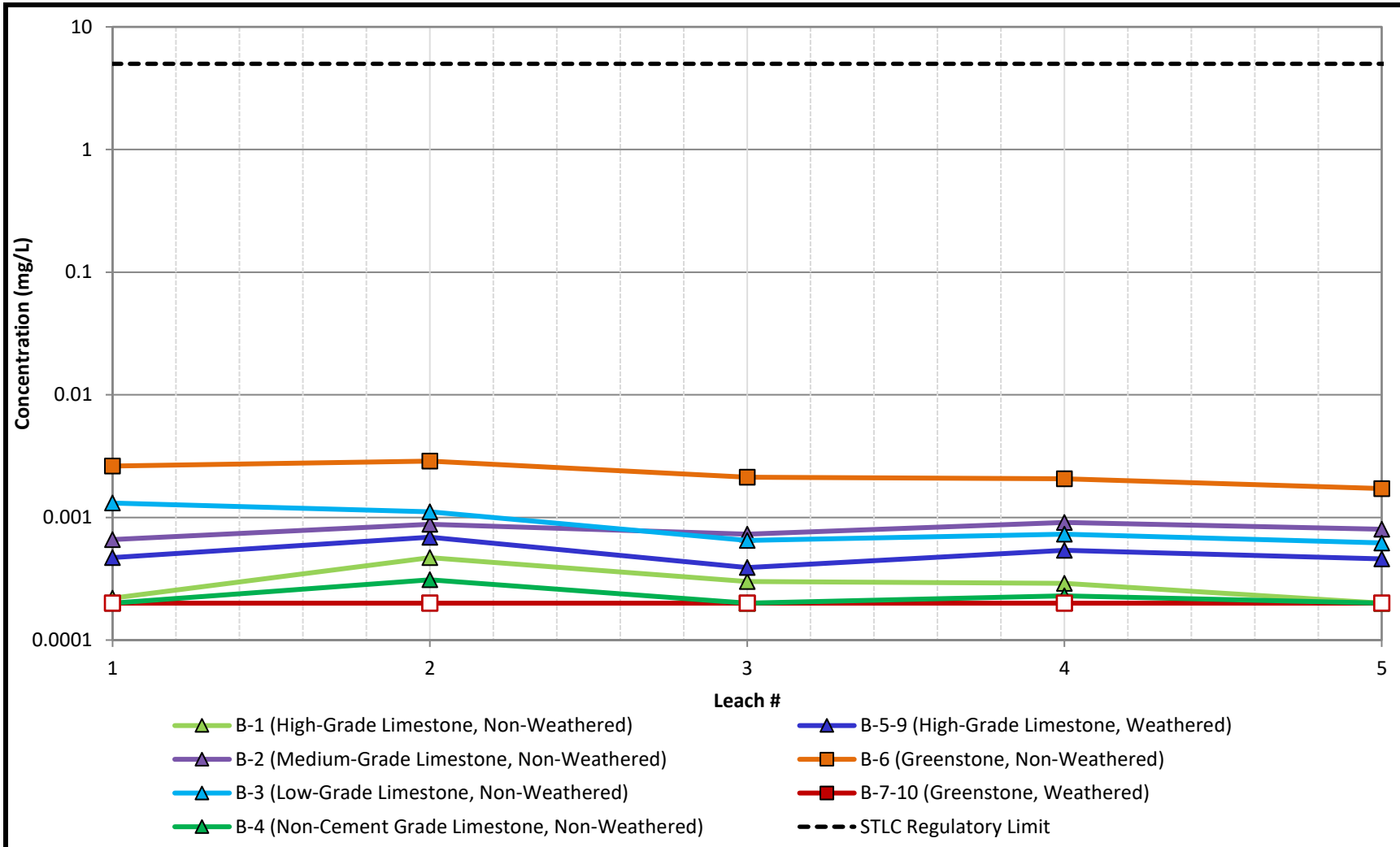
*Open symbols denote values at or below the method detection limit

WSP GOLDER	Title: **Sequential Modified WET- Aluminum**		
	Project Name	Project No. 31405507	FIGURE C-7
	Client Name: Lehigh Permanente	Date: 8/4/2022	



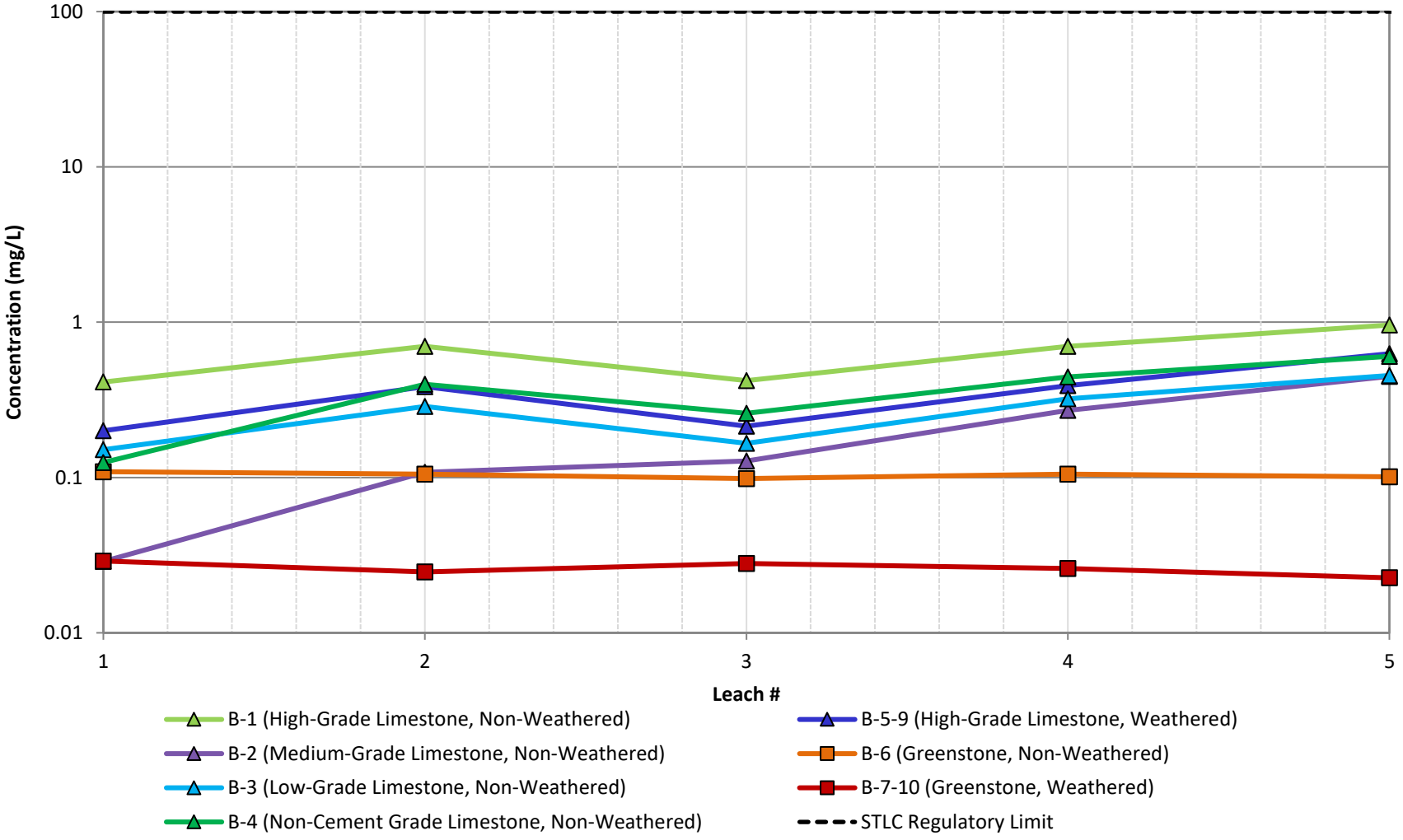
*Open symbols denote values at or below the method detection limit

WSP GOLDER	Title: **Sequential Modified WET- Antimony**		
	Project Name	Project No. 31405507	FIGURE C-8
	Client Name: Lehigh Permanente	Date: 8/4/2022	



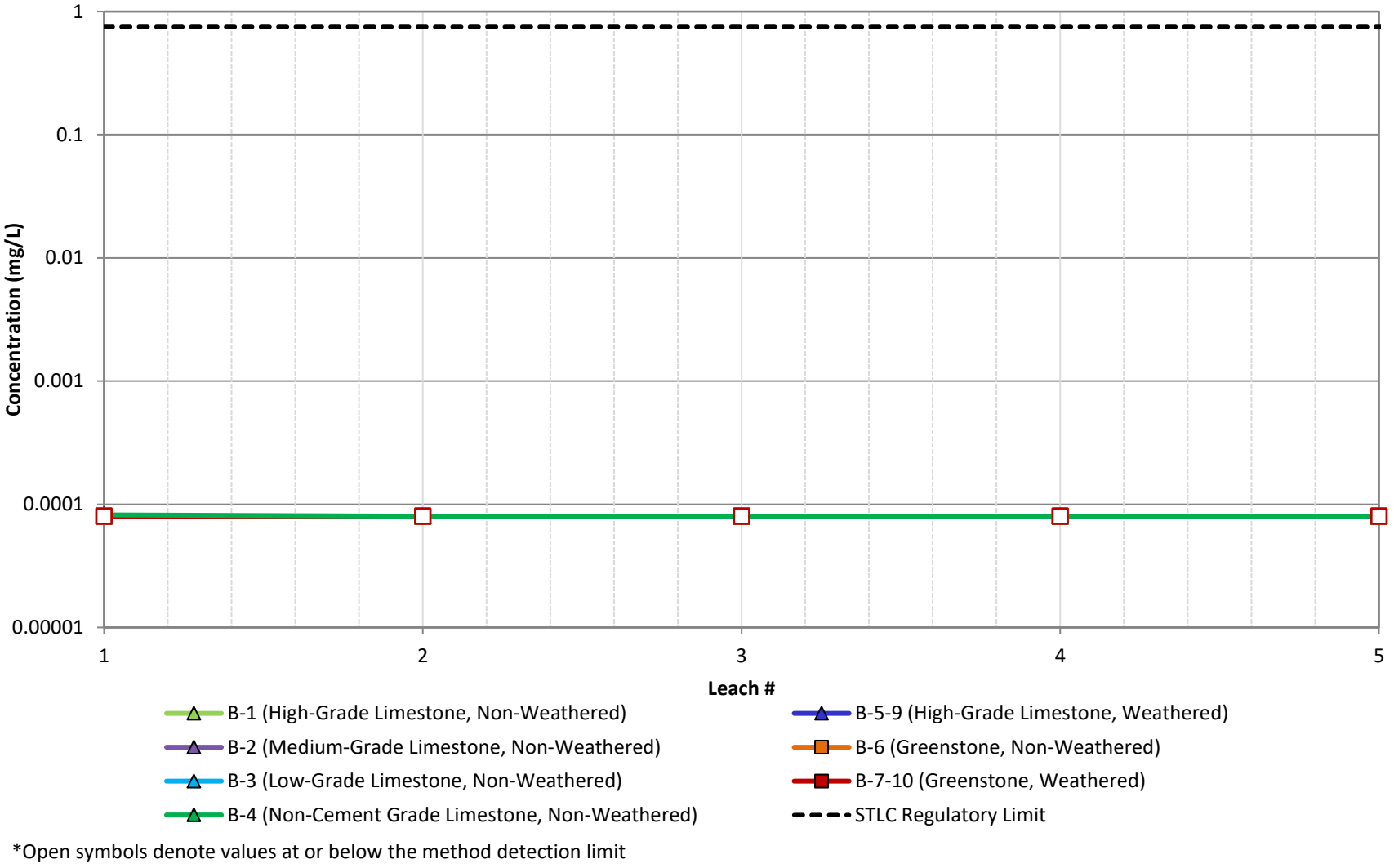
*Open symbols denote values at or below the method detection limit

WSP GOLDER	Title: **Sequential Modified WET- Arsenic**		
	Project Name	Project No. 31405507	FIGURE C-9
	Client Name: Lehigh Permanente	Date: 8/4/2022	



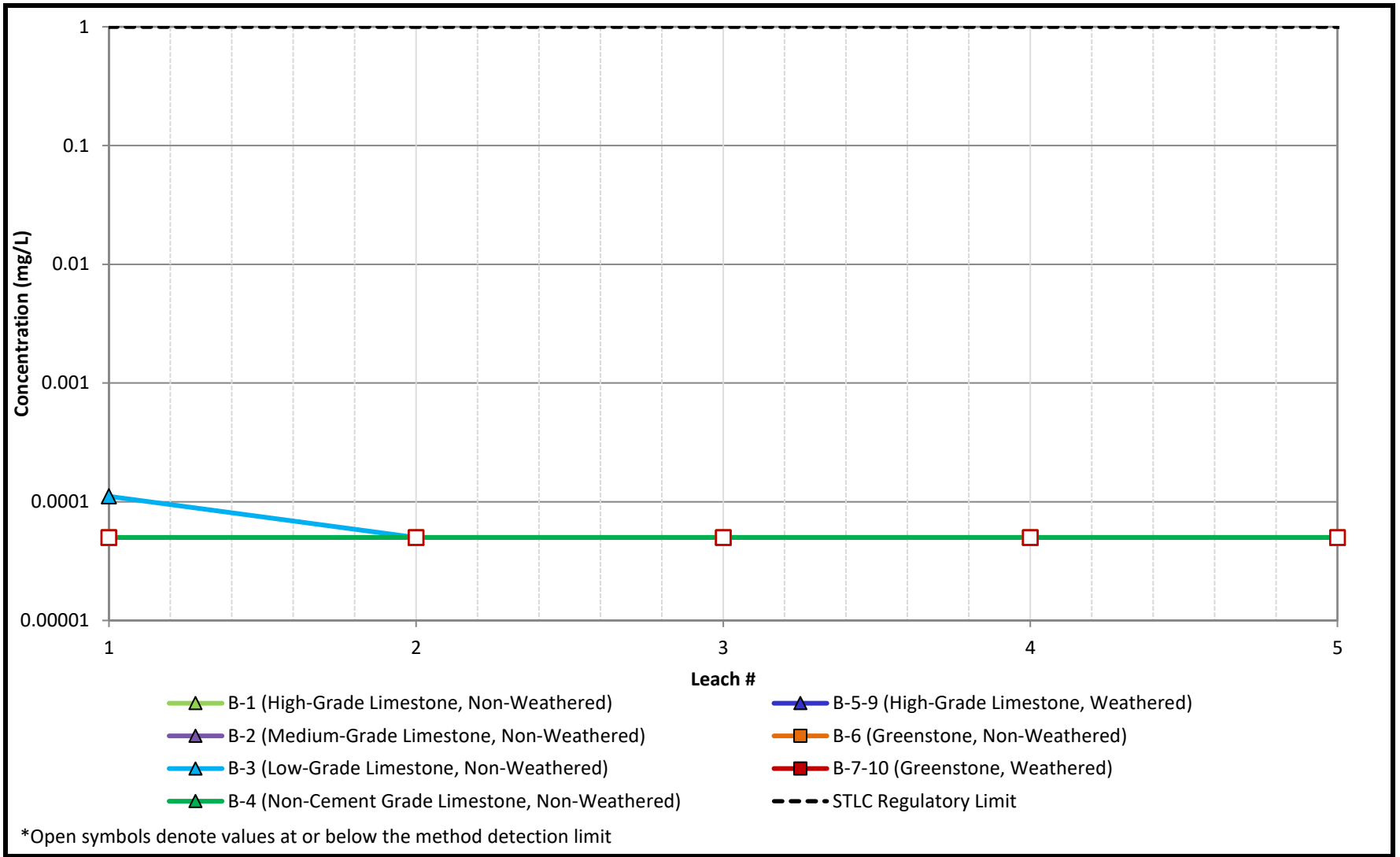
*Open symbols denote values at or below the method detection limit

WSP GOLDER	Title: **Sequential Modified WET- Barium**		
	Project Name	Project No. 31405507	FIGURE C-10
	Client Name: Lehigh Permanente	Date: 8/4/2022	



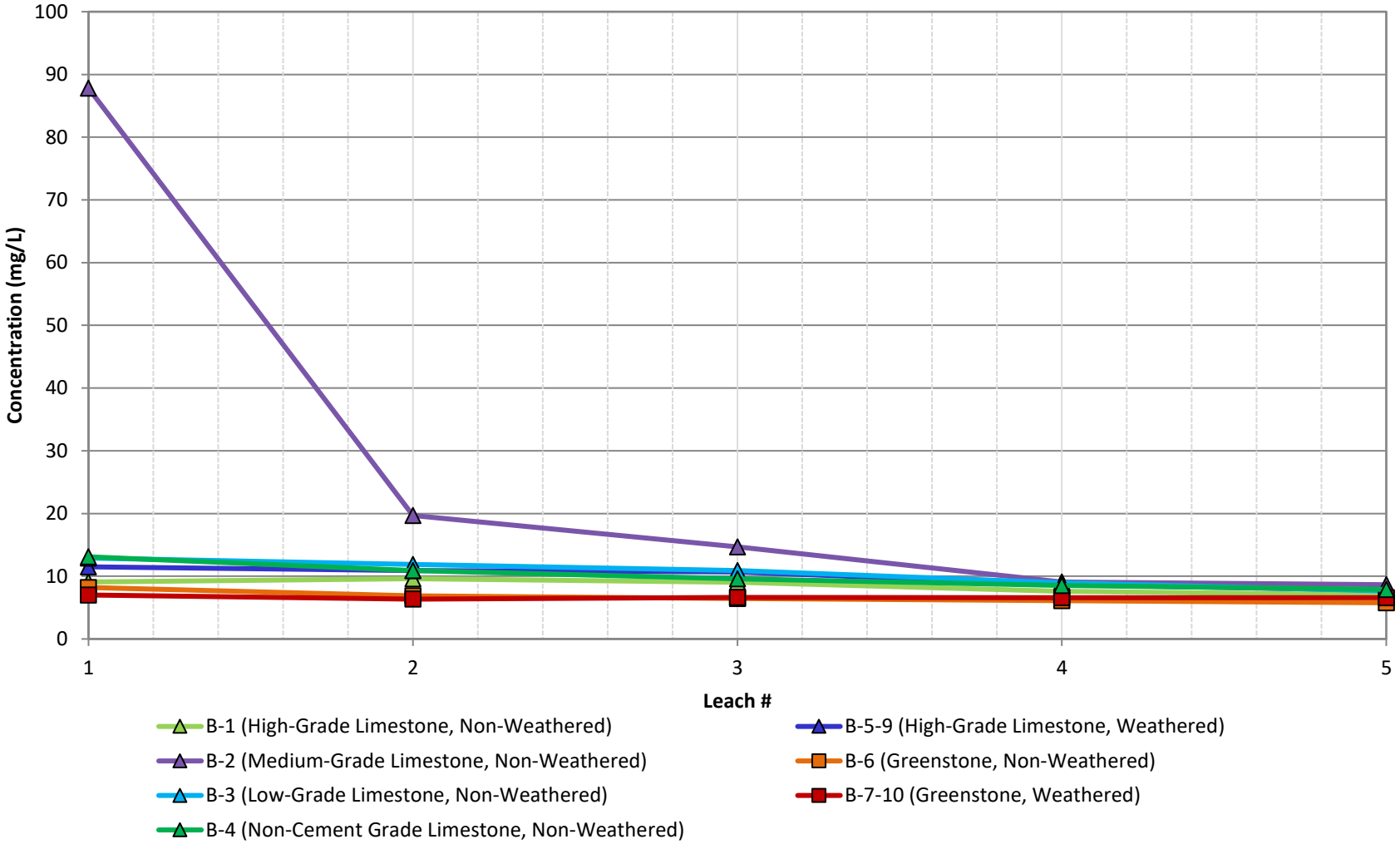
*Open symbols denote values at or below the method detection limit

WSP GOLDER	Title: **Sequential Modified WET- Beryllium**		
	Project Name	Project No. 31405507	FIGURE C-11
	Client Name: Lehigh Permanente	Date: 8/4/2022	



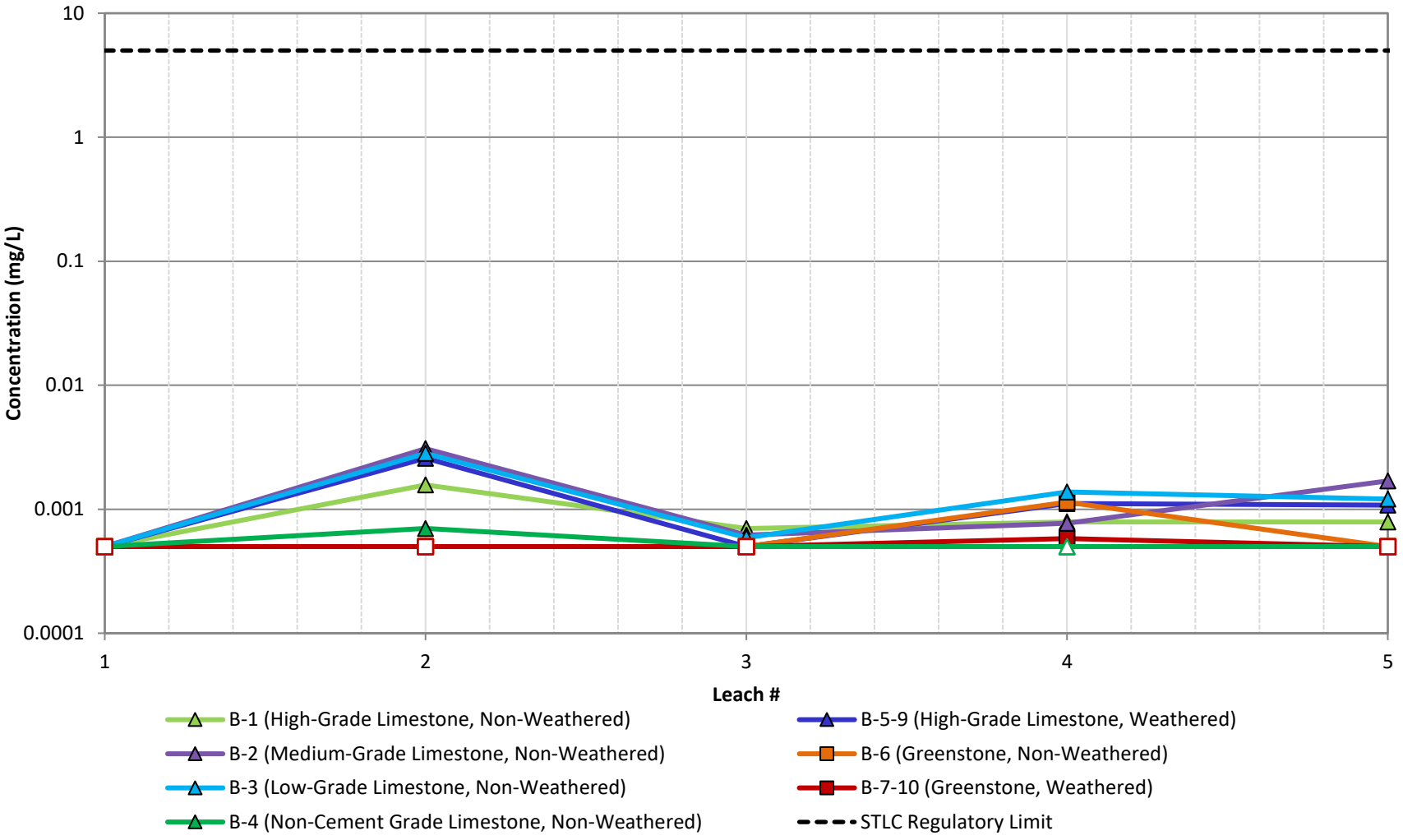
*Open symbols denote values at or below the method detection limit

WSP GOLDER	Title: **Sequential Modified WET- Cadmium**		
	Project Name	Project No. 31405507	FIGURE C-12
	Client Name: Lehigh Permanente	Date: 8/4/2022	



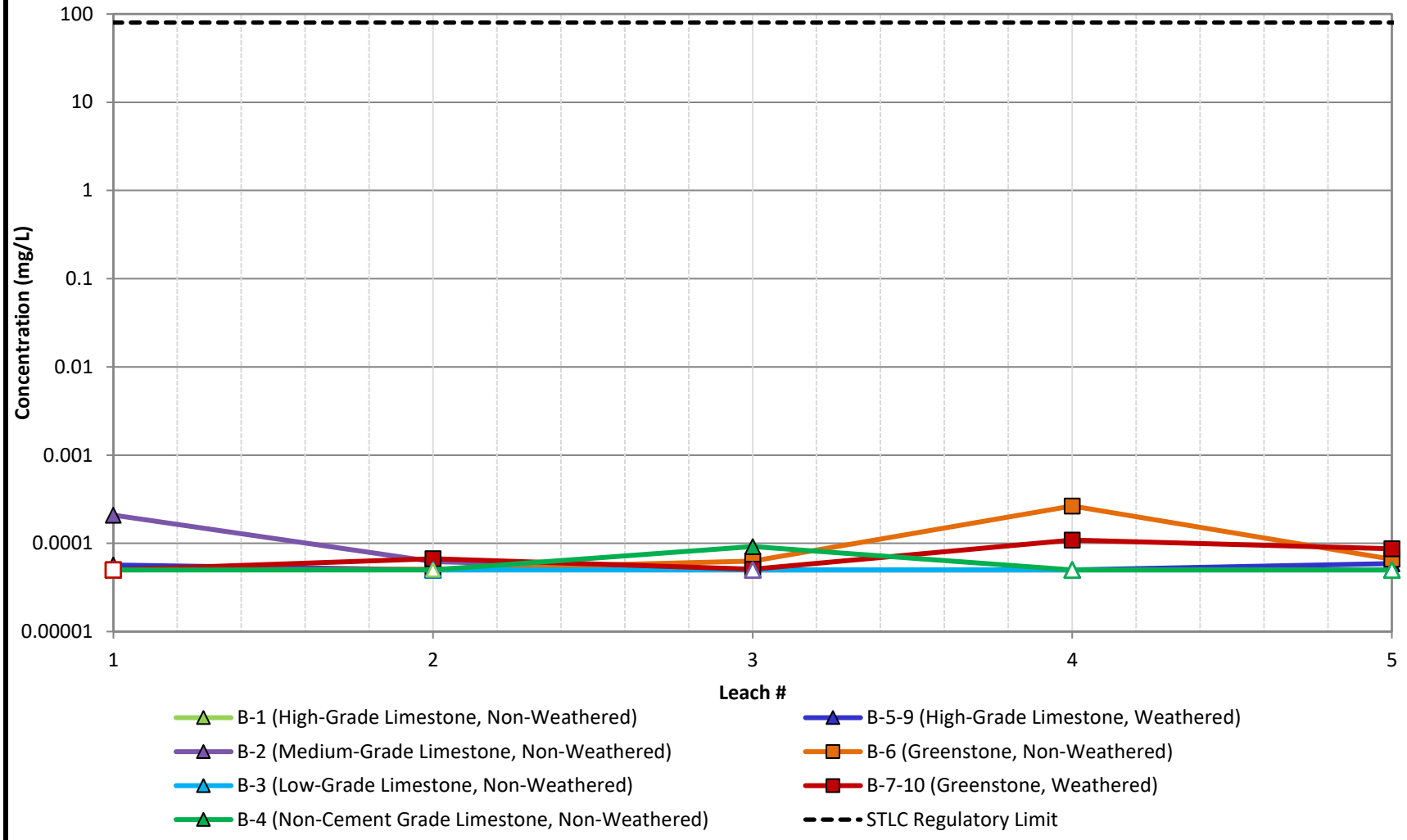
*Open symbols denote values at or below the method detection limit

WSP GOLDER	Title: **Sequential Modified WET- Calcium**		
	Project Name	Project No. 31405507	FIGURE C-13
	Client Name: Lehigh Permanente	Date: 8/4/2022	



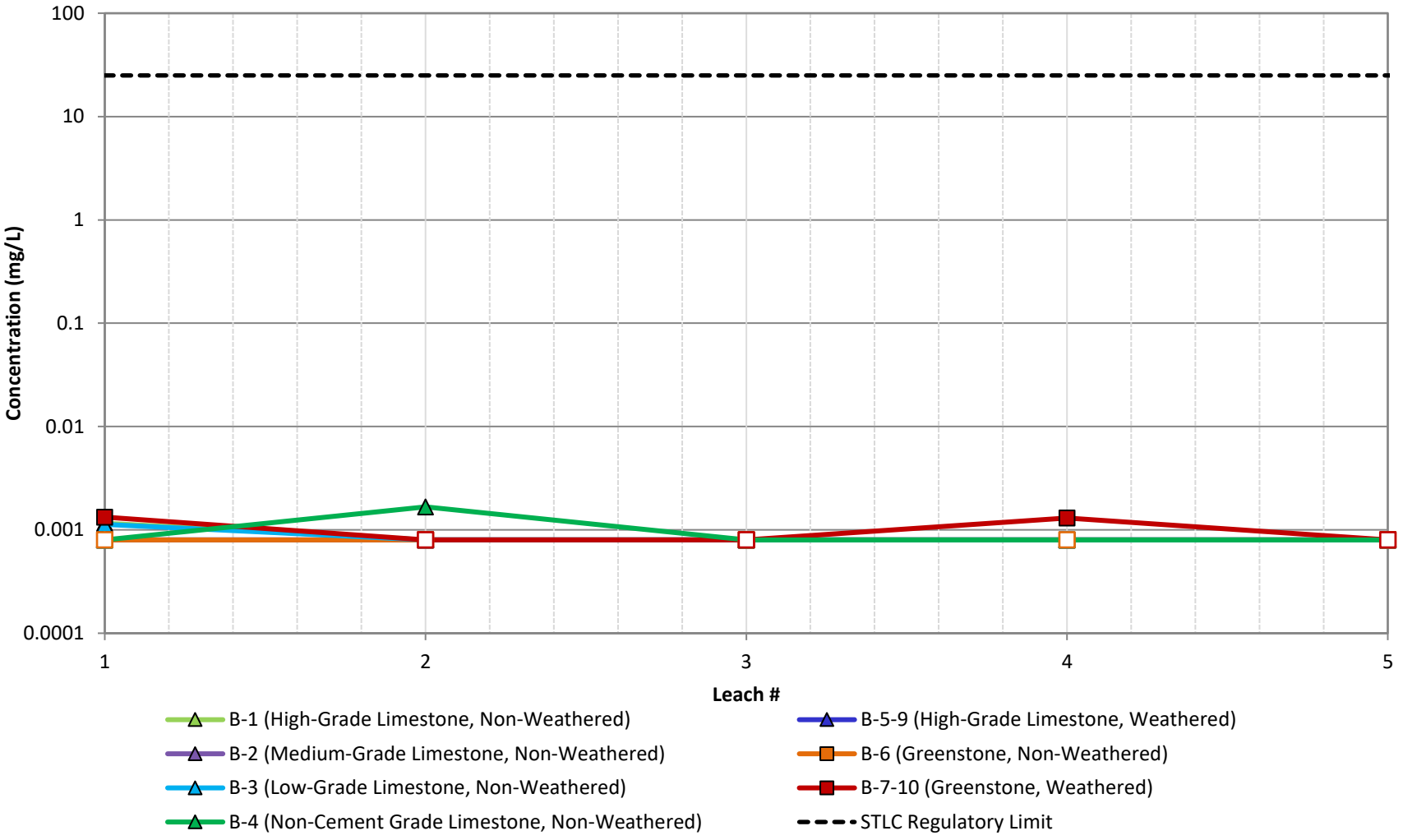
*Open symbols denote values at or below the method detection limit

WSP GOLDER	Title: **Sequential Modified WET- Chromium**		
	Project Name	Project No. 31405507	FIGURE C-14
	Client Name: Lehigh Permanente	Date: 8/4/2022	



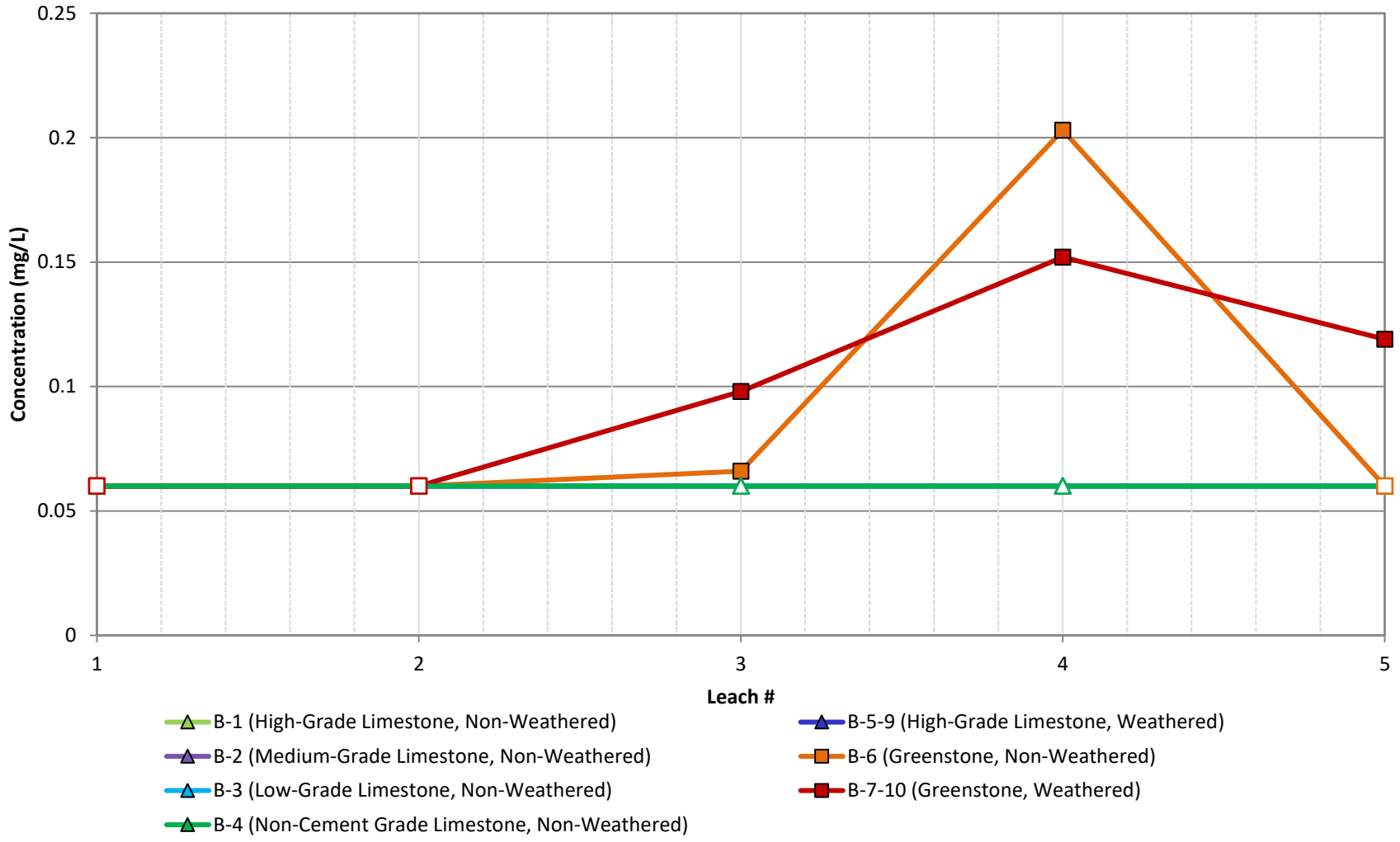
*Open symbols denote values at or below the method detection limit

WSP GOLDER	Title: **Sequential Modified WET- Cobalt**		
	Project Name	Project No. 31405507	FIGURE C-15
	Client Name: Lehigh Permanente	Date: 8/4/2022	



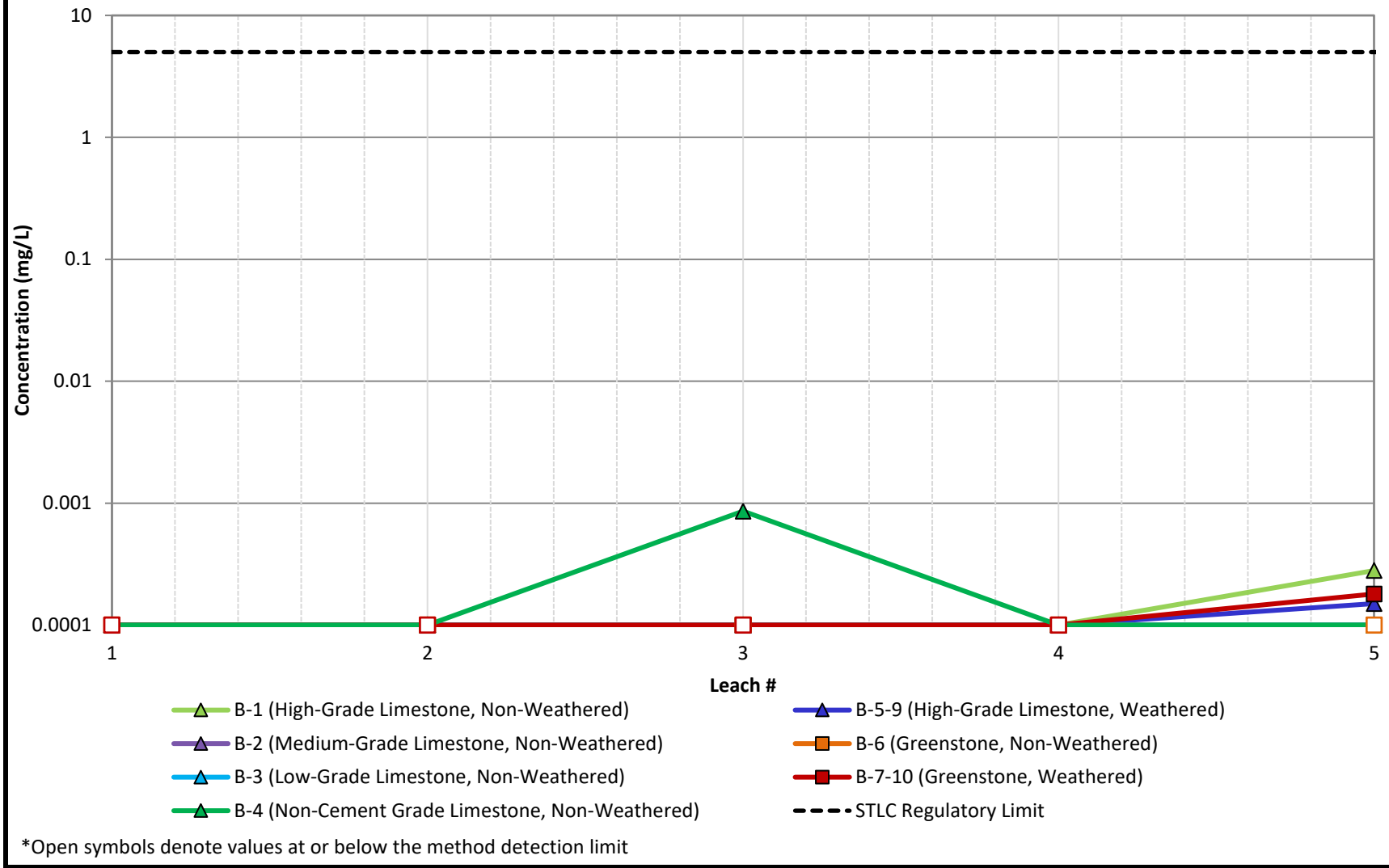
*Open symbols denote values at or below the method detection limit

WSP GOLDER	Title: **Sequential Modified WET- Copper**		
	Project Name	Project No. 31405507	FIGURE C-16
	Client Name: Lehigh Permanente	Date: 8/4/2022	



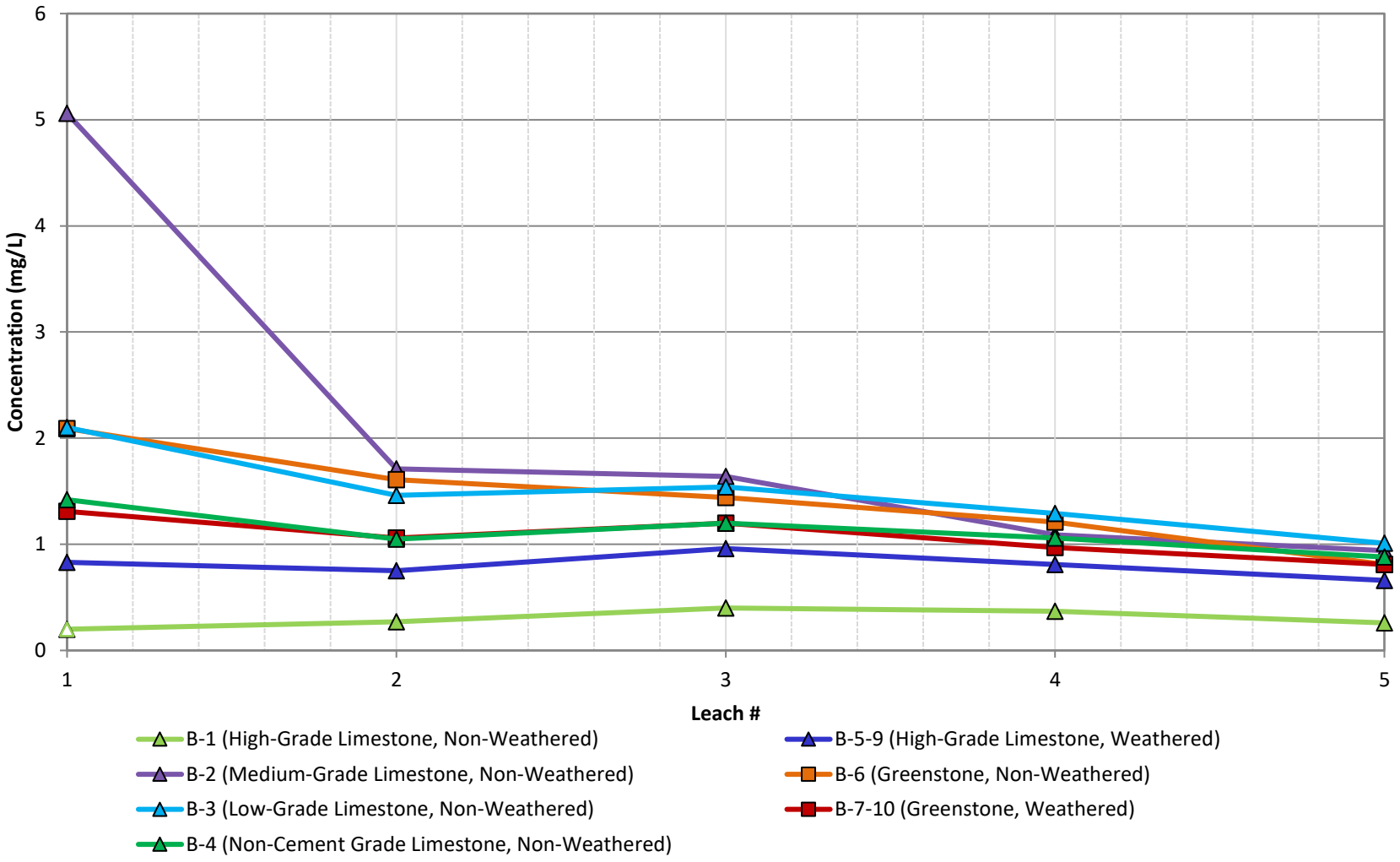
*Open symbols denote values at or below the method detection limit

WSP GOLDER	Title: **Sequential Modified WET- Iron**		
	Project Name	Project No. 31405507	FIGURE C-17
	Client Name: Lehigh Permanente	Date: 8/4/2022	



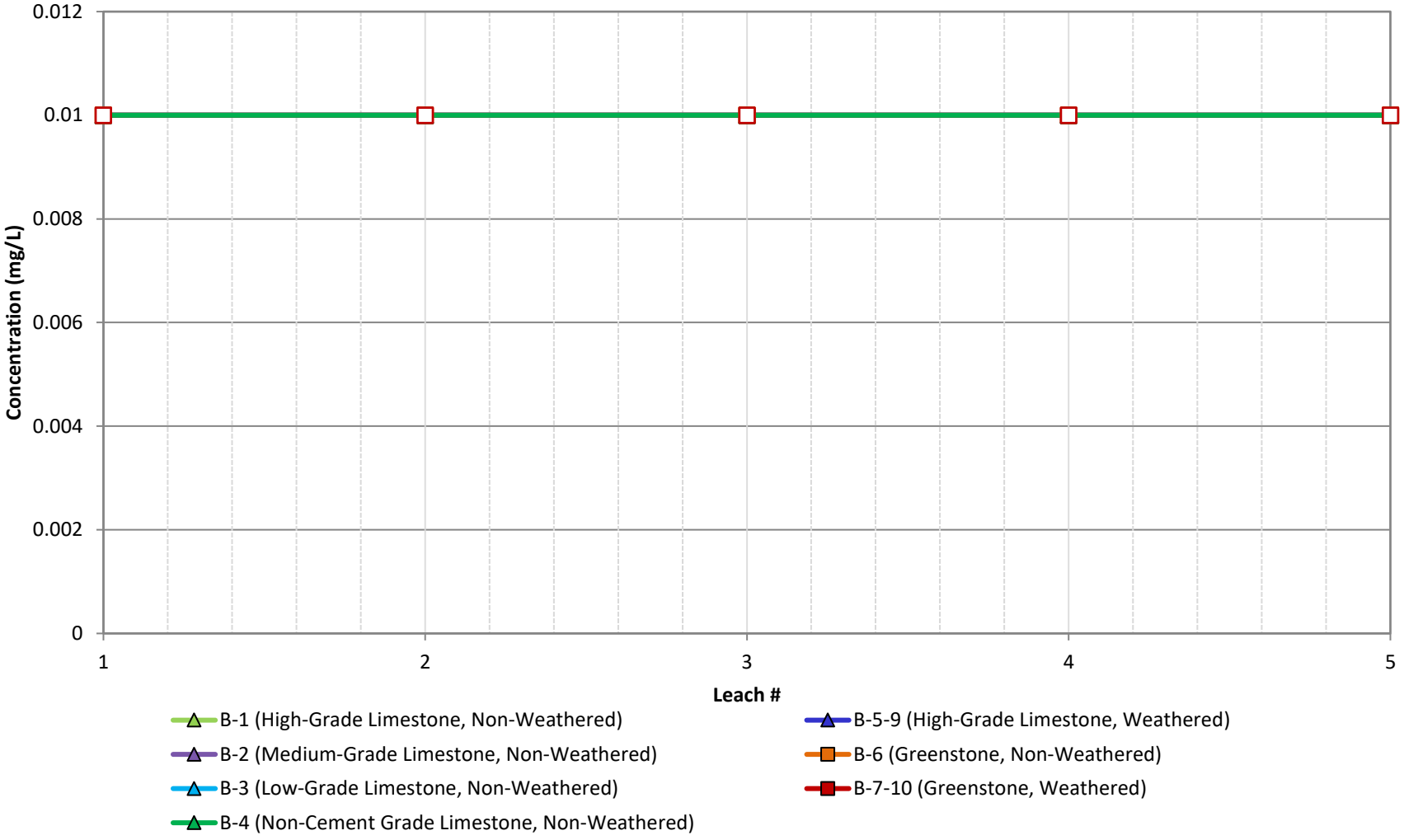
*Open symbols denote values at or below the method detection limit

WSP GOLDER	Title: **Sequential Modified WET- Lead**		
	Project Name	Project No. 31405507	FIGURE C-18
	Client Name: Lehigh Permanente	Date: 8/4/2022	



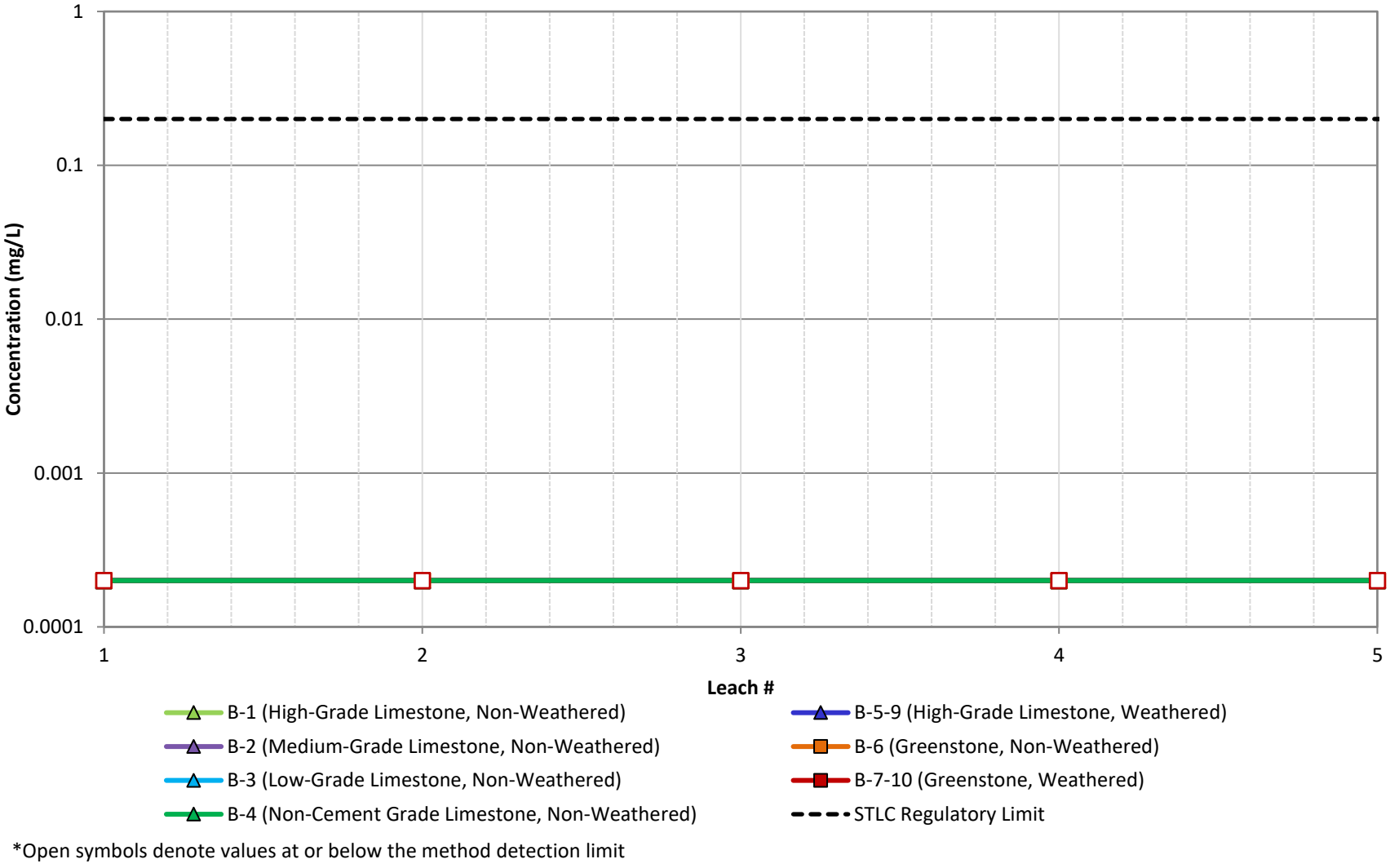
*Open symbols denote values at or below the method detection limit

WSP GOLDER	Title: **Sequential Modified WET- Magnesium**		
	Project Name	Project No. 31405507	FIGURE C-19
	Client Name: Lehigh Permanente	Date: 8/4/2022	



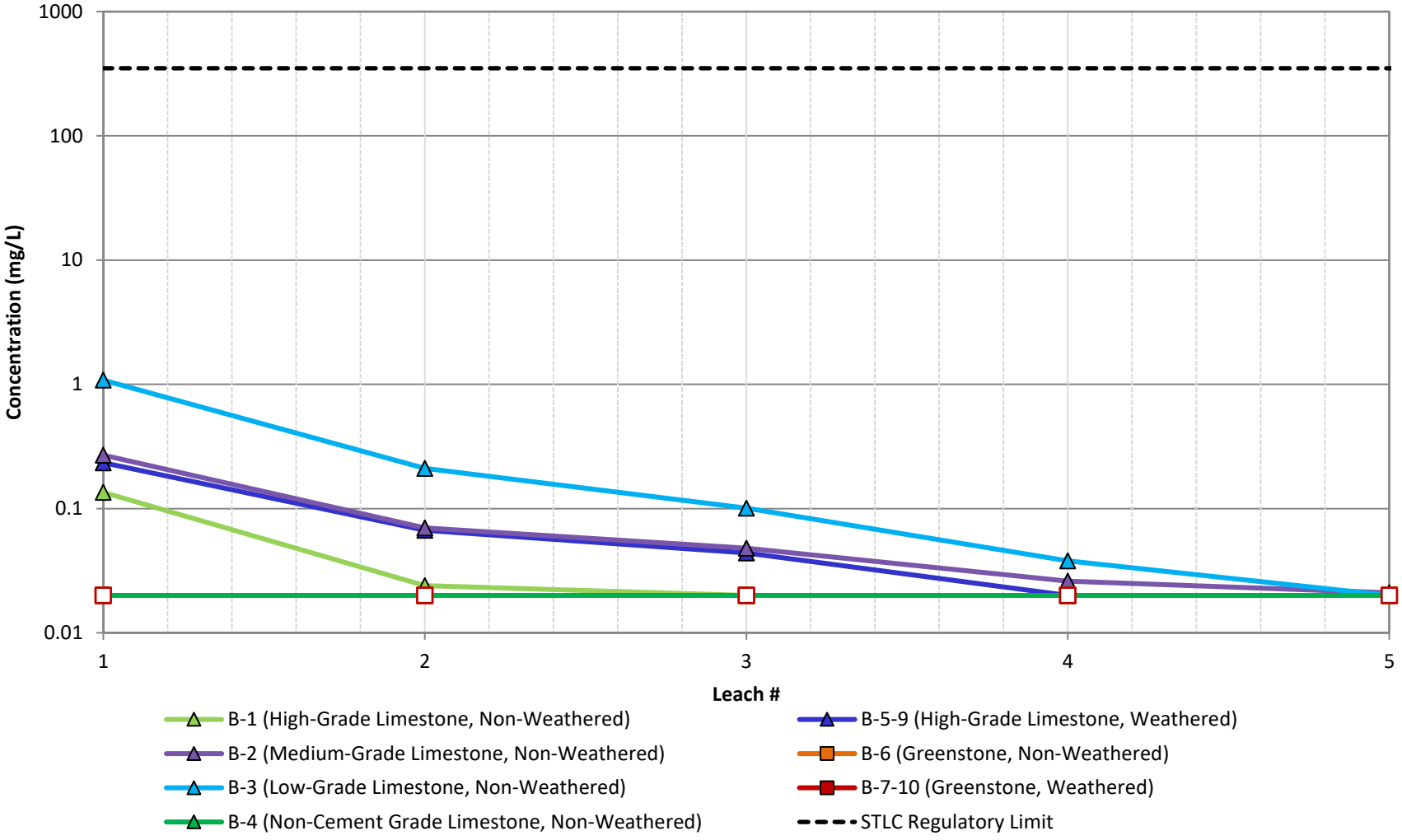
*Open symbols denote values at or below the method detection limit

WSP GOLDER	Title: **Sequential Modified WET- Manganese**		
	Project Name	Project No. 31405507	FIGURE C-20
	Client Name: Lehigh Permanente	Date: 8/4/2022	



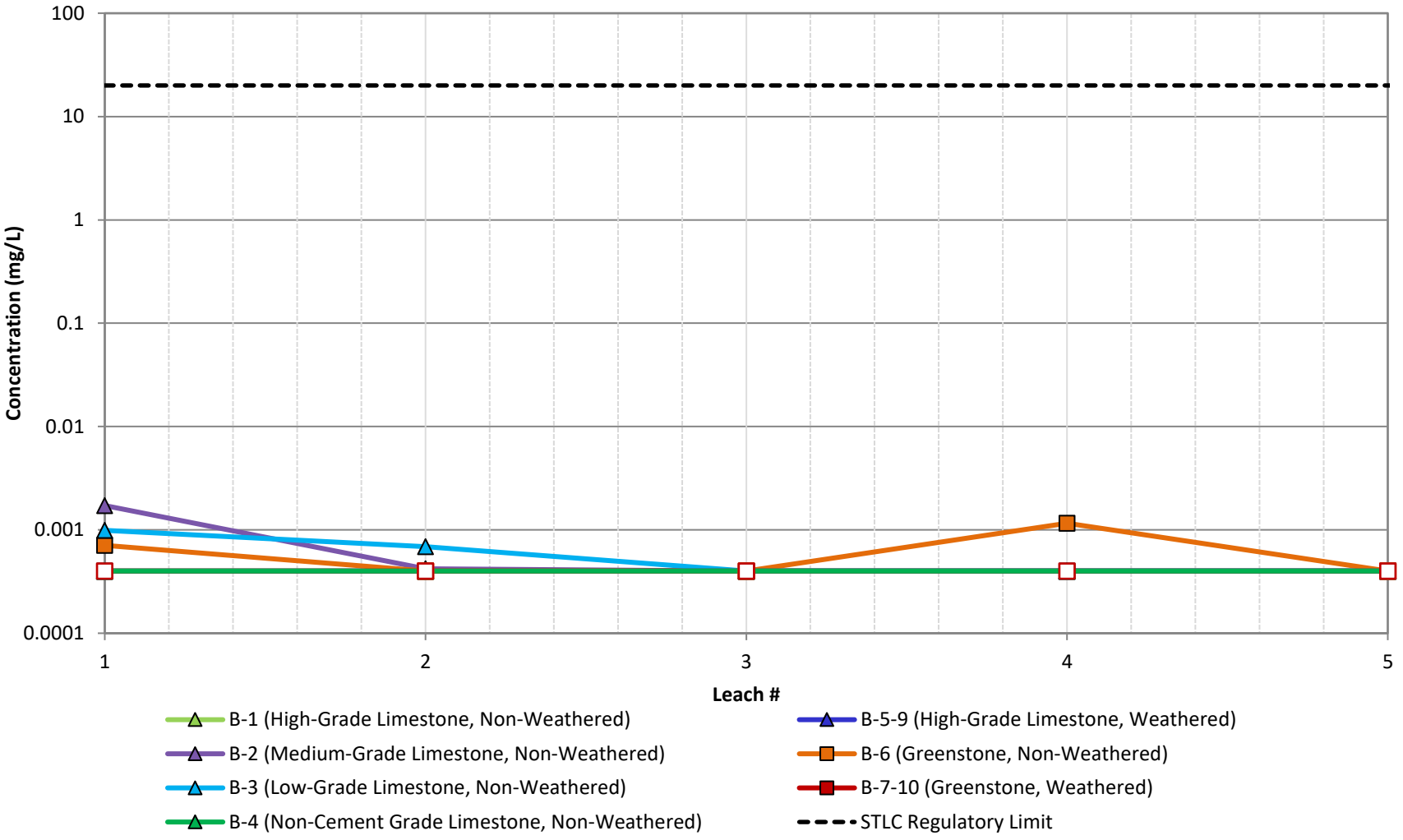
*Open symbols denote values at or below the method detection limit

WSP GOLDER	Title: **Sequential Modified WET- Mercury**		
	Project Name	Project No. 31405507	FIGURE C-21
	Client Name: Lehigh Permanente	Date: 8/4/2022	



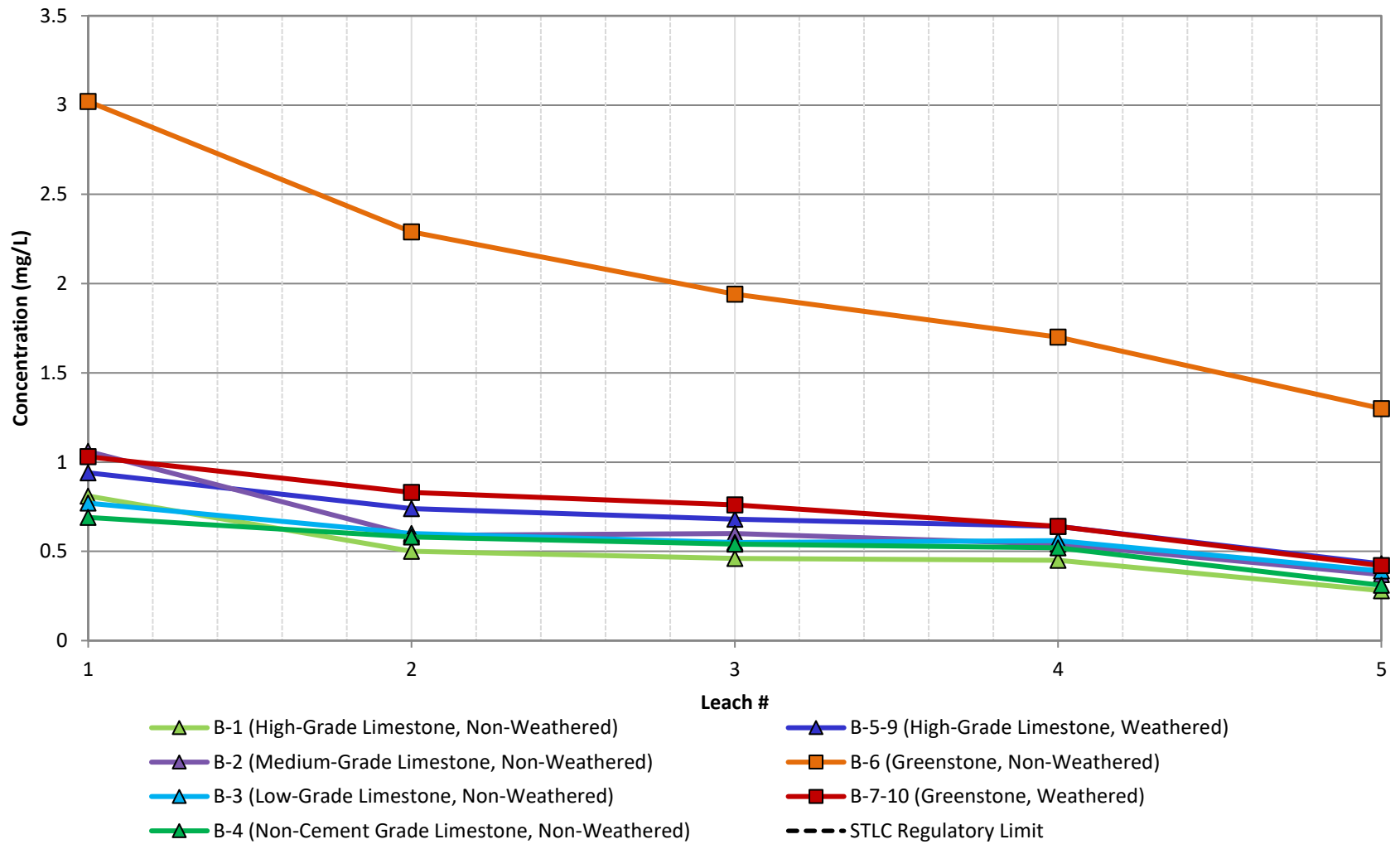
*Open symbols denote values at or below the method detection limit

WSP GOLDER	Title: **Sequential Modified WET- Molybdenum**		
	Project Name	Project No. 31405507	FIGURE C-22
	Client Name: Lehigh Permanente	Date: 8/4/2022	



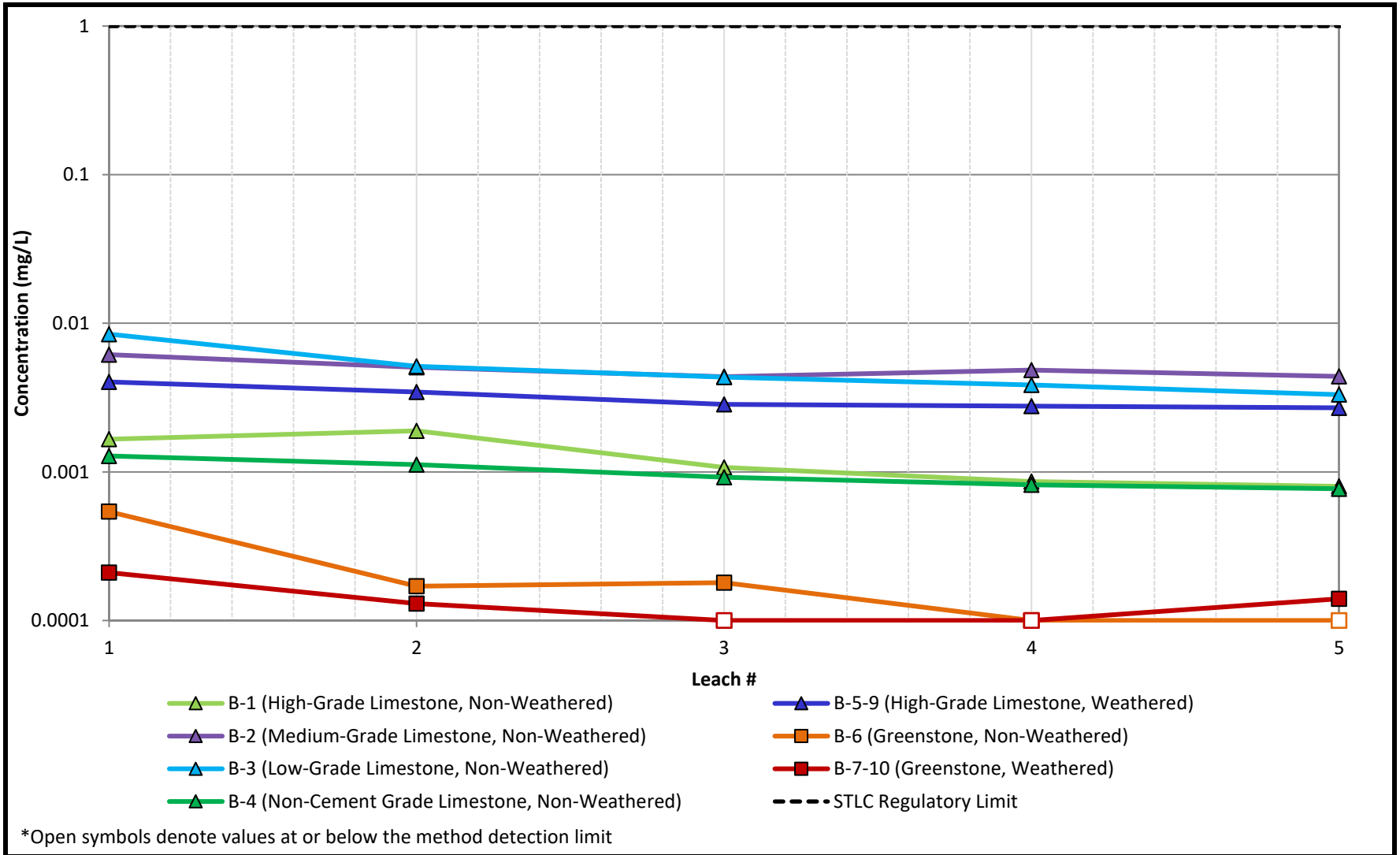
*Open symbols denote values at or below the method detection limit

WSP GOLDER	Title: **Sequential Modified WET- Nickel**		
	Project Name	Project No. 31405507	FIGURE C-23
	Client Name: Lehigh Permanente	Date: 8/4/2022	



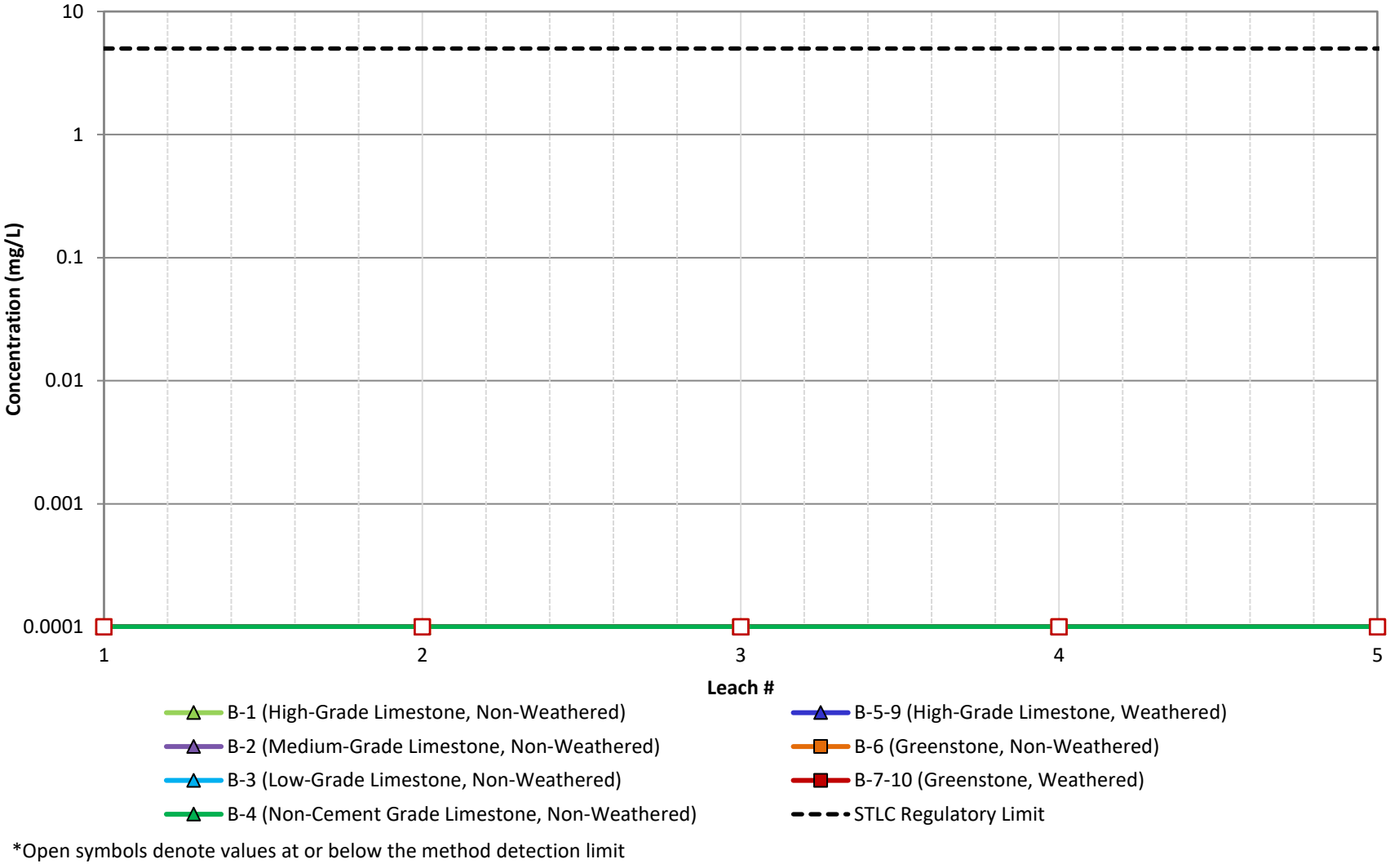
*Open symbols denote values at or below the method detection limit

WSP GOLDER	Title: **Sequential Modified WET- Potassium**		
	Project Name	Project No. 31405507	FIGURE C-24
	Client Name: Lehigh Permanente	Date: 8/4/2022	



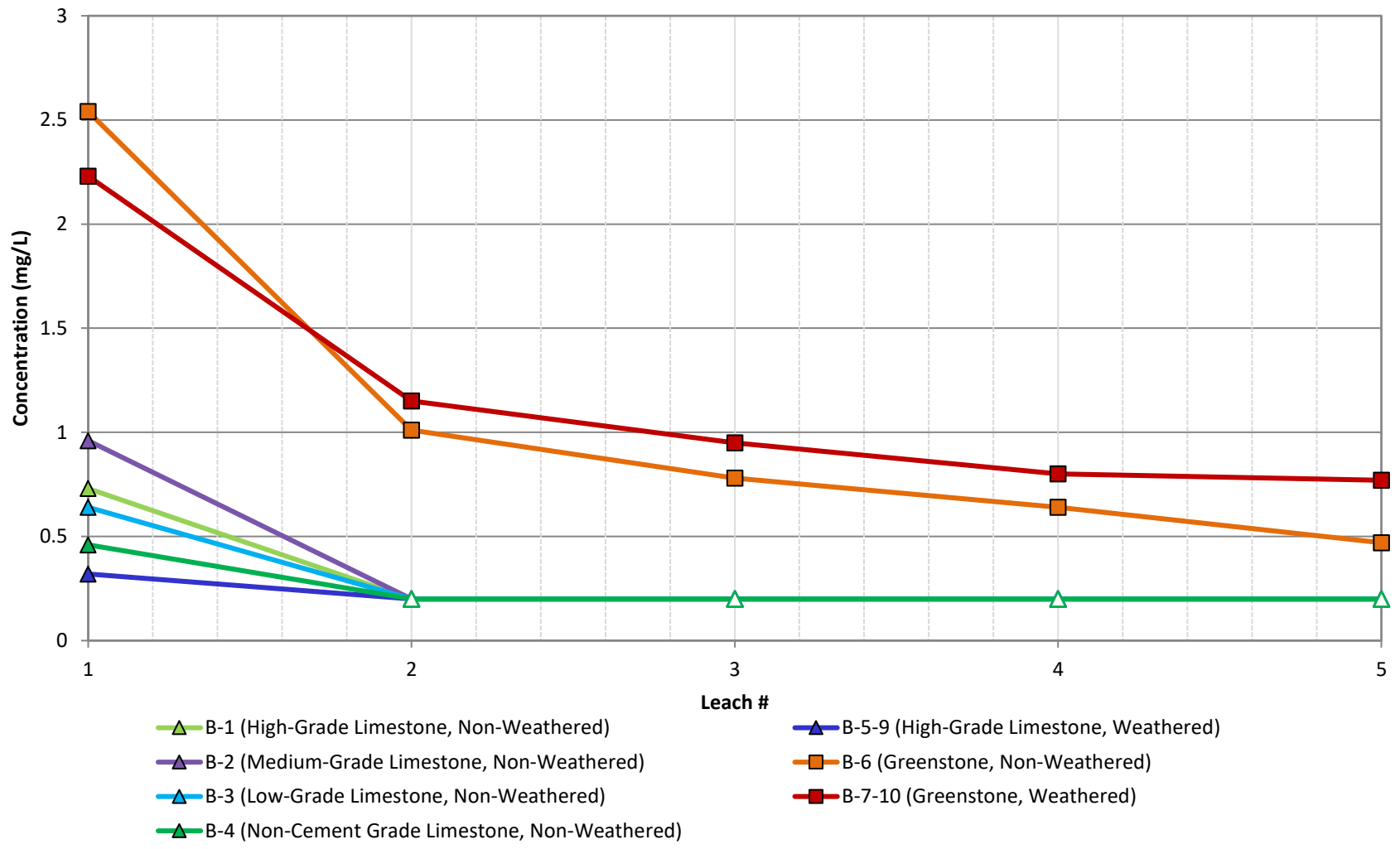
*Open symbols denote values at or below the method detection limit

WSP GOLDER	Title: **Sequential Modified WET- Selenium**		
	Project Name	Project No. 31405507	FIGURE C-25
	Client Name: Lehigh Permanente	Date: 8/4/2022	



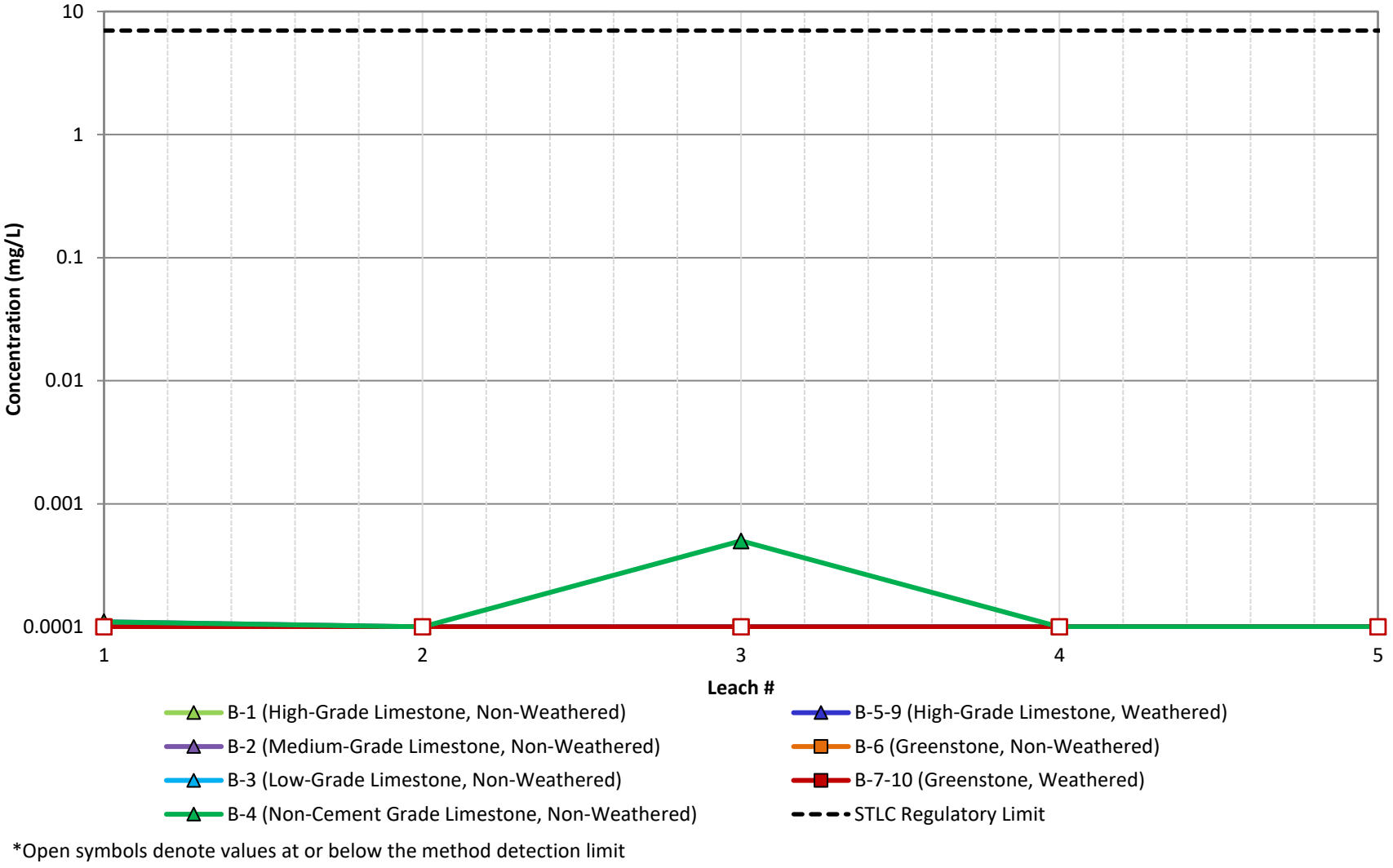
*Open symbols denote values at or below the method detection limit

WSP GOLDER	Title: **Sequential Modified WET- Silver**		
	Project Name	Project No. 31405507	FIGURE C-26
	Client Name: Lehigh Permanente	Date: 8/4/2022	



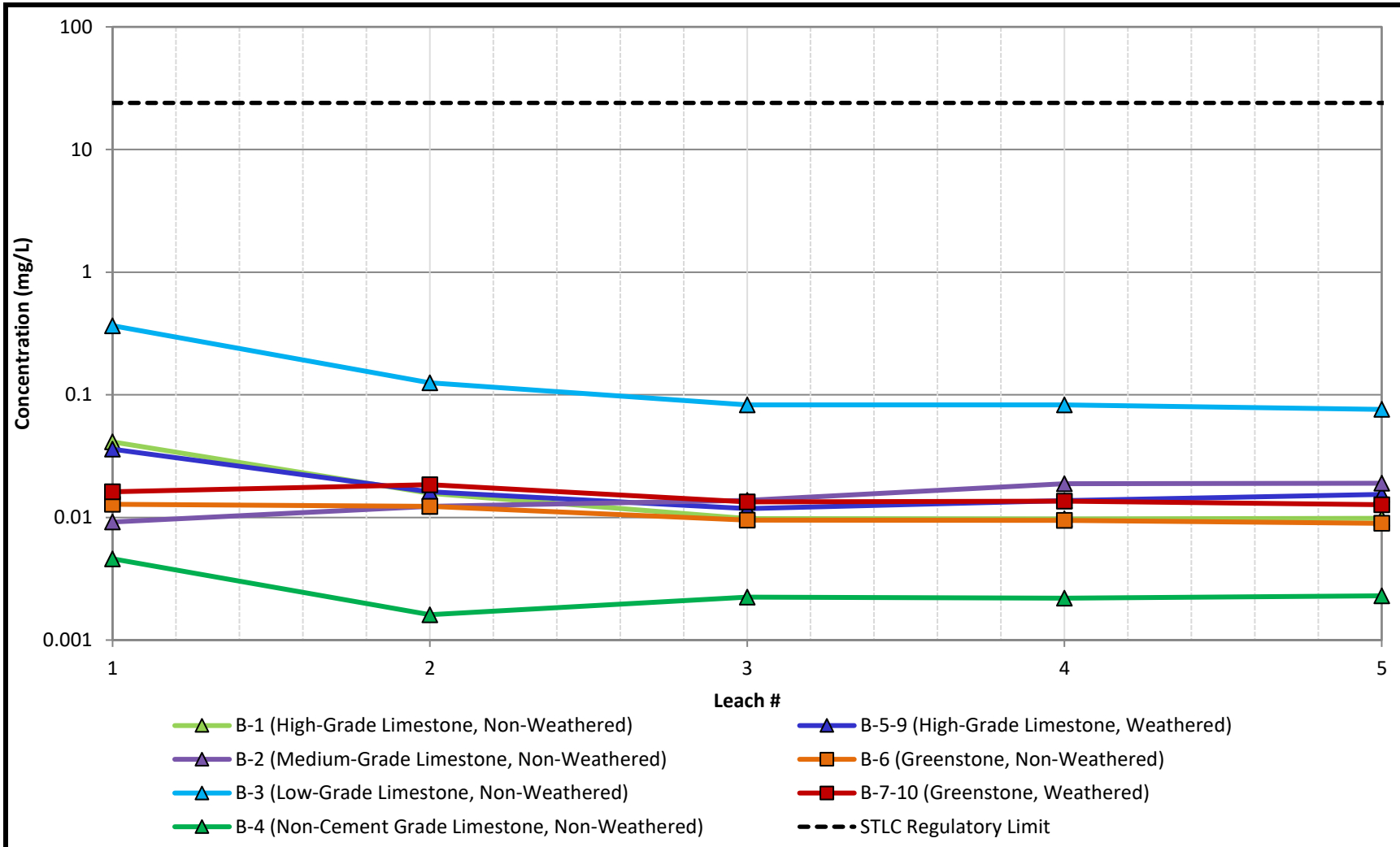
*Open symbols denote values at or below the method detection limit

WSP GOLDER	Title: **Sequential Modified WET- Sodium**		
	Project Name	Project No. 31405507	FIGURE C-27
	Client Name: Lehigh Permanente	Date: 8/4/2022	



*Open symbols denote values at or below the method detection limit

WSP GOLDER	Title: **Sequential Modified WET- Thallium**		
	Project Name	Project No. 31405507	FIGURE C-28
	Client Name: Lehigh Permanente	Date: 8/4/2022	



*Open symbols denote values at or below the method detection limit

WSP GOLDER	Title: **Sequential Modified WET- Vanadium**		
	Project Name	Project No. 31405507	FIGURE C-29
	Client Name: Lehigh Permanente	Date: 8/4/2022	

APPENDIX K

Stantec 2022

Permanente Creek Restoration Plan Stability Analysis

Stantec

Memo

To:	Carolina Addison Lehigh Permanente	From:	Paul Kos Denver
Project/File:	233001622	Date:	August 26, 2022

Reference: PCRP Stability Analysis- DRAFT

INTRODUCTION

Lehigh Southwest Cement Company (Lehigh), a subsidiary of Lehigh Hanson, Inc., engaged Stantec Consulting Services Inc. (Stantec) to provide professional engineering services for geotechnical analysis related to proposed grading associated with the Permanente Creek Restoration Project (PCRP) at the Permanente Facility in Cupertino, California. An element of the PCRP involves removing material from the creek corridor and adjacent slopes. The PCRP design and grading plans are presented in the associated report prepared by Waterways (90% Designs, dated August 26, 2022). The grading plans were provided to Stantec by Waterways, and Stantec performed geotechnical analyses of the proposed slopes in support of the environmental review and subsequent permit applications.

This PCRP Stability Analysis has been prepared to assist Lehigh with upcoming environmental review and subsequent permit applications to relevant regulatory agencies. This report documents the results of static and pseudo-static slope stability analyses of the reclamation surface. The report does not contain the creek restoration design details and shall be reviewed in conjunction with Waterways' 90% Designs.

BACKGROUND

The Permanente Facility is a limestone and aggregate mining operation, active since the late 1930's, in the unincorporated foothills of western Santa Clara County, approximately two miles west of the City of Cupertino, California. The Quarry occupies a portion of a 3,510-acre property (Permanente Property) owned by Hanson Permanente Cement, Inc. and operated by Lehigh.

The Permanente Property is situated in the rugged foothills along the eastern side of the Santa Cruz Mountains segment of the California Coast Ranges. This area of the Coast Ranges is characterized by moderately to steeply sloping hillsides ranging from approximately 500 to 2,000 feet (ft) above mean sea level (AMSL). The eastern side of the range is incised with eastern flowing drainages, including the Permanente Creek Drainage Basin, which flows through the central part of the Permanente Property, and flows through the Cities of Los Altos and Mountain View and into Mountain View Slough or Stevens Creek through the Stevens Creek Diversion Channel operated by the Santa Clara Valley Water District, which ultimately can reach the San Francisco Bay.

GEOLOGIC SETTING

The geology in the project area is complex due to the faulting and deformation associated with the Franciscan Complex. This geologic unit consists of faulted limestone and metabasalts (greenstone) and also contains basalt, diorite, shale, sandstone, chert, greywacke, and schist. Structure in the area includes numerous low- and high-angle faults. Low-angle faults separate limestone units from greenstone units and

tend to follow the limestone bedding planes and typically dip to the southeast at 10° to 40°. High-angle faults, including the regional Berrocal Fault, are typically oriented in the northwest-southeast direction and dip at greater than 60°. The geology has been mapped several times by different geologists, and numerous drilling programs have been conducted. The results of these previous studies on the geologic units, structure, and interpretation were included in previous submittals (Golder 2011 and Foruria 2004).

PREVIOUS GEOTECHNICAL EVALUATIONS

The geologic and geotechnical properties of the rocks present at the Permanente Quarry have been evaluated several times by several companies. Each investigation included drilling, laboratory testing, assessment of strength parameters for the various rock types encountered, and slope stability calculations. The rock strength parameters were based on laboratory data, rock mass rating (RMR) calculations, and back-analysis of landslide areas. The strength parameters for soil, greenstone overburden, and limestone have been consistent through multiple geotechnical analyses performed by multiple consultants, and these values are listed in Table 1. The strength parameters for greenstone vary significantly depending on the condition of the bedrock and particularly, the amount of weathering and shearing, and lower-bound values have historically been used for design purposes to be conservative. These lower-bound values are based on back-analysis of the Main Slide in the North Quarry. Laboratory data suggest the in-place greenstone may have significantly higher strength, particularly at depths greater than approximately 50 feet, where the bedrock has not been weathered. Site observations also suggest that greenstone strengths are often under-reported as several areas of the highwall are constructed in weathered greenstone, and these areas have maintained their integrity with 50-foot high benches with face angles of 60° to 70° (Golder 2011).

Table 1: Historic Rock Strength Summary

Material	Unit Weight (pcf)	Cohesion (psf)	Φ' (°)
Limestone	165	12,500	30
Greenstone	155-165	1,400-1,880	19-23
Fault	155	0	20
Slide Debris	135	0-700	20-23
Greenstone Overburden	125	0	35
Soil	120	200	30

GEOTECHNICAL STABILITY EVALUATION

The slope stability analyses were modeled using the software Slide2 Modeler version 9 by rocscience, released in 2020. The software used limit equilibrium on slices of potential failure surface to calculate factor of safety (FoS). The models were evaluated under static and pseudo-static conditions, with horizontal ground acceleration, for the designed ramp configuration provided by the site using the Spencer method. The minimum FoS for each model evaluation is included in this report. The two types of analysis have been summarized in Table 2. The minimum acceptable factors of safety for the analyses are 1.3 for static conditions and 1.0 for pseudo-static conditions based on mining industry standards. For the pseudo-static model conditions, a horizontal seismic coefficient of 0.15 times the force of gravity (g) was applied to the

static condition models to be consistent with previous studies and to follow recommendations for earthquakes with magnitudes up to 8.25 (Golder 2011). To evaluate the slope stabilities, cross-sections were analyzed for the reclamation surface.

Table 2: Stability Analyses

Analysis Type	Description	Minimum Acceptable Factor of Safety
Static Analysis	A limit equilibrium method of analysis which satisfies moment and force equilibrium to solve a slope stability problem. The output is a single FoS for the potential failure surface with the lowest FoS.	1.3
Pseudo-static Analysis	A limit equilibrium method of analysis which represents the effects of earthquake shaking by accelerations that create inertial forces. This is the simplest way to analyze the dynamic effects of earthquake loading of a soil or slope. The output is a single FoS for the potential failure surface with the lowest FoS.	1.0

Site specific geotechnical information is available for each rock type on the property, and strength parameters for the material have been established in previous geotechnical analyses (Golder 2011). These strength parameters are based on laboratory testing, back-calculation, and published values for soil properties. These strength parameters are listed in Table 3.

Table 3: Geotechnical Strength Parameters

Material	Unit Weight (pcf)	Cohesion (psf)	Phi' (Degrees)
Greenstone (Weathered)	165	1,800	27
Greenstone (Unweathered)	165	12,500	30
Limestone	165	12,500	30

As previously discussed, the greenstone strengths can vary significantly depending on the degree of weathering, and Stantec focused on evaluating the greenstone strengths as part of this geotechnical investigation. The greenstone strengths were re-evaluated based on RMR classifications. The historic greenstone strength (ϕ'=27° and cohesion=1,800 pounds per square foot [psf]) is suitable for areas that have been weathered and are near the surface. A stronger strength for greenstone is expected for bedrock at depths greater than 50 feet from the surface, which is "beyond" the surficial weathered zone. While this transition to competent bedrock has been demonstrated by drilling, Stantec has used the weathered greenstone strength values for all depths to be conservative. Similarly, there are likely areas with limestone

that would exhibit greater strengths, and these have also not been included in the geotechnical analyses to be conservative.

Stability analyses are focused on areas with greater excavation volumes, particularly the rock pile removal area (Section A) and the 1250 Pond area (Sections C and E); the cross-sections modeled align with Waterway's sections and Waterway's naming conventions have been retained for clarity between the reports. Stantec modelled multiple cross-sections in the Pond 1250 area to evaluate the stability under different slope configurations and excavation depths. The cross-sections extend to the top of the surrounding slopes to evaluate any impacts that the grading may have on the global stability. Stantec adjusted the limits of the analyses to evaluate both the global slope stability and the stability in the area immediately adjacent to the PCRP grading.

The configurations modeled as part of this analysis exceed the minimum acceptable factor of safety, as defined in Table 3. Generally, the elevated geotechnical stability results are from the shallow cut slopes associated with the PCRP grading plan. Results from the stability analyses are shown in Table 4. Printouts of the slope stability sections are attached.

Table 4: Geotechnical Stability Analyses Results

Analysis Area	Analysis method	Section A	Section C	Section E
Cut Slope	Static	1.8	3.0	2.3
	Pseudo-Static	1.7	2.8	2.2
Global Slope	Static	1.5	2.8	1.5
	Pseudo-Static	1.5	2.7	1.4

CLOSURE

This report provides the analysis and supporting information needed to demonstrate that Lehigh Southwest Cement Company's plan for the PCRP meets design and performance requirements under static and seismic conditions. The PCRP will be excavated so that stable slopes remain. As mutual protection to Lehigh, the public, and Stantec, this report was submitted for exclusive use by Lehigh Southwest Cement Company. Our report and recommendations should not be reproduced in whole or in part without the supporting Waterways 90% Design report and our express written permission, other than as required in relation to agency review and submittals. A draft of this report was reviewed by personnel from Lehigh Southwest Cement Company.

Regards,

STANTEC CONSULTING SERVICES INC.

Reference: PCRP Stability Analysis

Paul Kos P.E.
Senior Geological Engineer
Mobile: 303-570-9163
paul.kos@stantec.com

Attachment: Stability Model Reports

Stantec

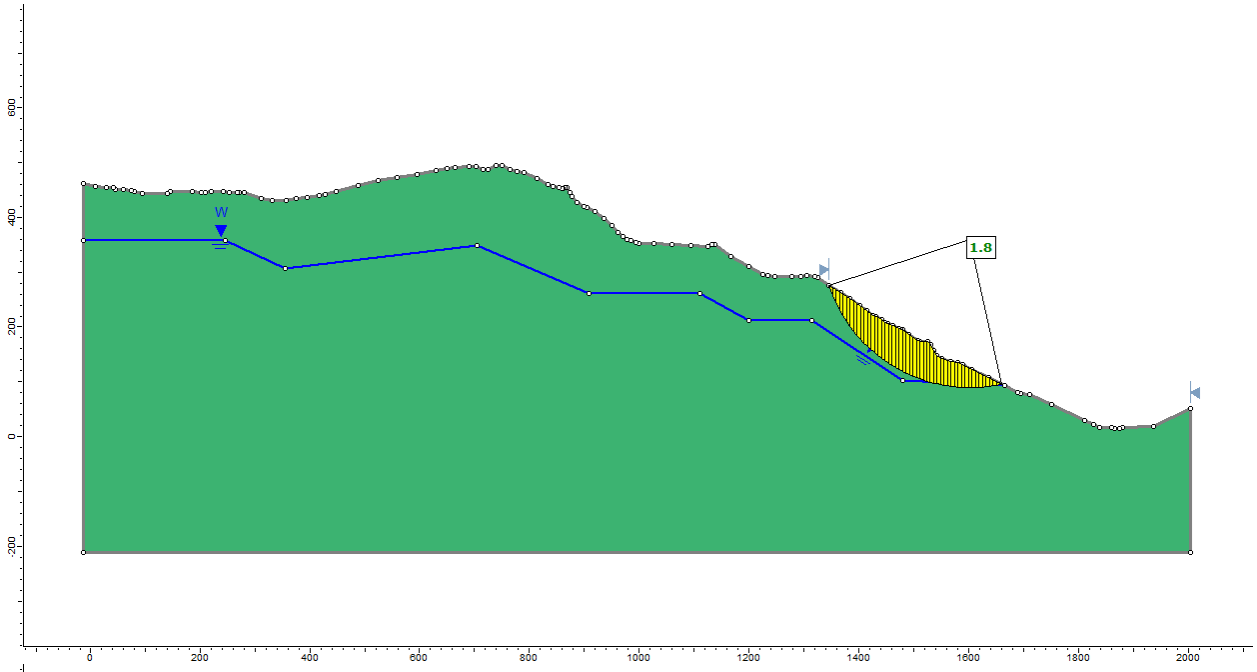
Memo

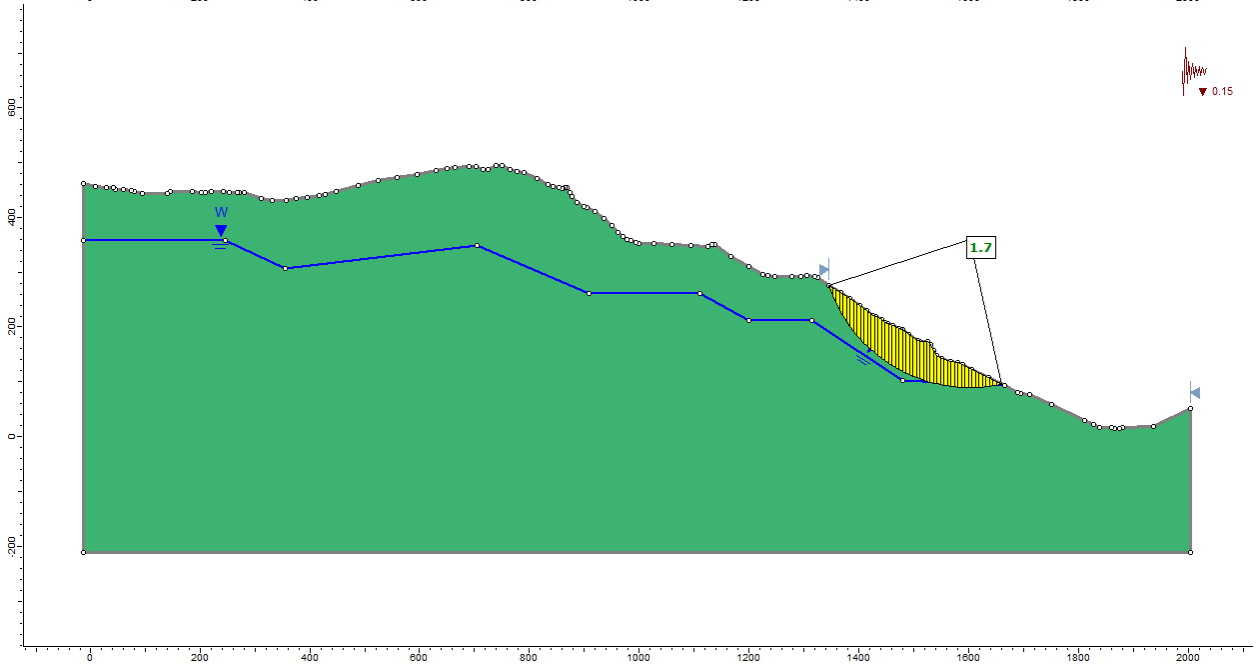
Attachment A

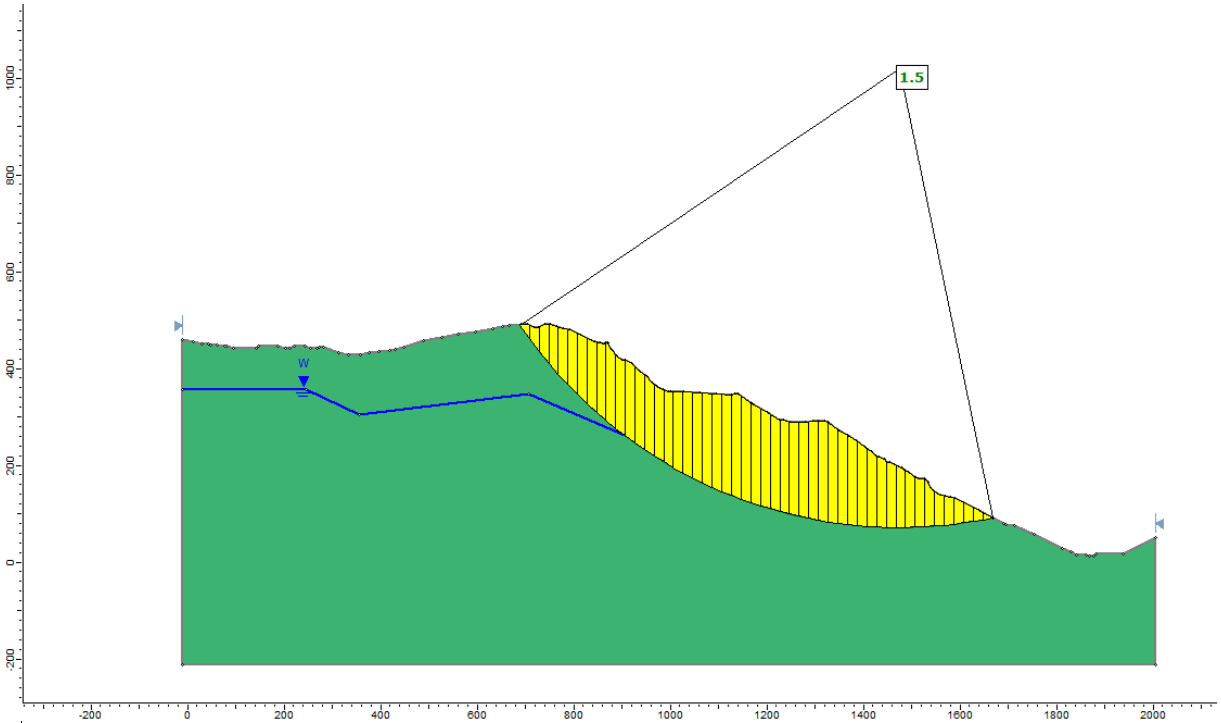
Stability Model Reports

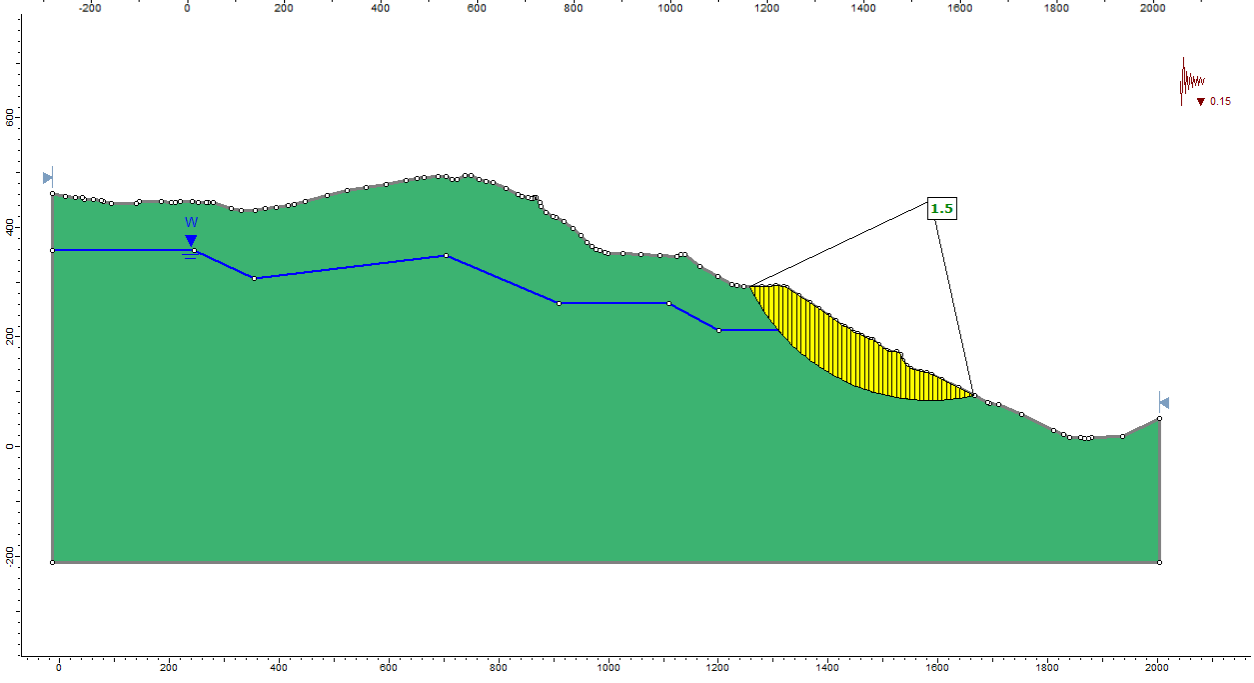
Design with community in mind

SECTION A (Rock Pile Removal Area)

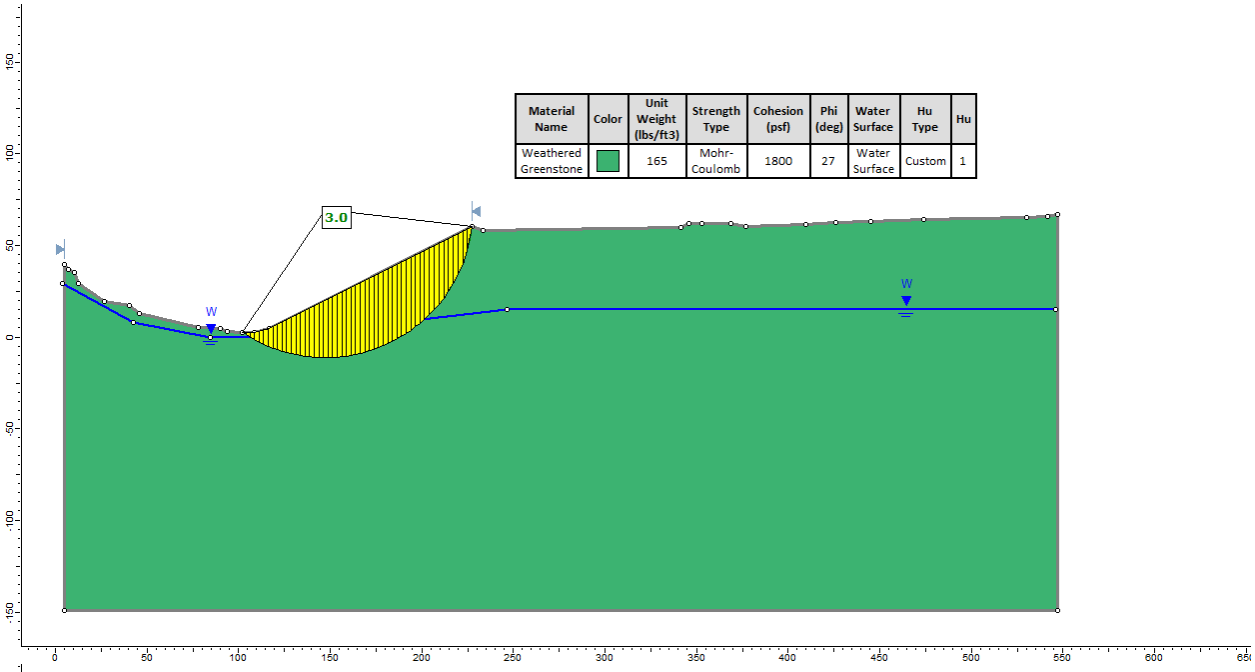


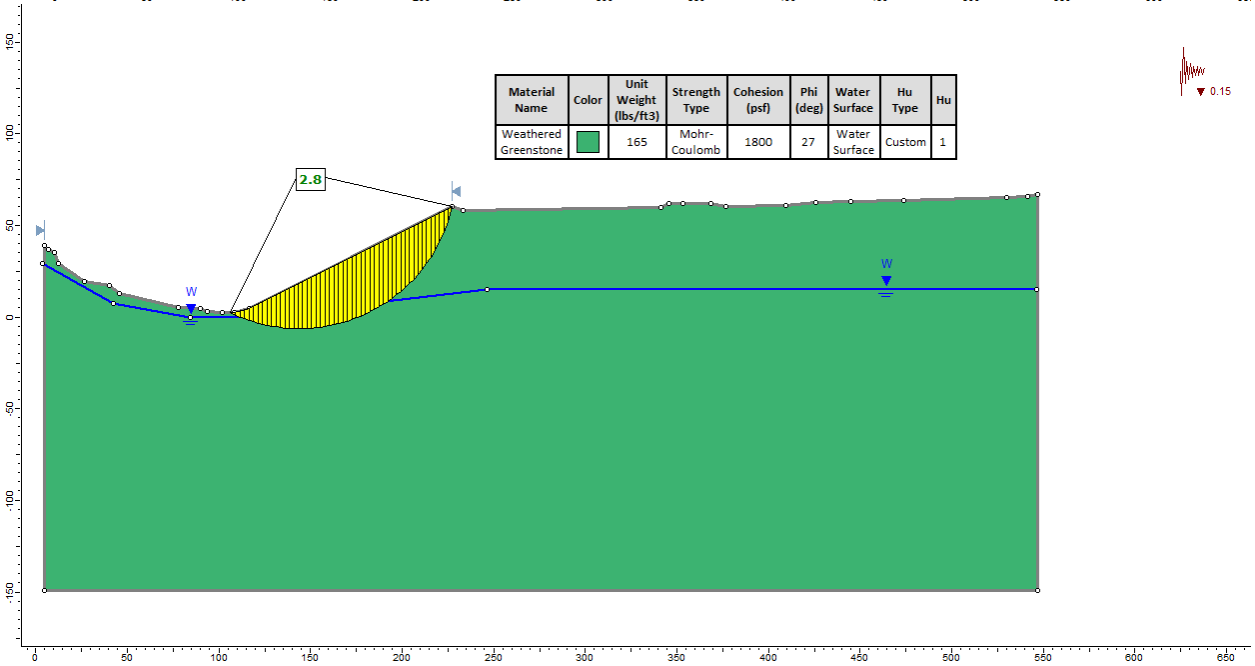


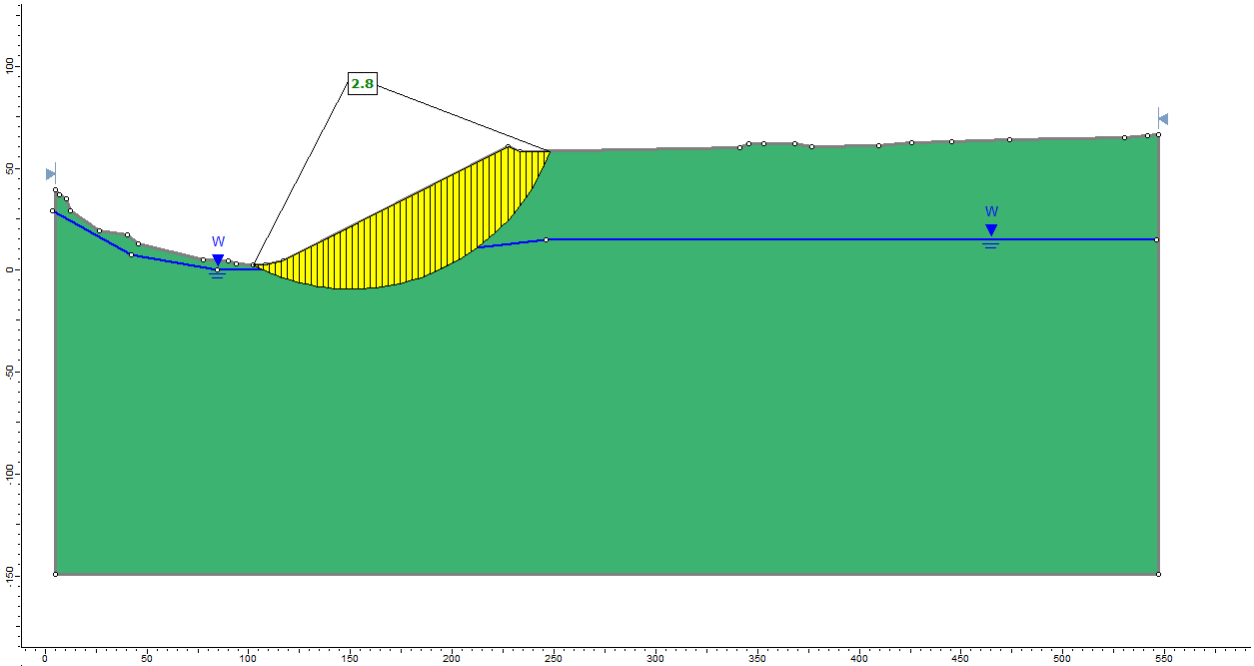

1.5
W
1000
800
600
400
200
0
-200
-200
0
200
400
600
800
1000
1200
1400
1600
1800
2000

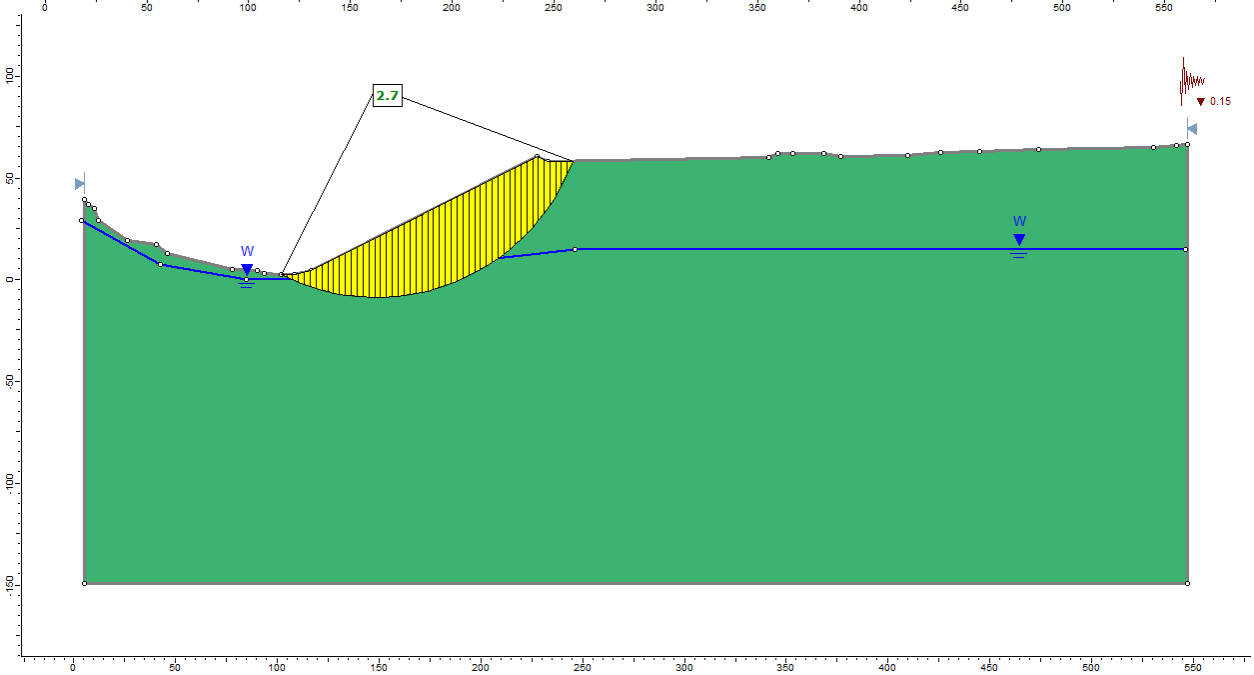

0.15
1.5
W
600
400
200
0
-200
0
200
400
600
800
1000
1200
1400
1600
1800
2000

SECTION C (Pond 1250 Area)

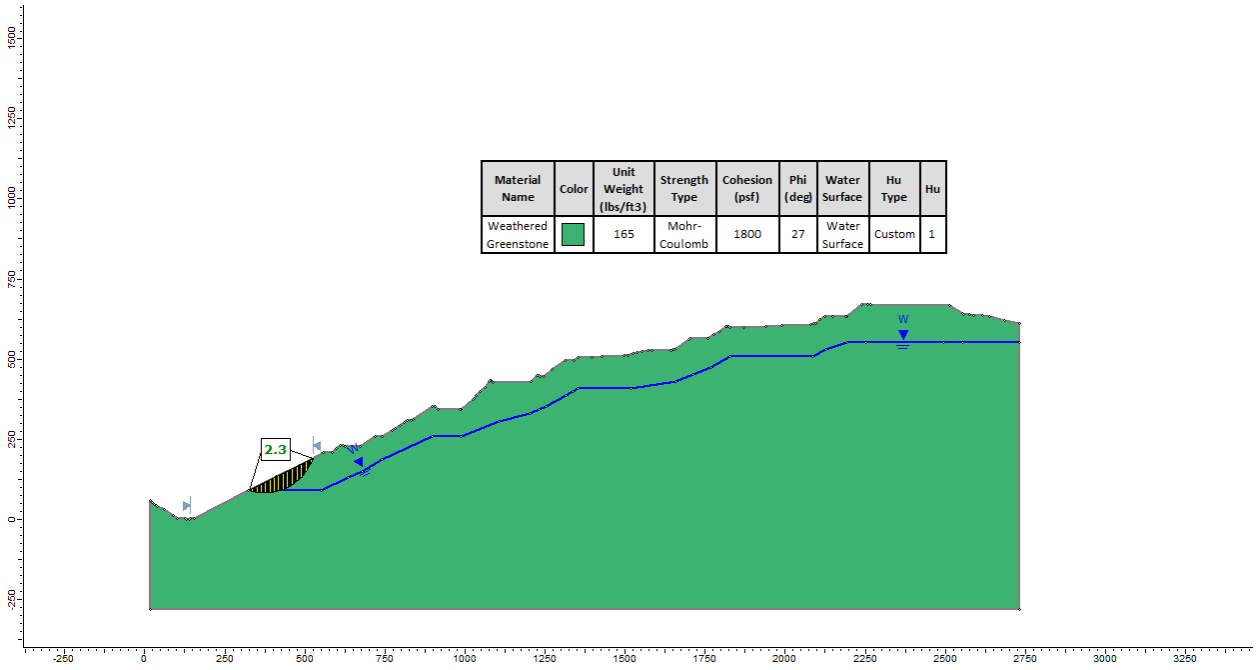


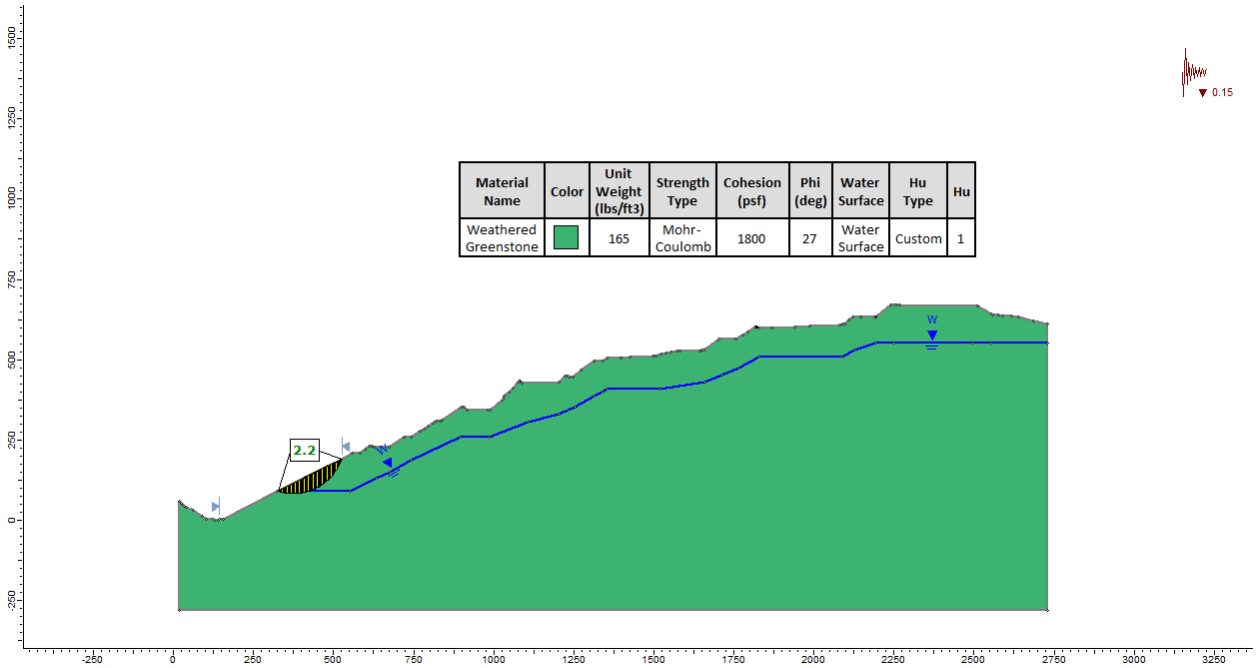


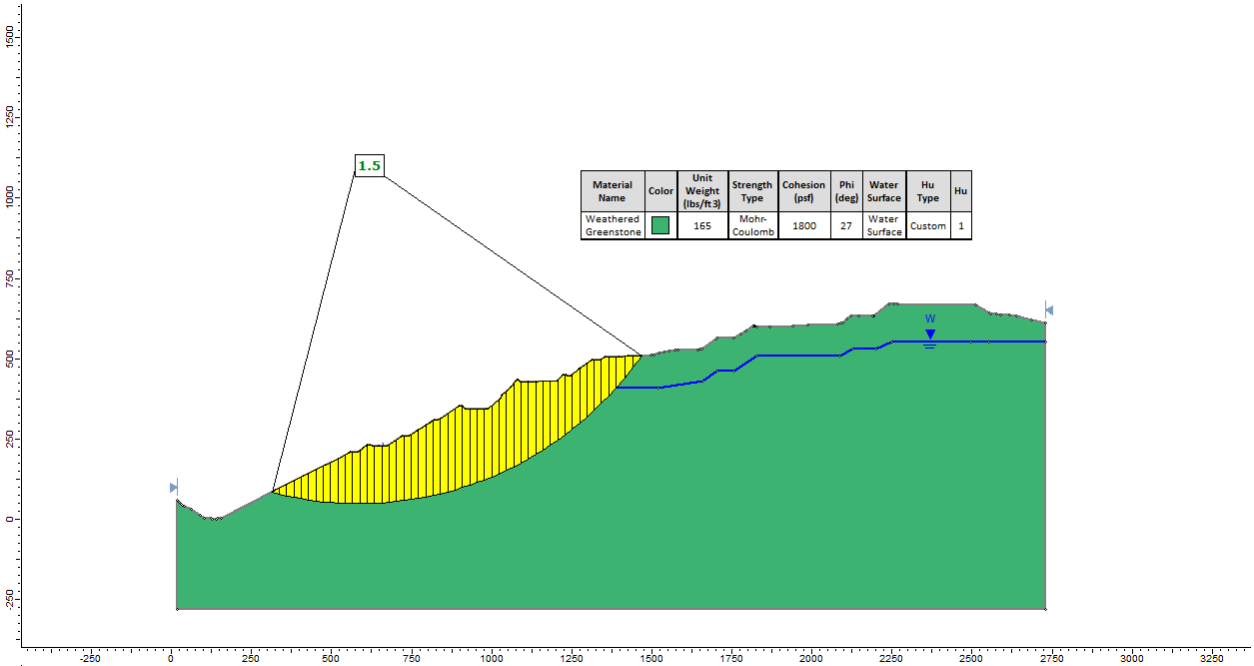

2.8
W
W
100
50
0
-50
-100
-150
0
50
100
150
200
250
300
350
400
450
500
550

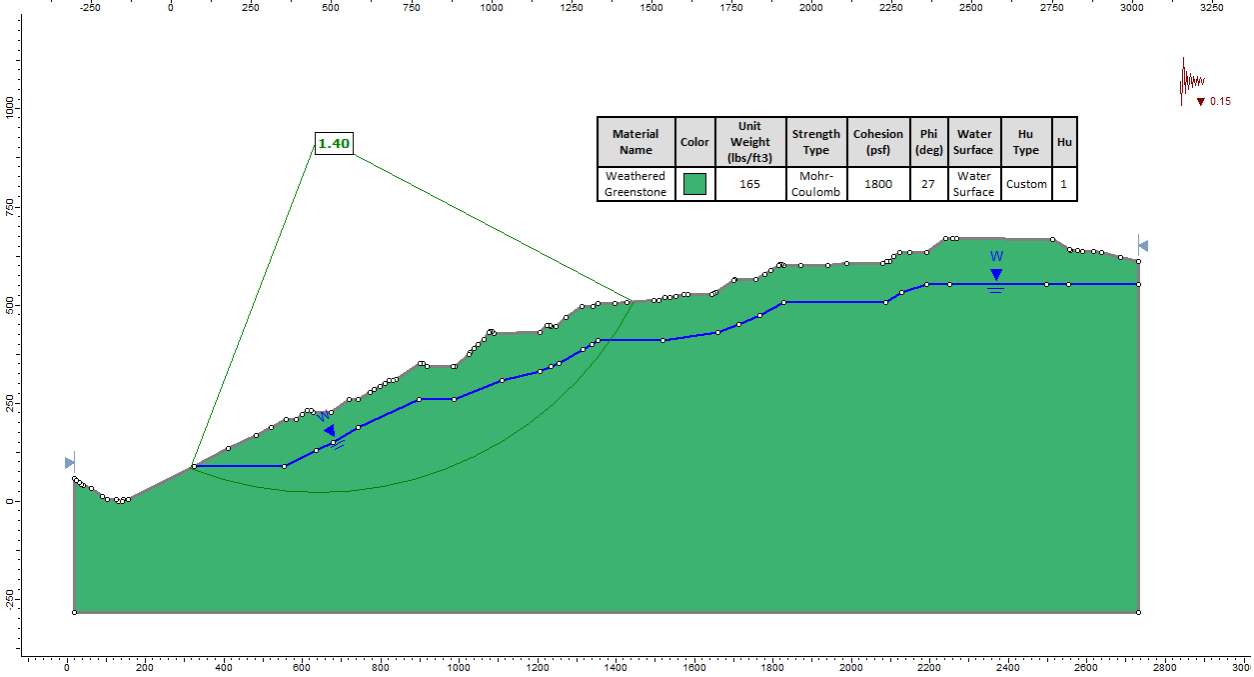

2.7
0.15
W
W
100
50
0
-50
-100
-150
0
50
100
150
200
250
300
350
400
450
500
550

SECTION E (Pond 1250 Area)









Design with community in mind

APPENDIX L

Material Removal Area

Lower Limit of Potential Finished Grade Figures

TREE REMOVAL SUMMARY

TREE SPECIES	DBH	NUMBER
MADRONE	12"	1
MADRONE	18"	1
WILLOW	4"	1
WILLOW	6"	2
WILLOW	10"	1
WILLOW	12"	1

NOTES:

1. SEE THE UPDATED 90% DESIGN DRAWINGS, DATED AUGUST 26, 2022 FOR SHEETS REFERENCED IN THESE NOTES AND DETAIL CALLOUTS SHOWN ON FIGURES 1–4.
2. THE GRADING PLAN REFLECTS THE LOWER LIMIT OF POTENTIAL FINISHED GRADE CHANNEL PROFILES. REFER TO THE NOTES ON SHEET C40 OF THE DESIGN DRAWINGS FOR A DESCRIPTION OF PROPOSED METHODOLOGY FOR "FIELD–FITTING" THE DESIGN PROFILE TO ACCOMMODATE UNKNOWN SUBSURFACE CONDITIONS.
3. POOL AND STEP GEOMETRY AND LOCATIONS ARE NOT SHOWN ON THE GRADING PLAN OR DESIGN PROFILE DUE TO UNKNOWN SUBSURFACE CONDITIONS. POOL AND STEP GEOMETRY AND LOCATIONS WILL BE DETERMINED AT THE TIME OF CONSTRUCTION BY THE ENGINEER TO CONFORM TO SUBSURFACE CONDITIONS, PER THE TYPICAL CASCADE AND STEP–POOL DETAILS ON SHEET C34 OF THE DESIGN DRAWINGS.
4. INSTALL ENGINEERED STREAMBED MATERIAL AND FLOODPLAIN ARMOR PER THE TYPICAL CHANNEL TREATMENT SECTION, SHEET C26 OF THE DESIGN DRAWINGS, EXCEPT AT LOCATIONS WHERE BEDROCK IS EXPOSED DURING CONSTRUCTION.
5. SALVAGE TREES WITHIN AREAS TO BE GRADED PER THE TREE REMOVAL NOTES, SHEETS C1.
6. POND 1250 AND THE UPPER WATER TREATMENT FACILITIES WILL BE RELOCATED, AS NEEDED, TO ACCOUNT FOR SPATIAL CHANGES DUE TO CONSTRUCTION.

DETAIL CALLOUT NOTES:

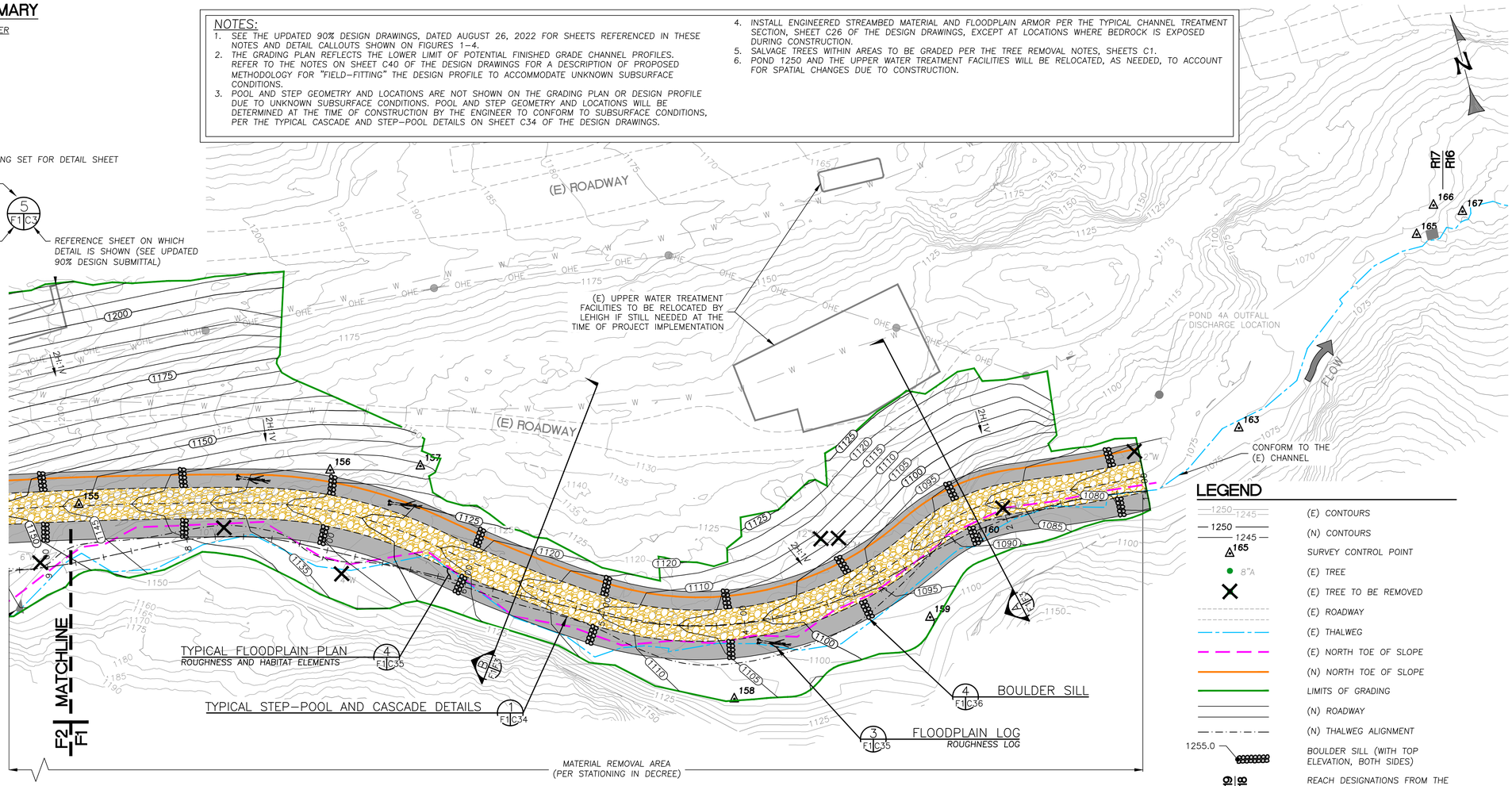
1. REFER TO THE COMPLETE DRAWING SET FOR DETAIL SHEET REFERENCES AS SHOWN BELOW.

DETAIL IDENTIFICATION (NUMBER OR LETTER)

5
F1 C3

REFERENCE FIGURE FROM WHICH DETAIL IS TAKEN

REFERENCE SHEET ON WHICH DETAIL IS SHOWN (SEE UPDATED 90% DESIGN SUBMITTAL)

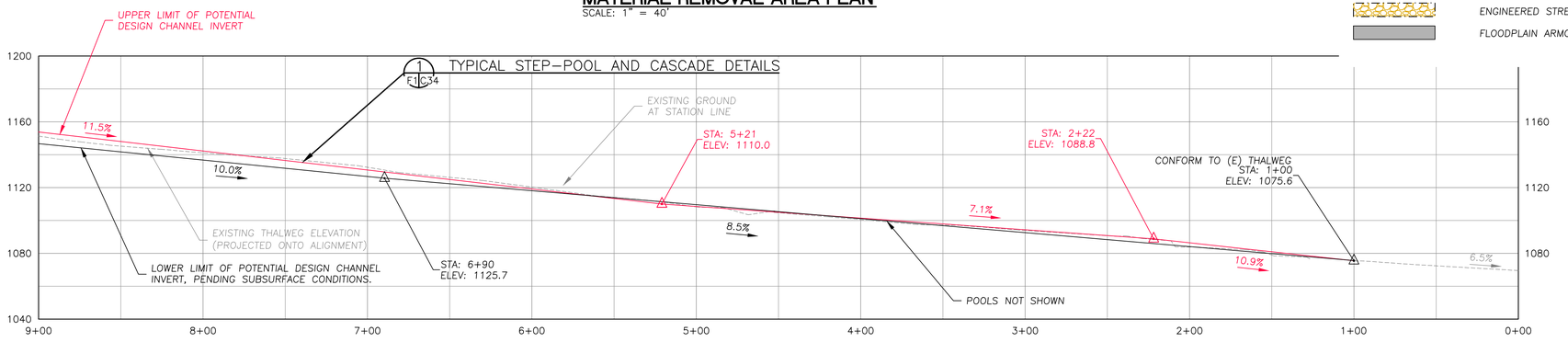


MATERIAL REMOVAL AREA PLAN

SCALE: 1" = 40'

LEGEND

- (E) CONTOURS
- (N) CONTOURS
- SURVEY CONTROL POINT
- (E) TREE
- (E) TREE TO BE REMOVED
- (E) ROADWAY
- (E) THALWEG
- (E) NORTH TOE OF SLOPE
- (N) NORTH TOE OF SLOPE
- LIMITS OF GRADING
- (N) ROADWAY
- (N) THALWEG ALIGNMENT
- BOULDER SILL (WITH TOP ELEVATION, BOTH SIDES)
- REACH DESIGNATIONS FROM THE "PERMANENTE CREEK LONG–TERM RESTORATION PLAN" (URS, 2011)
- ENGINEERED STREAMBED MATERIAL
- FLOODPLAIN ARMOR



MATERIAL REMOVAL AREA CHANNEL PROFILE

SCALE: 1" = 40'

WATERWAYS CONSULTING INC.
Santa Cruz, CA | watways.com | Portland, OR

PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT GROUP

PERMANENTE CREEK RESTORATION PLAN

MATERIAL REMOVAL AREA SITE PLANS, PROFILES AND SECTIONS THAT REFLECT THE LOWER LIMIT OF POTENTIAL FINISHED GRADE CHANNEL PROFILE

BAR IS ONE INCH ON ORIGINAL DRAWING. ADJUST SCALES FOR REDUCED PLOTS

0 1"

FIGURE
F1

TREE REMOVAL SUMMARY

TREE SPECIES	DBH	NUMBER
BAY	16"	1
MAPLE	14"	2
MAPLE	18"	2
MAPLE	30"	1
OAK	16"	1
WILLOW	20"	1
WILLOW	16"	1
WILLOW	14"	2
WILLOW	12"	2

LEGEND

- (E) CONTOURS
- (N) CONTOURS
- SURVEY CONTROL POINT
- (E) TREE
- (E) TREE TO BE REMOVED
- (E) ROADWAY
- (E) THALWEG
- (E) NORTH TOE OF SLOPE
- (N) NORTH TOE OF SLOPE
- LIMITS OF GRADING
- (N) ROADWAY
- (N) THALWEG ALIGNMENT
- BOULDER SILL (WITH TOP ELEVATION, BOTH SIDES)
- REACH DESIGNATIONS FROM THE "PERMANENTE CREEK LONG-TERM RESTORATION PLAN" (URS, 2011)
- ENGINEERED STREAMBED MATERIAL
- FLOODPLAIN ARMOR

POND 1250 AND THE UPPER WATER TREATMENT FACILITIES TO BE REMOVED BY LEHIGH PRIOR TO START OF CONSTRUCTION

12 INCH DIA HDPE PIPE
INV. IN: 1224.8
INV. OUT: NOT SURVEYED

(E) UPPER WATER TREATMENT FACILITIES TO BE REMOVED BY LEHIGH PRIOR TO START OF CONSTRUCTION

POND 1250

(N) NORTH TOE

LIMITS OF GRADING (APPROX.)

(E) BASIN AT YEAGAR YARD

CONFORM TO THE (E) THALWEG GRADE

CONFORM TRIBUTARY CHANNEL TO PERMANENTE CREEK AT THE DIRECTION OF THE ENGINEER

FLOW

(E) THALWEG

(N) THALWEG ALIGNMENT

(E) NORTH TOE

REMOVE (E) RELIC CONCRETE STRUCTURES

1 F2/C34 TYPICAL STEP-POOL AND CASCADE DETAILS

4 F2/C36 BOULDER SILL

FLOODPLAIN LOG 3 F2/C35
ROUGHNESS LOG

TYPICAL FLOODPLAIN PLAN 4 F2/C35
ROUGHNESS AND HABITAT ELEMENTS

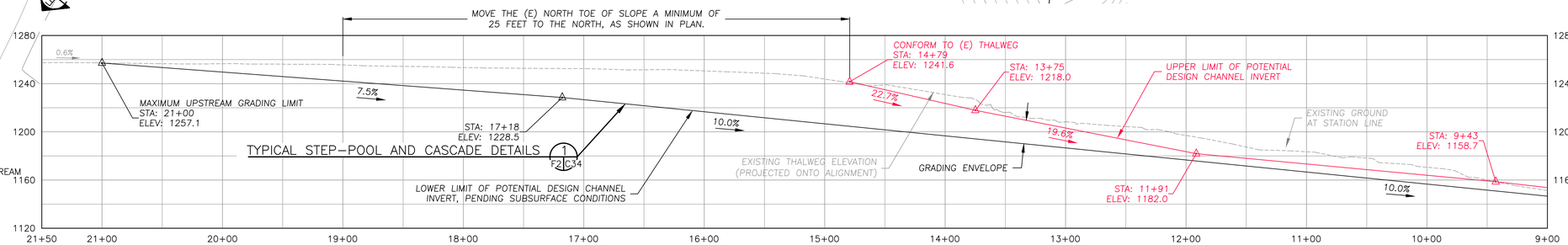
FLOODPLAIN LOG 3 F2/C35
LIVE LOG

A F2/C26 *MATERIAL REMOVAL AREA TRIBUTARY CHANNEL PROFILE*

F2/F1 MATCHLINE

MATERIAL REMOVAL AREA PLAN
SCALE: 1" = 40'

MATERIAL REMOVAL AREA (PER STATIONING IN DEGREE)



MATERIAL REMOVAL AREA CHANNEL PROFILE
SCALE: 1" = 50'

WATERWAYS CONSULTING INC.
Santa Cruz, CA | waterways.com | Portland, OR

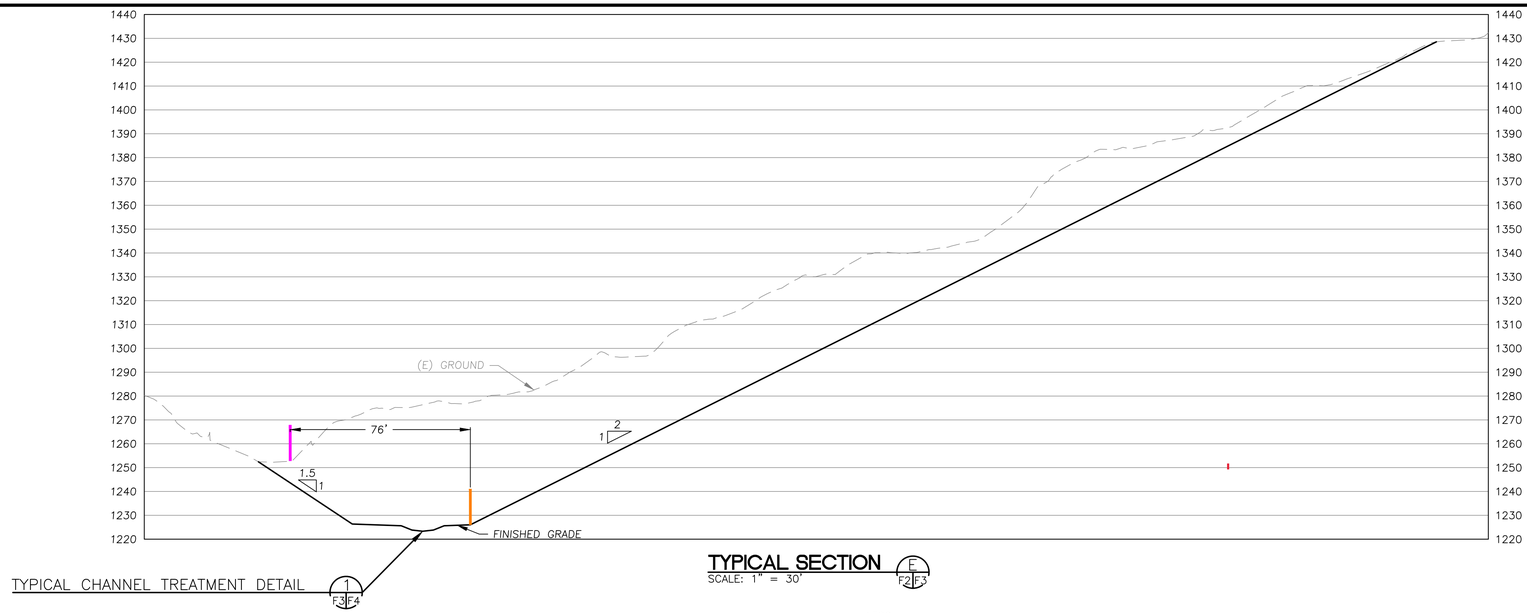
PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT GROUP

PERMANENTE CREEK RESTORATION PLAN
MATERIAL REMOVAL AREA SITE PLANS, PROFILES AND SECTIONS THAT REFLECT THE LOWER LIMIT OF POTENTIAL FINISHED GRADE CHANNEL PROFILE

BAR IS ONE INCH ON ORIGINAL DRAWING. ADJUST SCALES FOR REDUCED PLOTS

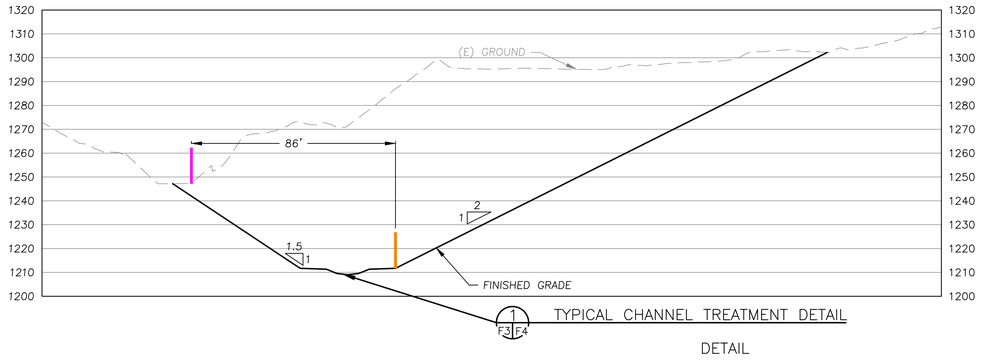
0 1"

FIGURE
F2



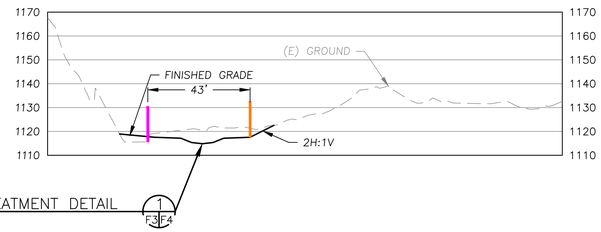
TYPICAL CHANNEL TREATMENT DETAIL 1 F3 F4

TYPICAL SECTION E
SCALE: 1" = 30' F2 F3



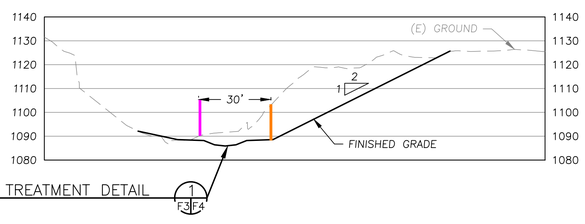
TYPICAL CHANNEL TREATMENT DETAIL 1 F3 F4

DETAIL



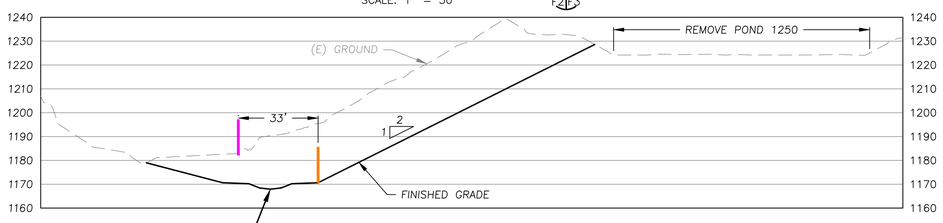
TYPICAL CHANNEL TREATMENT DETAIL 1 F3 F4

TYPICAL SECTION B
SCALE: 1" = 30' F1 F3



TYPICAL CHANNEL TREATMENT DETAIL 1 F3 F4

TYPICAL SECTION A
SCALE: 1" = 30' F1 F3



TYPICAL CHANNEL TREATMENT DETAIL 1 F3 F4

TYPICAL SECTION C
SCALE: 1" = 30' F2 F3

TYPICAL SECTION D
SCALE: 1" = 30' F2 F3

LEGEND

(E) NORTH SLOPE TOE

PROPOSED NORTH SLOPE TOE

NOTE:
1. FINISHED GRADE SHOWN REPRESENTS THE LOWER LIMIT OF POTENTIAL DESIGN CHANNEL INVERT.

WATERWAYS CONSULTING INC.
Santa Cruz, CA | watways.com | Portland, OR

PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT GROUP

PERMANENTE CREEK RESTORATION PLAN

MATERIAL REMOVAL AREA SITE PLANS, PROFILES AND SECTIONS
THAT REFLECT THE LOWER LIMIT OF POTENTIAL FINISHED GRADE
CHANNEL PROFILE

BAR IS ONE INCH ON ORIGINAL DRAWING. ADJUST SCALES FOR REDUCED PLOTS

0 1"

FIGURE
F3

Appendix D

Air Quality and Greenhouse Gas Emissions (Environmental Science Associates, November 2021)

PERMANENTE CREEK RESTORATION PLAN

Air Quality and Greenhouse Gas Emissions Technical Report
File No. PLN17-22580

Prepared for
County of Santa Clara
Department of Planning and Development

February 2023

PERMANENTE CREEK RESTORATION PLAN

Air Quality and Greenhouse Gas Emissions Technical Report
File No. PLN17-22580

Prepared for
Count of Santa Clara
Department of Planning and Development

February 2023

787 The Alameda
Suite 250
San Jose, CA 95126
408.660.400
esassoc.com

ESA

Atlanta	Orlando	San Diego
Bend	Palm Beach County	San Francisco
Camarillo	Pasadena	San Jose
Irvine	Pensacola	Sarasota
Los Angeles	Petaluma	Seattle
Mobile	Portland	Tampa
Oakland	Sacramento	

OUR COMMITMENT TO SUSTAINABILITY | ESA helps a variety of public and private sector clients plan and prepare for climate change and emerging regulations that limit GHG emissions. ESA is a registered assessor with the California Climate Action Registry, a Climate Leader, and founding reporter for the Climate Registry. ESA is also a corporate member of the U.S. Green Building Council and the Business Council on Climate Change (BC3). Internally, ESA has adopted a Sustainability Vision and Policy Statement and a plan to reduce waste and energy within our operations. This document was produced using recycled paper.

TABLE OF CONTENTS

Permanente Creek Restoration Plan Air Quality and Greenhouse Gas Emissions Report

Page

Executive Summary **ES-1**

Chapter 1, Introduction **1**
1.1 Project Context and Overview 1
1.2 Emissions Analysis for the County's SEIR 1

Chapter 2, Criteria Pollutants and Health Risk Assessment Analysis **3**
2.1 Environmental Setting 3
2.1.1 Introduction 3
2.1.2 Regional Topography, Meteorology, and Climate 5
2.1.3 Existing Air Quality 6
2.1.4 Sensitive Receptors 7
2.2 Regulatory Setting 8
2.3 CEQA Baseline Emissions 13
2.3.1 2012 EIR Baseline 14
2.3.2 2012 Emissions and Analysis 14
2.3.3 2012 EIR Mitigation Measures 16
2.4 Analysis, Impacts, and Mitigation 17
2.4.1 Significance Criteria 17
2.4.2 Methodology 18
2.4.3 Impact Analysis 27
2.5 References 36

Chapter 3, Greenhouse Gas Emissions Technical Analysis **39**
3.1 Greenhouse Gas Emissions 39
3.1.1 Environmental Setting 39
3.2 Regulatory Setting 41
3.2.1 Federal Regulations 41
3.2.2 State Regulations 42
3.2.3 Local Regulations 44
3.3 CEQA Baseline Emissions 44
3.3.1 2012 EIR Baseline 44
3.3.2 2012 Emissions and Analysis 44
3.3.3 2012 EIR Mitigation Measures 45
3.4 Analysis, Impacts, and Mitigation 46
3.4.1 Significance Criteria 46
3.4.2 Methodology 47
3.4.3 Impact Analysis 49
3.4.4 References 52

Page

Exhibits

Exhibit A Criteria Pollutants and Greenhouse Gas Emissions
Exhibit B Health Risk Assessment

List of Figures

Figure 2-1 Residential Areas in the Vicinity of the Project Site 9

List of Tables

Table 1-1 Emissions Applicability Factors 2
Table 2-1 Air Quality Data Summary (2017–2019) for the Project Area 7
Table 2-2 Ambient Air Quality Standards and San Francisco Bay Area Air Basin Attainment Status 10
Table 2-3 2012 Reclamation Plan Amendment Maximum Daily Criteria Air Pollutant Emissions (Pounds/Day) 14
Table 2-4 2012 Reclamation Plan Amendment Maximum Annual Criteria Air Pollutant Emissions (tons/year) 15
Table 2-5 2012 Reclamation Plan Amendment Health Risk Summary 15
Table 2-6 2012 Reclamation Plan Amendment Estimated Chronic and acute hazard impacts 16
Table 2-7 Estimated PM2.5 Concentration Impacts 16
Table 2-8 PCRP Total Average Daily Criteria Pollutant Emissions 28
Table 2-9 PCRP Total Annual Criteria Pollutant Emissions 29
Table 2-10 PCRP Average Daily Criteria Pollutant Emissions Applicable to SEIR 29
Table 2-11 PCRP Annual Criteria Pollutant Emissions Applicable to SEIR 30
Table 2-12 Maximum Daily Net Criteria Pollutant Emissions for SEIR Consideration 31
Table 2-13 Maximum Annual Net Criteria Pollutant Emissions for SEIR Consideration 32
Table 2-14 Estimated Cancer Risk at the meir and Caretaker's Residence 34
Table 2-15 Estimated Chronic and Acute Hazard Impacts 35
Table 3-1 California Greenhouse Gas Emissions 41
Table 3-2 2012 Reclamation Plan Amendment Maximum Annual GHG Emissions 45
Table 3-3 PCRP Total Annual GHG Emissions 50
Table 3-4 PCRP GHG Emissions Applicable to SEIR 50
Table 3-5 Maximum Annual Net GHG Emissions for SEIR Consideration 51

EXECUTIVE SUMMARY

In 2012, the County of Santa Clara (County) prepared the Lehigh Permanente Quarry Reclamation Plan Amendment Environmental Impact Report (2012 EIR), which included consideration of Lehigh Southwest Cement Company (Lehigh)'s 2011 Creek Restoration Plan. The 2012 EIR described and analyzed the associated environmental effects as direct and indirect impacts of the project then under consideration. Since 2012, the proposed creek restoration activities have been further developed and refined. The further developed and refined plan is called the Permanente Creek Restoration Plan (PCRP or Project).

On the behalf of the County, Environmental Science Associates (ESA) has conducted this analysis of potential impacts associated with air quality and greenhouse gas (GHG) emissions that would result from implementation of the PCRP. This analysis was prepared for the County to inform its consideration of the Grading Approval that would be required for Lehigh to implement the PCRP.

This technical report documents details of the air quality analysis, including analysis associated with criteria air pollutants and health risks associated with toxic air contaminants (TAC), as well as analysis of GHG emissions to support the County's environmental impact analysis for the PCRP as required by the California Environmental Quality Act (CEQA) and its implementing regulations (CEQA Guidelines).

This page intentionally left blank

CHAPTER 1
Introduction

1.1 Project Context and Overview

In March 2011, Lehigh Southwest Cement Company (Lehigh) proposed the Permanente Creek Long-term Restoration Plan (2011 Creek Restoration Plan). The 2011 Creek Restoration Plan focused on the long-term removal of structures in and adjacent to the creek and the restoration of the creek's riparian zone. Some of the activities that would occur under the 2011 Creek Restoration Plan overlapped with the activities analyzed in the 2012 Lehigh Permanente Quarry Reclamation Plan Amendment Environmental Impact Report prepared by the County of Santa Clara (County) (2012 EIR). Where that was true, the 2012 EIR described and analyzed the associated environmental effects as direct and indirect impacts of the project then under consideration. Since 2012, the proposed creek restoration activities have been further developed and refined, in part, to fulfill the requirements set forth in an Amended Consent Decree between the Sierra Club and Lehigh Southwest Cement Company and Hanson Permanente Cement, Inc. lodged February 22, 2019 (the Consent Decree). The further developed and refined plan is called the Permanente Creek Restoration Plan (PCRP or Project).

The PCRP would restore and modify specific segments of Permanente Creek located within and outside of the existing reclamation plan boundary for the Lehigh Permanente Quarry. The PCRP would also modify the creek restoration work to occur in the seven subareas collectively referred to in the 2012 EIR as the Permanente Creek Restoration Area (PCRA) and supplements that work. The PCRP would require Grading Approval from the County to authorize activities proposed outside Lehigh's existing reclamation plan boundary. Because only minor additions or changes would be necessary to make the 2012 EIR adequately apply to the PCRP, the County is preparing a Supplemental Environmental Impact Report (SEIR) for the PCRP pursuant to the California Environmental Quality Act (CEQA).

1.2 Emissions Analysis for the County's SEIR

This Air Quality and Greenhouse Gas Emissions Technical Study has been prepared to inform the County's consideration of the PCRP's air quality and greenhouse gas (GHG) impacts in its SEIR. The study describes the existing environmental and regulatory setting noting any changes that have occurred subsequent to the certification of the 2012 EIR, and quantitatively evaluates the PCRP's air pollutant and GHG emissions that were not evaluated in the 2012 EIR.

Pursuant to CEQA Guidelines Section 15163 , the County's SEIR will focus on the information necessary to analyze the project modifications, changed circumstances, or new information that triggered the need for additional environmental review. Therefore, this technical report evaluates air quality and GHG emissions to determine whether they would have the potential for significant direct, indirect, and/or cumulative environmental effects that are new or substantially more severe compared with the project analyzed in the 2012 EIR.

The 2012 EIR evaluated impacts of Permanente Creek restoration within the reclamation plan boundary specifically within seven subareas called the Permanente Creek Restoration Area (PCRA) for mapping and illustrative purposes. The PCRP uses different nomenclature following the convention established in the Consent Decree: rather than referring to "subareas," the PCRP refers to segments of the creek as "reaches." The PCRA subareas and PCRP reaches are illustrated in Figure 2-1. As shown in the figure, some of the disturbance area within the PCRA that was evaluated in the 2012 EIR overlaps with the newly defined PCRP reaches. Given the similar scope of activities proposed in the PCRA disturbance areas evaluated in the 2012 EIR relative to the scope of activities described for the PCRP in those locations, the emissions-generating activities within the proposed PCRP where overlaps exist with the analyses in the PCRA 2012 EIR were not reevaluated as part of this assessment.

Emissions are estimated for the activities of each proposed PCRP phase and then scaled based on the percentage of PCRA area overlap associated with the 2012 EIR's assessed regions. These scaling values, referred to as Emissions Applicability Factors, are determined for each PCRP phase. **Table 1-1** provides the area of each PCRP reach, the area of each reach without overlap in the PCRA 2012 EIR, the percent of emissions determined to be evaluated in the 2012 EIR, and the Emission Applicability Factors. Refer to Exhibit A for additional information about these factors.

TABLE 1-1
EMISSIONS APPLICABILITY FACTORS

PCRP Phase	Acres		Percent Emissions Evaluated in 2012 EIR	Percent Emissions Evaluated for SEIR
	PCRP Outside of 2012 Disturbance Area	PCRP Creek Reach Area		
Concrete Channel	0.66	0.66	0%	100%
Rock Pile Area	12.42	13.93	11%	89%
Channel Widening	12.24	13.93	11%	89%
Old Crusher	0.00	<0.01	100%	0%
Material Removal	3.15	15.68	80%	20%

SOURCE: See Exhibit A.

CHAPTER 2
Criteria Pollutants and Health Risk Assessment Analysis

2.1 Environmental Setting

This section describes the environmental and regulatory setting of the area where the PCRP would be implemented (the Project site) and surrounding area with respect to air quality, including criteria air pollutants (CAPs) toxic air contaminants (TACs), and odors. An analysis of potential impacts to air resources stemming from the Project is also provided, including identification of the appropriate CEQA baseline, a review and summary of the criteria used for determining the significance of environmental impacts, and an analysis of potential impacts relevant to PCRP implementation. 2012 EIR mitigation measures are also provided, as relevant, to reduce the intensity of potential impacts associated with the PCRP. For a discussion of potential impacts associated with greenhouse gas (GHG) emissions, please refer to Chapter 3, Greenhouse Gas Emissions Technical Report.

2.1.1 Introduction

Criteria Air Pollutants

The U.S. Environmental Protection Agency (U.S. EPA) has identified certain air pollutants that are a threat to public health and welfare. These pollutants are called "criteria" air pollutants (CAPs) because standards have been established for each of them to meet specific public health and welfare criteria (see Section 2.3, *Regulatory Setting*, below). The CAPs were described in Section 4.3 of the Draft 2012 EIR are supplemented with the health-related information provided below.

Ozone

Ozone is a respiratory irritant and an oxidant that increases susceptibility to respiratory infections in humans. It can also cause substantial damage to vegetation and other materials, when present in sufficiently high atmospheric concentrations. Ozone is not emitted directly into the atmosphere. Instead, it is a secondary air pollutant that is produced in the atmosphere through a complex series of photochemical reactions involving reactive organic gases (ROG) and nitrogen oxides (NO_X). ROG and NO_X are known as precursor compounds for ozone. Significant ozone production generally requires ozone precursors to be present in a stable atmosphere with strong sunlight for approximately 3 hours.

Ozone is a regional air pollutant because it is not emitted directly by sources but is formed downwind from sources of ROG and NO_X under the influence of wind and sunlight. Ozone concentrations tend to be higher in the late spring, summer, and fall, when long sunny days combine with regional subsidence inversions to create conditions conducive to the formation and accumulation of secondary photochemical compounds like ozone.

Ozone can cause the muscles in the airways to constrict, potentially leading to wheezing and shortness of breath (U.S. EPA 2021a). Ozone can make it more difficult to breathe deeply and vigorously; cause shortness of breath and pain when taking a deep breath; cause coughing and sore or scratchy throat; inflame and damage the airways; aggravate lung diseases such as asthma, emphysema, and chronic bronchitis; increase the frequency of asthma attacks; and make the lungs more susceptible to infection (U.S. EPA 2021a). Long-term exposure to ozone is linked to aggravation of asthma and is likely to be one of many causes of asthma development, and long-term exposures to higher concentrations of ozone may also be linked to permanent lung damage, such as abnormal lung development in children (U.S. EPA 2021a). Inhalation of ozone causes inflammation and irritation of the tissues lining human airways, causing and worsening a variety of symptoms, and exposure to ozone can reduce the volume of air that the lungs breathe in and cause shortness of breath (California Air Resources Board [CARB] 2021).

People most at risk from breathing air containing ozone include people with asthma, children, older adults, and people who are active outdoors, especially outdoor workers (U.S. EPA 2022). Children are at greatest risk from exposure to ozone because their lungs are still developing and they are more likely to be active outdoors when ozone levels are high, which increases their exposure (U.S. EPA 2021a).

Nitrogen Oxides

Nitrogen dioxide (NO_2) is an air quality pollutant of concern because it acts as a respiratory irritant. NO_2 is a major component of the group of gaseous nitrogen compounds commonly referred to as NO_X. A precursor to ozone formation, NO_X is produced by fuel combustion in motor vehicles, industrial stationary sources (such as refineries, power plants, and chemical manufacturing facilities), ships, aircraft, and rail transit. Typically, NO_X emitted from fuel combustion is in the form of nitric oxide (NO) and NO_2, with the vast majority (95 percent) of the NO_X emissions being comprised of NO. NO is converted to NO_2 in the atmosphere when it reacts with ozone or undergoes photochemical reactions. Short-term exposures to NO_2 can potentially aggravate respiratory diseases, particularly asthma, leading to respiratory symptoms (such as coughing, wheezing, or difficulty breathing), hospital admissions, and visits to emergency rooms, while longer exposures to elevated concentrations of NO_2 may contribute to the development of asthma and potentially increase susceptibility to respiratory infections (U.S. EPA 2021b).

Carbon Monoxide

Carbon monoxide (CO) is a non-reactive pollutant that is a product of incomplete combustion; it is mostly associated with emissions from motor vehicle traffic. High CO concentrations develop primarily during winter when periods of light winds combine with the formation of ground-level temperature inversions (typically from the evening through early morning). These conditions result in reduced dispersion of vehicle emissions. Motor vehicles also exhibit increased CO

emission rates at low air temperatures. When inhaled at high concentrations, CO combines with hemoglobin in the blood and reduces the oxygen-carrying capacity of the blood. This results in reduced levels of oxygen reaching the brain, heart, and other body tissues. This condition is especially critical for people with cardiovascular diseases, chronic lung disease, or anemia.

Particulate Matter

Particulate matter less than 10 microns in diameter (PM_{10}) and particulate matter less than 2.5 microns in diameter ($PM_{2.5}$) represent fractions of particulate matter that can be inhaled into air passages and the lungs and can cause adverse health effects. Particulate matter in the atmosphere results from many kinds of dust- and fume-producing industrial and agricultural operations, fuel combustion, and atmospheric photochemical reactions. Some sources of particulate matter, such as demolition and construction activities, are more local in nature, while others, such as vehicular traffic, have a more regional effect. Very small particles of certain substances (e.g., sulfates and nitrates) can cause lung damage directly, or can contain adsorbed gases (e.g., chlorides or ammonium) that may be injurious to health. According to a study prepared by CARB, exposure to ambient $PM_{2.5}$, particularly diesel particulate matter (DPM), can be associated with approximately 14,000 to 24,000 premature annual deaths per year statewide (CARB 2010). Particulate matter also can damage materials and reduce visibility.

Toxic Air Contaminants

TACs are airborne substances that are capable of causing short-term (acute) and/or long-term (chronic or carcinogenic, i.e., cancer-causing) adverse human health effects (i.e., injury or illness). TACs include both organic and inorganic chemical substances. They may be emitted from a variety of common sources including gasoline stations, automobiles, dry cleaners, industrial operations, and painting operations. The current California list of TACs includes over 200 compounds, including DPM emissions from diesel-fueled engines (CARB 2021).

The main TAC of concern for the PCRP is DPM from off-road diesel equipment and on-road diesel vehicles, in addition to some trace metals found in fugitive dust in disturbance areas and on paved and unpaved roads.

2.1.2 Regional Topography, Meteorology, and Climate

The *General Climate and Meteorology* discussion presented in Section 4.3.1.1 of the 2012 EIR remains relevant and accurate; nonetheless, additional details are provided below. The PCRP would occur in the western foothills of Santa Clara County near the southern end of Santa Clara Valley (Valley), which is oriented northwest-southeast and bounded by the Santa Cruz Mountains to the west, the Diablo Range to the east, the San Francisco Bay to the north and the convergence of the Gabilan Range and the Diablo Range to the south. The climate includes warm, dry summers and cool winters with modest rainfall (Bay Area Air Quality Management District [BAAQMD] 2019). Approximately 10 miles to the east-northeast of the Project area is the City of San Jose, where average maximum and minimum winter (i.e., January) temperatures of 58 degrees Fahrenheit (°F) and 41°F, respectively, while average summer (i.e., July) maximum and minimum temperatures are 82°F and 56°F, respectively. Total precipitation in the area averages 15 inches per year, with most

precipitation occurring from November through April (Western Regional Climate Center [WRCC] 2021).

As a result of the Valley's northwest-southeast axis, wind patterns in the Valley include north-northwesterly sea breeze typically developing during the daytime with stronger winds in the spring and summer (BAAQMD 2019). Based on data from January 2015 through December 2015 from the San José Station, winds blow from the southwest most of the time. Specifically, the winds from the southwest direction comprise about 36 percent of all hourly wind directions. The station rarely experienced winds at speeds greater than 13 mph (WRCC 2016).

Air pollution in Santa Clara County can be high because of the large population base and extent of mobile sources in the area. Ozone is the primary pollutant of concern in the summer and $PM_{2.5}$ is the primary pollutant of concern in the winter. Ozone frequently forms on hot summer days when the prevailing seasonal northerly winds carry ozone precursors southward across the county, causing health standards to be exceeded. The high population density, wood smoke, industrial and freeway traffic, and poor wintertime air circulation caused by extensive hills to the east and west that block wind flow into the region can cause many exceedances of $PM_{2.5}$ during the winter months.

2.1.3 Existing Air Quality

BAAQMD's regional monitoring network measures the ambient concentrations of CAPs. Monitoring on the Project site has not been completed; however, existing levels of air quality at the Project site can be inferred from ambient air quality measurements conducted by BAAQMD at its closest air quality monitoring stations to the Project site, which are the Jackson Street San Jose Monitoring Station (approximately 11 miles to the east-northeast) and the University Avenue Los Gatos Monitoring Station (approximately 9 miles southeast). The San Jose station monitors ozone, PM_{10}, $PM_{2.5}$, and NO_2 and the Los Gatos station monitors ozone. **Table 2-1** shows a 3-year (2019 through 2021) summary of the most up-to-date available data monitored at the San Jose monitoring station. The data are compared to the California Ambient Air Quality Standards (state standards) and National Ambient Air Quality Standards (national standards). The data are similar to those disclosed in the 2012 EIR, with the exception of relatively high PM_{10} and $PM_{2.5}$ concentrations experienced in 2020, which were likely a result of large wildfires that occurred in northern California that year (BAAQMD 2020).

As shown in Table 2-1, the state 1-hour ozone and federal 8-hour ozone standards were exceeded one to four times each year during the 3-year study period. The 24-hour state PM_{10} standard was exceeded four times in 2019 and ten times in 2020, with no exceedances in 2021. There were no exceedances of the national 24-hour or state annual average PM_{10} standards recorded during the 3-year study period, but there was insufficient data available for 2020 relative to state annual average. The $PM_{2.5}$ 24-hour national standard was exceeded 12 times in 2020 and once in 2021, with no exceedances in 2019. The $PM_{2.5}$ annual average concentration did not exceed the state standard during the 3-year study period. There were no exceedances of the NO_2 standards during the 3-year study period.

TABLE 2-1
AIR QUALITY DATA SUMMARY (2019–2021) FOR THE PROJECT AREA

Pollutant	Standard	Monitoring Data by Year		
		2019	2020	2021
Ozone				
Highest State 1-Hour Average (ppm)	0.09 ppm	0.095	0.106	0.098
Days over State Standard		1	1	3
Highest National 8-Hour Average (ppm)	0.070 ppm	0.081	0.085	0.084
Days over National Standard		2	2	4
Respirable Particulate Matter (PM_{10})				
Highest State 24-Hour Average (µg/m^3) Highest 24-hour average, µg/m^3	50 µg/m^3	77.1	137.1	45.1
Measured Days over State Standard		4	10	0
Measured Days over National Standard	150 µg/m^3	0	0	0
State Annual Average (µg/m^3)	20 µg/m^3	19.1	*	20.1
Fine Particulate Matter ($PM_{2.5}$)				
Highest National 24-Hour Average (µg/m^3) Highest 24-hour average, µg/m^3	35 µg/m^3	27.6	120.5	38.1
Measured Days over National Standard		0	12	1
State Annual Average (µg/m^3)	12 µg/m^3	9.1	11.5	8.9
Nitrogen Dioxide (NO_2)				
Highest National Hourly Average (ppm) Highest 24-hour average, µg/m^3	0.100 ppm	0.060	0.052	0.048
Measured Days over National Standard		0	0	0

NOTES:

Measurements are from the Jackson Street Monitoring Station in San José.

ppm = Parts per million
µg/m^3 = Micrograms per cubic meter
* = There was insufficient data available to determine the value.

SOURCE: CARB 2022

2.1.4 Sensitive Receptors

For the purposes of this air quality analysis, sensitive receptors are defined as facilities and land uses that include members of the population that are particularly sensitive to the effects of air pollutants, such as children, the elderly, and people with illnesses. Examples include schools, hospitals, and daycare centers. The reasons for greater than average sensitivity include pre-existing health problems, proximity to emissions sources, and/or duration of exposure to air pollutants. Schools, hospitals, and convalescent homes are relatively sensitive to poor air quality because children, elderly people, and the infirm are more susceptible to respiratory distress and other air quality-related health problems than the general public. Residential areas are considered sensitive to poor air quality because these sensitive individuals may be present at a residence. In addition, the

majority of each 24-hour period tends to be spent by individuals in and around the residence, leading to greater exposure durations of the location's ambient air quality concentrations.

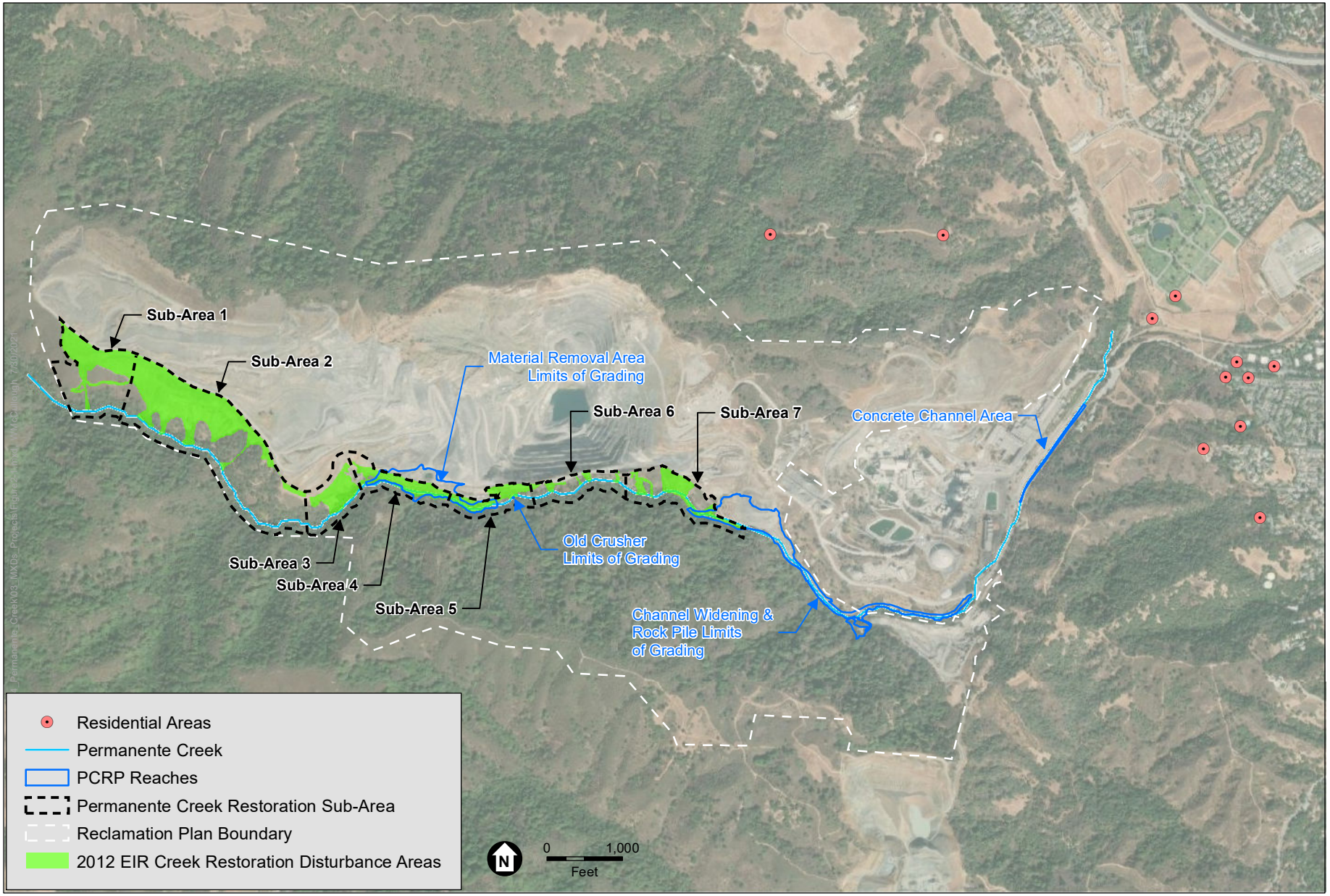
The description of sensitive residential land uses in the vicinity of the Project site presented in Draft 2012 EIR Section 4.3.1.1 remains accurate with one exception. The 2012 EIR identified the caretaker's residence associated with the Historical Society that is located approximately 700 feet east of the East Materials Storage Area (EMSA) on the north side of Permanente Road as the closest residence. The Applicant has recently clarified that this residence would not serve as a dwelling during implementation of the PCRP. The next closest residences are approximately 2,000 feet to the east, south of Permanente Road. Residential areas in the vicinity of the Project site are shown in **Figure 2-1**.

2.2 Regulatory Setting

Established federal, state, and regional regulations provide the framework for analyzing and controlling air pollutant emissions and thus general air quality. The U.S. EPA is responsible for implementing the programs established under the federal Clean Air Act (CAA), such as establishing and reviewing the federal ambient air quality standards and reviewing State Implementation Plans (SIPs), described further below. However, the U.S. EPA has delegated the authority to implement many of the federal programs to the states while retaining an oversight role to ensure that the programs continue to be implemented. In California, CARB is responsible for establishing and reviewing the state ambient air quality standards, developing and managing the California SIP, securing approval of this plan from the U.S. EPA, and identifying TACs. CARB also regulates mobile emissions sources in California, such as construction equipment, trucks, and automobiles, and oversees the activities of air quality management districts, which are organized at the county or regional level. An air quality management district is primarily responsible for regulating stationary emission sources at facilities within its geographic areas, and for preparing the air quality plans that are required under the federal CAA and the 1988 California CAA. The BAAQMD is the regional agency with regulatory authority over emission sources in the nine county San Francisco Bay Area.

Federal and State Ambient Air Quality Standards

Regulation of criteria air pollutants is achieved through both national and state ambient air quality standards and emissions limits for individual sources. Regulations implementing the federal CAA and its subsequent amendments established national ambient air quality standards (national standards) for six criteria pollutants: ozone, NO_2, SO_2, PM_{10}, $PM_{2.5}$, and lead. California has adopted more stringent state standards for most of the criteria air pollutants. In addition, California has established state ambient air quality standards for sulfates, hydrogen sulfide, vinyl chloride, and visibility-reducing particles. Because of the meteorological conditions in the state, there is considerable difference between some of state and federal standards in California, as shown in **Table 2-2**. As noted in the table, the federal primary standard for 8-hour ozone is now 0.070 parts per million (ppm), which is a reduction from the 0.075 ppm standard that was in place at the time of the 2012 EIR. All other ambient air quality standards are essentially the same as they were at the time of the 2012 EIR.



SOURCE: Benchmark Resources, 2021

Figure 2-1
Residential Areas in the Vicinity of the Project Site

TABLE 2-2
AMBIENT AIR QUALITY STANDARDS AND SAN FRANCISCO BAY AREA AIR BASIN ATTAINMENT STATUS

Pollutant	Averaging Time	State Standard	SF Air Basin Attainment Status for State Standard	National Primary Standard	SF Air Basin Attainment Status for National Standard
Ozone	8 hour	0.070 ppm	Non-Attainment	0.070 ppm	Non-Attainment
	1 hour	0.090 ppm	Non-Attainment	---	---
Carbon Monoxide	8 hour	9.0 ppm	Attainment	9 ppm	Attainment
	1 Hour	20 ppm	Attainment	35 ppm	Attainment
Nitrogen Dioxide	Annual Average	0.030 ppm	---	0.053 ppm	Attainment
	1 Hour	0.18 ppm	Attainment	0.100 ppm	Unclassified
Sulfur Dioxide	Annual Average	---	---	0.030 ppm	Attainment
	24 Hour	0.04 ppm	Attainment	0.14 ppm	Attainment
	1 Hour	0.25 ppm	Attainment	0.075 ppm	Attainment
Respirable Particulate Matter (PM10)	Annual Arithmetic Mean	20 μg/m3	Non-Attainment	---	---
	24 hour	50 μg/m3	Non-Attainment	150 μg/m3	Unclassified
Fine Particulate Matter (PM2.5)	Annual Arithmetic Mean	12 μg/m3	Non-Attainment	15 μg/m3	Unclassified/Attainment
	24 hour	---	---	35 μg/m3	Non-Attainment
Sulfates	24 hour	25 μg/m3	Attainment	---	---
Lead	Calendar Quarter	---	---	1.5 μg/m3	Attainment
	30 Day Average	1.5 μg/m3	---	---	Attainment
	3-month Rolling Average	---	---	0.15 μg/m3	Attainment
Hydrogen Sulfide	1 hour	0.03 ppm	Unclassified	---	---
Vinyl Chloride	24 hour	0.010 ppm	No information available	---	---
Visibility Reducing Particles	8 hour	Extinction of 0.23/km; visibility of 10 miles or more	Unclassified	---	---

NOTES: ppm = parts per million; $\mu g/m^3$ = micrograms per cubic meter

SOURCE: BAAQMD, 2017a.

The ambient air quality standards are intended to protect public health and welfare, and they incorporate a margin of safety. They are designed to protect those segments of the public most susceptible to respiratory distress, known as sensitive receptors, including people with asthma, the very young, elderly, people weak from other illness or disease, or persons engaged in strenuous work or exercise. Healthy adults can tolerate occasional exposure to air pollution levels somewhat above the ambient air quality standards before adverse health effects are observed.

Attainment Status

Under amendments to the federal CAA, U.S. EPA has classified air basins or portions thereof as either "attainment" or "non-attainment" for each criteria air pollutant, based on whether the national standards have been achieved. The California CAA, which is patterned after the federal CAA, also requires areas to be designated as "attainment" or "non-attainment" for the state standards. Thus, areas in California have two sets of attainment / non-attainment designations: one set with respect to the national standards and one set with respect to the state standards. Table 2-2 shows the attainment status of the San Francisco Bay Area Air Basin (SFBAAB) with respect to the national and state ambient air quality standards for different criteria pollutants. The attainment status relative to the state and federal ambient air quality standards are essentially the same as they were at the time of the 2012 EIR.

Federal

The U.S. EPA is responsible for implementing programs established by the federal CAA, such as establishing and reviewing the national standards for the following air pollutants: CO, ozone, NO_2, SO_2, PM_{10}, $PM_{2.5}$, and lead. The federal CAA also requires the U.S. EPA to designate areas (counties or air basins) as attainment or non-attainment with respect to each CAP, depending on whether the area meets the national standards. If an area is designated as non-attainment, it does not meet the national standards and is required to create and maintain a SIP for achieving compliance with the national standards. Conformity to the SIP is defined under the 1990 CAA amendments as conformity with the plan's purpose in eliminating or reducing the severity and number of violations of the national standards and achieving expeditious attainment of these standards. Air quality within the SFBAAB is classified as nonattainment for the federal 8-hour ozone and 24-hour $PM_{2.5}$ standards.

State

CARB is the agency delegated responsibility for preparing and submitting the SIP to the U.S. EPA. CARB also oversees air quality policies in California and has established state standards for NO_2, CO, SO_2, PM_{10}, $PM_{2.5}$, ozone, lead, sulfates, hydrogen sulfide, vinyl chloride, and visibility reducing particles. The state standards are at least as stringent (and typically more stringent) than the national standards.

The California CAA was approved in 1988. It requires each local air district in the state to prepare an air quality plan to achieve compliance with the state standards. Similar to the U.S. EPA, the CARB designates counties or air basins in California as attainment or non-attainment with respect to the state standards. Air quality within the basin does not attain the state standards for ozone, PM_{10}, and $PM_{2.5}$.

Toxic Air Contaminants

TACs are airborne substances that can cause short-term (acute) or long-term (chronic or carcinogenic, i.e., cancer-causing) adverse human health effects, either injury or illness. TACs include both organic and inorganic chemical substances. They may be emitted by a variety of common sources: gasoline stations, automobiles, diesel engines, dry cleaners, industrial operations, and painting operations. TACs are regulated differently than criteria air pollutants at both the federal and State levels. At the federal level, these pollutants are called "hazardous air pollutants." California's list of TACs identifies 243 substances and the federal list of hazardous air pollutants identifies 189 substances.

CARB identified DPM as a TAC in 1998, based primarily on evidence demonstrating cancer effects in humans. The exhaust from diesel engines includes hundreds of different gaseous and particulate components, many of which are toxic and carcinogenic. Mobile sources such as trucks and buses are among the primary sources of diesel emissions, and DPM concentrations are higher near heavily traveled highways and rail lines with diesel locomotive operations. The risk from DPM, as determined by CARB, declined from 750 in one million in 1990 to 540 in one million in 2000, but still remains the highest risk TAC to California's ambient air quality. In 2000, CARB approved a comprehensive Diesel Risk Reduction Plan to reduce diesel emissions from both new and existing diesel-fueled vehicles and engines. Further regulations of diesel emissions by CARB include the On-Road Heavy Duty Diesel Vehicle (In-Use) Regulation, the On-Road Heavy Duty (New) Vehicle Program, the In-Use Off-road Diesel Vehicle Regulation, and the New Off-road Compression Ignition Diesel Engines and Equipment Program. All of these regulations and programs have timetables by which manufacturers must comply and existing operators must upgrade their diesel-powered equipment.

In 2004, CARB adopted a measure to limit idling of diesel-fueled commercial motor vehicles. Heavy-duty diesel vehicles with a Gross Vehicle Weight Rating of 10,000 pounds or heavier are prohibited from idling for more than 5 minutes within California's borders. Exceptions to the rule apply for certain circumstances.

Local Regulations

Bay Area Air Quality Management District

The Project is within the jurisdiction of the BAAQMD, which is the local agency delegated responsibility for preparing, adopting, and implementing stationary and area air emission control measures and standards. Specifically, BAAQMD conducts monitoring, evaluation, and education programs; implements control measures to reduce emissions from stationary sources; issues permits to operate for stationary sources and inspects emissions sources; and enforces air quality regulations.

BAAQMD Air Quality Plans

The 1977 CAA amendments require that regional planning and air pollution control agencies prepare a regional Air Quality Plan to outline the measures by which both stationary and mobile sources of pollutants can be controlled to achieve all standards specified in the CAA. The California CAA also requires development of air quality plans and strategies to meet state air

quality standards in areas designated as non-attainment (except for areas designated as non-attainment for the state PM standards). Maintenance plans are required for attainment areas that had previously been designated non-attainment to ensure continued attainment of the standards. (As indicated above, air quality plans developed to meet federal requirements are referred to as SIPs).

For state air quality planning purposes, the SFBAAB is classified as a serious non-attainment area for the 1-hour ozone standard. The "serious" classification triggers various plan submittal requirements and transportation performance standards. One such requirement is that the BAAQMD update the Clean Air Plan every 3 years to reflect progress in meeting the air quality standards and to incorporate new information regarding the feasibility of control measures and new emission inventory data. BAAQMD also must review the Bay Area's record of progress in implementing previous measures. The plans for the SFBAAB are prepared with the cooperation of the Metropolitan Transportation Commission (MTC), and the Association of Bay Area Governments (ABAG). After the certification of the 2012 EIR, the BAAQMD adopted the most recent revision to the Clean Air Plan - the 2017 Bay Area Clean Air Plan (2017 CAP) (BAAQMD 2017b). The 2017 CAP serves to:

- Protect the environment and offer a long-range vision of how the Bay Area could function in a year 2050 post-carbon economy and describes a control strategy that the BAAQMD will implement over the next 3 to 5 years.
- Update the most recent BAAQMD ozone plan, the 2010 Clean Air Plan, to fulfill State ozone planning requirements. The 2017 control strategy includes all feasible measures to reduce emissions of ROG and NO_x and reduce transport of ozone and its precursors to neighboring air basins.
- Build upon and enhance the BAAQMD's efforts to reduce emissions of fine particulate matter and toxic air contaminants.

Under the California CAA, the BAAQMD is required to develop an air quality attainment plan for non-attainment criteria pollutants within the air district. The Project is subject to BAAQMD rules and regulations governing CAPs, TACs, and odorous compounds even though permits may not be required.

Santa Clara County General Plan

The 2012 EIR identifies air quality policies associated with the Health and Safety Chapter of the *Santa Clara County General Plan, 1995-2010* (Santa Clara County 1994), that apply to the Reclamation Plan Amendment. The Santa Clara County General Plan, 1995-2010 remains current.

2.3 CEQA Baseline Emissions

The CEQA baseline for this air quality analysis includes the baseline conditions identified in the 2012 EIR, the 2012 EIR Reclamation Plan Amendment emissions, as well as the approved 2012 EIR Mitigation Measures that are conditions of the 2012 Reclamation Plan approval.

2.3.1 2012 EIR Baseline

The baseline for the 2012 EIR reflects the physical environmental conditions in the vicinity of the PCRP as they existed on June 29, 2007, when the County published a NOP in connection with the Applicant's first proposed amendment of the 1985 Reclamation Plan. As described in Draft 2012 EIR Section 4.3.2, documentation pertinent to the air quality analysis establishes that, by 2007, some materials storage already had occurred in the EMSA. The 2012 Reclamation Plan Amendment involved an existing quarry operation characterized by fluctuating production and associated air emissions, in response to continually changing market demands. The baseline air pollutant emissions identified in the 2012 EIR air quality analysis are based on an average over the 11-year period from January 1, 2000, to December 31, 2010, which includes periods of relatively high production as well as relatively low production at the Permanente Quarry in response to changing market demands. The daily and annual 2012 EIR baseline criteria pollutant emissions are shown in **Tables 2-3 and 2-4**.

The 2012 EIR included a health risk assessment and modeling of $PM_{2.5}$ concentrations. The 2012 EIR baseline health risk impacts are shown in **Tables 2-5** and **2-6**. The 2012 EIR baseline $PM_{2.5}$ concentrations are shown in **Table 2-7**.

2.3.2 2012 Emissions and Analysis

Criteria Pollutants

Baseline and maximum daily 2012 Reclamation Plan Amendment emissions and the net change in emissions compared to the BAAQMD daily thresholds (as disclosed in the 2012 EIR) are summarized in **Table 2-3**. Baseline and maximum annual 2012 Reclamation Plan Amendment emissions and the net change in emissions compared to the BAAQMD annual thresholds are summarized in **Table 2-4**. The 2012 Reclamation Plan Amendment emissions identified in the tables below include emissions associated with creek restoration activities proposed within the disturbance areas of the PCRAs. As shown in Tables 2-3 and 2-4, the Reclamation Plan Amendment (including the proposed creek restoration work) was found to result in net emissions reductions for all nonattainment air pollutants (PM_{10}, $PM_{2.5}$, and the ozone precursors NO_x and ROG), and therefore was disclosed to not exceed the BAAQMD daily or annual thresholds of significance. Reclamation Plan Amendment-related criteria pollutant emissions were found to result in a less-than-significant impact.

TABLE 2-3
2012 RECLAMATION PLAN AMENDMENT MAXIMUM DAILY CRITERIA AIR POLLUTANT EMISSIONS (POUNDS/DAY)

Scenario	PM_{10}	$PM_{2.5}$	NO_x	ROG	CO	SO_2
Baseline Emissions	5,411	893	2,440	167	2,641	27
Reclamation Plan Amendment Emissions	1,970	311	2,124	123	1,891	32
Maximum Daily Incremental Change	(3,441)	(582)	(316)	(44)	(750)	5
BAAQMD Threshold	82	54	54	54	None	None
Significant Impact (Yes or No)?	No	No	No	No	--	--

SOURCE: Draft 2012 EIR Section 4.3.5.1, Table 4.3-3.

TABLE 2-4
2012 RECLAMATION PLAN AMENDMENT MAXIMUM ANNUAL CRITERIA AIR POLLUTANT EMISSIONS (TONS/YEAR)

Scenario	PM_{10}	$PM_{2.5}$	NO_x	ROG	CO	SO_2
Baseline Emissions	754	122	324	24	288	1
Reclamation Plan Amendment Emissions	291	45	301	18	222	3
Maximum Annual Incremental Change	(463)	(77)	(23)	(6)	(66)	2
BAAQMD Threshold	15	10	10	10	None	None
Significant Impact (Yes or No)?	No	No	No	No	--	--

SOURCE: Draft 2012 EIR Section 4.3.5.1, Table 4.3-4.

Toxic Air Contaminants

A health risk assessment (HRA) was conducted to analyze potential health risks from emissions associated with the 2012 Reclamation Plan Amendment. This HRA was part of the impact analysis in the 2012 EIR. The HRA was conducted in accordance with technical guidelines developed by federal, state, and regional agencies, including U.S. EPA, *Haul Road Workgroup Recommendations Final Report* (U.S. EPA 2011) Office of Environmental Health Hazard Assessment (OEHHA) *Air Toxics Hot Spots Program Guidance* (OEHHA 2003), and the BAAQMD's *Health Risk Screening Analysis Guidelines* (BAAQMD 2005).

The reported health risks for that analysis were associated with off-road equipment used for the quarrying and overburden activities. On-road haul truck activity included in the HRA analysis consists of trucks hauling material to customers from the rock plant and trucks associated with importing mulched green waste to mix with the West Materials Storage Area (WMSA) material as it is used to backfill the Quarry pit in Phase 2. A summary of the 2012 EIR HRA impacts are shown in **Tables 2-5** and **2-6**.

TABLE 2-5
2012 RECLAMATION PLAN AMENDMENT HEALTH RISK SUMMARY

Risk	MEIR - Child Resident South of Stevens Creek Blvd. (per million)	Caretaker's Residence (per million)
Cancer – Draft 2012 EIR	8.98	8.61
BAAQMD significance thresholds	10	10
Exceeds threshold?	No	No

SOURCE: Draft 2012 EIR Section 4.3.5.1, Tables 4.3-8 and 4.3-11.

MEIR: maximally exposed individual receptor.

TABLE 2-6
2012 RECLAMATION PLAN AMENDMENT ESTIMATED CHRONIC AND ACUTE HAZARD IMPACTS

Health Risk	Location	2012 EIR Value[a]
Chronic	MEIR	0.13
Acute	MEIR	0.52

SOURCE: Draft 2012 EIR Section 4.3.5.1, Tables 4.3-10 and 4.3-13.

[a]The chronic and acute risk values from the 2012 EIR were reported for the caretaker's house.

$PM_{2.5}$ Concentrations

As shown in **Table 2-7**, the 2012 EIR determined that the maximum incremental annual $PM_{2.5}$ exhaust concentration at the maximally exposed individual receptor (MEIR) at the caretaker's residence would be 0.40 µg/m^3 without mitigation, which would exceed the BAAQMD threshold of 0.3 µg/m^3. The 2012 EIR included Mitigation Measures 4.3-3a and 4.3-3b (see Section 2.3.3, below), which would reduce $PM_{2.5}$ concentrations to below the threshold.

TABLE 2-7
ESTIMATED $PM_{2.5}$ CONCENTRATION IMPACTS (µG/M^3)

Location	Annual Average Concentration
2012 EIR Value[a] (Unmitigated)	0.40
2012 EIR Value[a] (Mitigated)	0.29

SOURCE: Draft 2012 EIR. Section 4.3.5.1, Table 4.3-15.

[a]The $PM_{2.5}$ concentration from the Draft 2012 EIR is reported for the caretaker's residence.

2.3.3 2012 EIR Mitigation Measures

As stated above in Section 2.3.2, no significant impacts associated with criteria pollutants were identified related to the 2012 Reclamation Plan Amendment, so the 2012 EIR did not identify mitigation measures to reduce criteria pollutant emissions. However, the 2012 EIR did identify a significant health risk impact, which was mitigated to a less-than-significant level with implementation of Mitigation Measures 4.3-3a through 4.3-3c. Mitigation Measures 4.3-3a through 4.3-3c are described below followed by a summary of how the mitigation measures are considered for the County's PCRP SEIR relative to the CEQA baseline.

> **Mitigation Measure 4.3-3a.** Within 90 days of [Reclamation Plan Amendment] Project approval, the Applicant shall submit to the County and the BAAQMD a comprehensive inventory of all Project-related off-road construction equipment expected to be used during any portion of the Project. The inventory shall include the horsepower rating, engine production year, and projected hours of use or fuel throughput for each piece of equipment. The inventory shall be updated and submitted annually throughout the duration of the Project.

SEIR Baseline Consideration

The Applicant would be required to implement 2012 EIR Mitigation Measure 4.3-3a as defined above during the implementation of the proposed PCRP.

Mitigation Measure 4.3-3b. Within 90 days of [Reclamation Plan Amendment] Project approval, the Applicant shall provide a plan for approval by the County and the BAAQMD demonstrating that Project-related off-road equipment would achieve a Project (EMSA-specific) wide fleet-average 35 percent reduction in DPM emissions compared to the proposed fleet in the ALG report (ALG 2011a) during Phase 1 of the Project. The plan shall be updated and submitted annually throughout the duration of the Project. Options for reducing emissions may include, but are not limited to:

- Using newer model engines (e.g., engines that meet U.S. EPA interim/final Tier 4 engine standards);
- Use of Retrofit Emission Control Devices that consist of diesel oxidation catalysts, diesel particulate filters, or similar retrofit equipment control technology verified by CARB (http://www.arb.ca.gov/diesel/verdev/verdev.htm);
- Use of low-emissions diesel products or alternative fuels;
- Use of alternative material handling options (e.g., conveyor system); or
- Other options as may become commercially available and verifiable.

SEIR Baseline Consideration

The Applicant has stated that all off-road equipment and vehicles that would be associated with PCRP implementation would be equipped with engines that meet U.S. EPA Tier 4 Final emissions standards (Lehigh 2021). Therefore, the PCRP would be implemented consistent with the requirements of 2012 EIR Mitigation Measure 4.3-3a. Alternatively, the 2012 EIR states that in lieu of Mitigation Measures 4.3-3a and 4.3-3b, the Applicant may implement 2012 EIR Mitigation Measure 4.3-3c (see below).

Mitigation Measure 4.3-3c. The Applicant shall submit evidence establishing to the County's satisfaction that there are legally-binding restrictions precluding any occupancy of the caretaker's residence during the entirety of Phase 1 of the [Reclamation Plan Amendment] Project.

SEIR Baseline Consideration

To date, no evidence has been submitted to the County indicating that there are legally-binding restrictions precluding any occupancy of the caretaker's residence; however, the Applicant has stated that the residence would not serve as a dwelling during implementation of the PCRP (Lehigh 2021).

2.4 Analysis, Impacts, and Mitigation

2.4.1 Significance Criteria

Subsequent to the 2012 EIR, the air quality criteria in the CEQA Guidelines Appendix G environmental checklist have been revised as shown below, resulting in the combination of two

of the criteria in place in 2012 (related to violations of air quality standards and cumulatively considerable net increases in non-attainment pollutants) into one criterion (second bullet below). For relevant purposes, the revised criteria shown below are consistent with and comparable to the criteria used in the 2012 EIR evaluation:

a) Conflict with or obstruct implementation of an applicable air quality plan;

b) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors);

c) Expose sensitive receptors to substantial pollutant concentrations; or

d) Result in other emissions (such as those leading odors) adversely affecting a substantial number of people.

2.4.2 Methodology

Air Quality Plans

Before approving a project where an air quality plan consistency determination is required, BAAQMD recommends that the lead agency analyze the project with respect to the following questions:

(1) does the project support the primary goals of the 2017 CAP?

(2) does the project include applicable control measures from the 2017 CAP?

(3) does the project disrupt or hinder implementation of any 2017 CAP control measures?

If the first two questions are concluded in the affirmative and the third question is concluded in the negative, then the BAAQMD considers the project consistent with the 2017 Clean Air Plan.

Any project that would not support the 2017 Clean Air Plan goals would not be considered consistent with the 2017 CAP. Whether the PCRP supports these goals will be determined by whether it is consistent with CEQA thresholds of significance. If the CEQA thresholds of significance are exceeded, then the Project would not be considered to support the 2017 Clean Air Plan goals, and the associated impact would be significant.

Criteria Pollutants

The analysis of criteria pollutants considers the impacts related to emissions of non-attainment pollutants and their precursors. Although ozone would not be directly emitted by PCRP-related construction equipment, the ozone precursors ROG and NO_x would be emitted and are therefore, along with particulate matter, the focus of the impact assessment. Given that ozone formation occurs through a complex photo-chemical reaction between NO_x and ROG in the atmosphere with the presence of sunlight, the impacts of ozone are typically considered on a basin-wide or regional basis instead of a localized basis. The ambient air quality standards for ozone are concentration-based; they are not based on the mass of their precursor pollutants (i.e., NO_x and

ROG). It is not necessarily the mass of precursor pollutants that causes human health effects, as opposed to the concentration of resulting ozone or particulate matter. Because of the complexity of ozone formation and the non-linear relationship of ozone concentration with its precursor gases and given the state of environmental science modeling in use at this time, it is infeasible to convert specific emissions levels of NO_x or ROG emitted in a particular area to a particular concentration of ozone in that area. Meteorology, the presence of sunlight, seasonal impacts, and other complex chemical factors all combine to determine the ultimate concentration and location of ozone (South Coast Air Quality Management District [SCAQMD] 2014, San Joaquin Valley Air Pollution Control District [SJVAPCD] 2014).

Significance Thresholds

The 2012 EIR relied on the methods and significance thresholds identified in the BAAQMD's 2010 CEQA Guidelines as supported by Appendix D of the BAAQMD Guidelines and BAAQMD's Revised Draft Options and Justification Report. After certification of the 2012 EIR, the BAAQMD updated its CEQA Guidelines in 2017 to address the California Supreme Court's opinion in California Building Industry Association v. BAAQMD (2015) 62 Cal.4th 369 (BAAQMD 2017c). However, as it pertains to projects such as the PCRP that do not include proposed residences, the methods and significance criteria identified in the 2017 BAAQMD CEQA Guidelines are essentially the same as those identified in the 2010 BAAQMD CEQA Guidelines. The analysis presented in this report uses the same general methodologies as those used for the 2012 EIR.

Impacts related to the PCRP contributing to an existing or projected air quality violation and whether the PCRP would result in a cumulatively considerable net increase of any criteria pollutant or associated precursors are judged by comparing estimated direct and indirect PCRP exhaust emissions to the significance thresholds, which for short-term construction emissions are 54 pounds per day for ROG, NO_x, and $PM_{2.5}$; and 82 pounds per day for PM_{10}. Only the exhaust portion of $PM_{2.5}$ and PM_{10} emissions are compared against the construction thresholds. The BAAQMD considers implementation of its recommended mitigation measures for fugitive dust sufficient to ensure that construction-related fugitive dust is reduced to a less-than-significant level. Therefore, the BAAQMD recommends that analyses focus on implementation of dust control measures rather than comparing estimated levels of fugitive dust to a quantitative significance threshold. For long-term operations, the BAAQMD has two sets of significance thresholds, including daily thresholds that are the same as the construction thresholds, and annual thresholds that are 10 tons per year for ROG, NO_x, and $PM_{2.5}$; and 15 tons per year for PM_{10}. These significance thresholds are the same as those used in the 2012 EIR to evaluate impacts associated with criteria pollutants. Although emissions resulting from implementation of the PCRP would be considered short-term construction emissions and appropriately evaluated with respect to the BAAQMD construction significance thresholds, for purposes of continuity with the 2012 EIR, this analysis compares the PCRP emissions to the average daily significance thresholds as well as the annual significance thresholds.

Emission Estimates

Project-related air quality impacts typically fall into two categories: short-term impacts due to construction or decommissioning, and long-term impacts due to project operations. The PCRP would

generate air pollutant emissions on a short-term basis during construction over a period of approximately 6 years; there would be no long-term sustained operational impacts. During construction (short-term), the PCRP would generate ozone precursors and affect local particulate concentrations primarily due to fugitive dust and diesel exhaust emissions from construction equipment.

The Applicant provided the County with scheduling assumptions for the five main phases that would be associated with the PCRP (Lehigh 2023). The Project is proposed to occur 5 days a week, approximately 132 workdays per year during the dry seasons (i.e., April 15 through October 15) of 2024 through 2029. Below is a list of the PCRP phases by anticipated year of construction:

- 2024: Concrete Channel/Channel Widening (Phase 1);
- 2025: Rock Pile Area (Phase 1);
- 2026: Rock Pile Area (Phase 2);
- 2027: Channel Widening (Phase 2) and Old Crusher Foundation;
- 2028: Material Removal Area (Phase 1); and
- 2029: Material Removal Area (Phase 2).

The Applicant provided a list of 12 types of off-road construction equipment that would be used during PCRP construction and indicated that each piece of equipment would be compliant with U.S. EPA Tier 4 non-road engine standards and would operate between 4 and 8 hours each workday for a specified number of days per year based on the applicable construction phase (Lehigh 2023, 2021). The average hours per day each equipment type would operate for a given construction phase were estimated by dividing the total operation hours per year by the estimated number of workdays for that phase. Engine horsepower ratings for the equipment types were estimated by ESA based on specification sheets found online for the provided equipment types or CalEEMod model defaults were used. **Table 2-8** lists the assumed engine horsepower ratings, types, and amounts of construction equipment that would be required to complete each phase of the PCRP.

With regard to on-road vehicle trips that would be associated with the PCRP, the Applicant has indicated that each construction phase would require between 8 and 16 worker one-way daily trips; 216 vendor truck one-way daily trips except for the Concrete Channel and Older Crusher Foundation phases, which would require 25 vendor truck one-way daily trips; and as described in Table 2-8, 2 to 1,481 haul truck one-way total trips (Lehigh 2023). For the purposes of the on-road emissions estimates, it is assumed that worker vehicles would be light duty trucks (i.e., LDT1), vendor trucks would be a mix of heavy-duty trucks (i.e., LHDT1, LHDT2, and MHDT), and haul trucks would be heavy-heavy duty trucks (i.e., HHDT).

TABLE 2-8
PCRP OFF-ROAD EQUIPMENT AND HAUL TRUCK TRIP REQUIREMENTS

Equipment/Haul Truck	Concrete Channel	Channel Widening	Rock Pile Area	Old Crusher	Material Removal
81 hp Clearing Saw	1	-	-	-	-
84 hp Generator	1	-	-	1	-
286 hp Caterpillar 350 Excavator	-	1	2	-	2
108 hp Caterpillar 313 Excavator	-	1	1	-	1
452 hp Caterpillar 740 (40-ton Truck)	-	2	4	-	4
393 hp Caterpillar 980 Loader	-	1	1	-	1
110 hp Caterpillar 299 (tracked skid steer loader)	-	2	1	-	1
402 hp Dump Truck	-	1	1	-	1
402 hp Hydroseeding Truck (1.5 k gal)	-	1	1	-	1
402 hp Water Truck (3,000 gallons	-	1	1	-	1
347 hp Caterpillar D8 Bulldozer	-	1	1	-	1
Caterpillar Compactor CP56	-	-	1	-	-
Haul Truck Trips (one-way)	2	343	1,481	2	1,276

NOTE: hp = horsepower

SOURCE: Exhibit A.

Construction-related on-site exhaust emissions were estimated based on the assumptions described above using the California Emissions Estimator Model (CalEEMod) version 2020.4.0. To estimate on-road mobile exhaust emissions, CalEEMod version 2020.4.0 uses vehicle emission factors from CARB's EMFAC2017 model. However, CARB and U.S. EPA have adopted the EMFAC2021 version of the model. The proposed PCRP's on-road vehicle exhaust emissions were estimated outside of CalEEMod using emissions factors for the vehicle types described above obtained from the EMFAC2021 model.

In addition, fugitive dust from bulldozing on the disturbance areas and travel on paved and unpaved roads were calculated using factors from U.S. EPA's AP-42, which is a compilation of emission factors for various industries and activities. Emission factors for grading equipment passes from Chapter 11 were used to estimate fugitive PM_{10} and $PM_{2.5}$ bulldozing emissions, and factors from Chapter 13 were used to estimate paved and unpaved road re-suspended PM_{10} and $PM_{2.5}$ (U.S. EPA 1998, 2006, and 2011). The 2012 EIR also reported metals sampled from overburden and road dust, which were speciated from the PM_{10} fugitive calculations. This information was also used in the HRA for the PCRP, as discussed below.

The modeled emissions for each construction phase of the PCRP were multiplied by the percent of emissions to be evaluated for the given construction phase based on the proposed creek reach area outside of the previously evaluated 2012 EIR disturbance areas to allow for evaluation of the applicable emissions in the County's SEIR (see Section 1.1, *Emissions Analysis for the SEIR*).

Calculated emissions for the County's SEIR were then summed and added to the baseline emissions (see Section 2.3, *CEQA Baseline Emissions*) for comparison to BAAQMD's applicable regional significance thresholds and to determine if the PCRP could cause a new or substantially more severe significant direct, indirect, and/or cumulative environmental effects compared with the project analyzed in the 2012 EIR. Detailed emissions assumptions and summaries, including the CalEEMod and EMFAC2021 assumptions and output, are included in Exhibit A.

As identified in the 2012 EIR, the Applicant has committed to the following fugitive dust emission reduction measures as part of the 2012 Reclamation Plan Amendment, which for purposes of this analysis are considered equivalent to the BAAQMD's basic measures for dust control:

- Water unpaved roads; and
- Water active areas consistent with a dust mitigation plan submitted by the Applicant to the BAAQMD in 2010.

Therefore, due to BAAQMD guidance, estimates of PCRP fugitive dust-related PM_{10} emissions have been estimated mainly for disclosure, but also for the purpose of estimating metals that could be entrained in the atmosphere with dust during construction for the HRA (see below).

Health Impacts

After certification of the 2012 EIR, the California Supreme Court published a decision in Sierra Club v. County of Fresno (2018) 6 Cal.5th 502 (known as the "Friant Ranch" case), which held that CEQA requires that a connection be drawn between potential project emissions and human health impacts. The Court found that while there will be some scientific limits to the analytical tools available to draw and quantify these connections, the EIR "must adequately explain what the agency does know and why, given existing scientific constraints, it cannot translate potential health impacts further" and that it did not "indicate the concentrations at which such pollutants would trigger identified symptoms." The Court concluded that "the public would have no idea of the health consequences that result when more pollutants are added to a nonattainment basin." The Court found that even if it were impossible to do more, the Friant Ranch EIR would have been found insufficient "because it failed to explain why it was not feasible to provide an analysis that connected the air quality effects to human health consequences."

Same as expressed in the amicus curiae brief submitted for the Friant Ranch case, the significance thresholds described above were set at emission levels tied to the region's attainment status. They are emission levels at which stationary pollution sources permitted by the BAAQMD must offset their emissions and CEQA projects must use feasible mitigations; they are not intended to be indicative of any localized human health impact that a project may have. Therefore, a PCRP-related exceedance of the mass regional emissions threshold (e.g., pounds per day or tons per year NO_x thresholds) prior to mitigation from construction-related activities could indicate that the PCRP could cause or contribute to the exposure of sensitive receptors to ground-level concentrations greater than health-protective levels.

Furthermore, available models today are designed to determine regional, population-wide health impacts, and cannot necessarily accurately quantify ozone-related health impacts caused by PCRP-

related NO_x or VOCs emissions. Therefore, it is currently infeasible to connect NO_x emissions associated with a project of limited scope, such as the short-term PCRP, to ozone-related health impacts.

The primary health concern with exposure to NO_x emissions is the secondary formation of ozone. As the amicus curiae briefs submitted by SCAQMD and SJVAPCD for the Friant Ranch case suggested, because of the complexity of ozone formation and given the state of environmental science modeling in use at this time, it is infeasible to determine whether, or the extent to which, a single project's precursor (i.e., NO_x and ROG) emissions would result in the formation of secondary ground-level ozone and the geographic and temporal distribution of such secondary formed emissions (SCAQMD 2014, SJVAPCD 2014). Meteorology, the presence of sunlight, seasonal impacts, and other complex chemical factors all combine to determine the ultimate concentration and location of ozone. Furthermore, available models today are designed to determine regional, population-wide health impacts, and cannot accurately quantify ozone-related health impacts caused by NO_x or ROG emissions from local level project of limited scope.

Community Health Risk Due to TACs

Impacts associated with the Project exposing sensitive receptors or the general public to substantial pollutant concentrations are evaluated by assessing the health risks posed by the placement of new sources of TAC emissions near existing sensitive receptors. Specifically, according to the BAAQMD, the Project would have a significant air quality impact if the construction phase would expose persons to substantial levels of TACs, such that the probability of contracting cancer exceeds 10 in one million, or if it would expose persons to pollutants such that a chronic Hazard Index of 1.0 would be exceeded. In addition, a significant impact would occur if the Project would result in an incremental increase in annual average concentrations of $PM_{2.5}$ of more than 0.3 microgram per cubic meter ($\mu g/m^3$) at a sensitive receptor location. (BAAQMD 2017c).

In addition, for assessing community risks and hazards relative to the criteria discussed above, the BAAQMD recommends use of a 1,000-foot radius around the project property boundary where the siting of a new source or receptor should be quantitatively assessed, considering both individual and nearby cumulative sources (i.e., proposed project plus existing and foreseeable future projects). For this analysis, the closest sensitive receptors were evaluated, even though they are located farther than 1,000 feet from where PCRP activities would occur on site. Haul trucks and vendor trucks arriving and departing from the site are a source of TACs and would travel closer than 1,000 feet from sensitive receptors for brief periods of time along the truck route.

An HRA was conducted to evaluate the cancer risks and non-cancer health effects associated with exposure to TACs that would be emitted because of the PCRP. TACs associated with the Project include various metals within fugitive dust (such as mercury and chromium), crystalline silica, and DPM. Cancer risks are evaluated based on assumed lifetime exposure to TACs over the expected lifespan of the Project. Non-cancer health risks evaluated include adverse health effects from both acute (highest 1-hour exposure) and chronic (average annual exposure). As recommended by BAAQMD, the HRA also calculated the annual average $PM_{2.5}$ concentrations.

The HRA follows the protocols outlined by the BAAQMD, CARB, OEHHA, and U.S. EPA. Consistent with guidelines and recommendations from these agencies, the HRA evaluated the incremental increase in lifetime cancer risks and non-cancer chronic and acute health risk from exposure to TAC emissions. At the time of the 2012 EIR, the OEHHA *2003 Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments* was the applicable guidance document for conducting HRAs (OEHHA 2003). Consistent with the 2012 EIR, this HRA assesses impacts from the PCRP based on the 2003 OEHHA guidance. After the 2012 EIR was certified, OEHHA released the *2015 Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments*, which revised some of the exposure parameters, such as breathing rates and age sensitivity factors. The 2015 OEHHA guidance was not available nor was its release reasonably foreseeable at the time the 2012 EIR was certified. For information and disclosure purposes, this HRA presents the health risk values using the 2015 OEHHA Guidance.

Cancer risk is defined as the lifetime probability of developing cancer from exposure to carcinogenic substances. Cancer risks are expressed as the chances in one million of contracting cancer, for example, 10 cancer cases among one million people exposed. Non-cancer adverse health risks are measured against a hazard index, which is defined as the ratio of the predicted incremental exposure concentrations of the various non-carcinogens from the Project to published reference exposure levels (RELs) that can cause adverse chronic (long-term) and acute (short-term) health effects.

Emissions Sources

The emissions sources described below are associated with PCRP work that would occur outside of the 2012 EIR PCRA disturbance areas, specifically related to the concrete channel, rock pile and channel widening area, and material removal area. These areas are described in Chapter 1, *Introduction*. These emissions sources were included in the HRA, as described below. The HRA calculations, including the emissions as calculated for the HRA, are included in Exhibit B.

DPM and $PM_{2.5}$ Emissions from Off-road Equipment

Off-road diesel equipment would be used for the creek restoration and includes graders, loaders, excavators, and backhoes. DPM emissions from off-road equipment can lead to increased cancer and chronic, non-cancer health risks. Off-road equipment emissions were calculated using CalEEMod version 2020.4.0, which is a land use emissions model developed by CARB and California air districts. Emissions of exhaust PM_{10} were assumed to be DPM. DPM can also increase $PM_{2.5}$ concentrations ($PM_{2.5}$ being a subset of PM_{10}) that can lead to adverse health effects, so these emissions were used to analyze $PM_{2.5}$ concentrations.

DPM and $PM_{2.5}$ Emissions from On-road Haul and Vendor Trucks

On-road diesel trucks modeled in the HRA include vendor trucks bringing materials to the site and haul trucks importing clean soil for PCRP restoration activities. As with off-road diesel equipment, DPM emissions from on-road diesel trucks can lead to increased cancer and chronic, non-cancer health risks. Emissions of DPM and $PM_{2.5}$ from on-road trucks were calculated using the CARB on-road emissions model EMFAC2021 and analyzed in the HRA for cancer and chronic health risks and $PM_{2.5}$ concentrations.

Fugitive Dust Emissions and Metals

Fugitive dust would be generated during grading of creek restoration areas as part of PCRP implementation, plus from travel on paved and unpaved roads, due to re-suspended road dust.

Fugitive dust was included in the HRA because trace amounts of metals in the dust can pose cancer and non-cancer acute and chronic health effects. These metals were analyzed in samples taken for the 2012 EIR from overburden and unpaved road on site, and these metals fractions were used in this HRA (see Exhibit B). It was conservatively assumed that the same metals fraction on unpaved roads would be found on paved roads, which was incorporated in the HRA. Fugitive PM_{10} emissions were calculated using U.S. EPA AP-42 factors from Chapter 11 for grading and Chapter 13 for paved and unpaved road travel (U.S. EPA 1998, 2006, and 2011), as described above.

The PCRP would incorporate fugitive dust control measures with watering of disturbance areas and unpaved roads. Watering of disturbance areas would achieve a control efficiency of approximately 50 percent, and watering of unpaved roads would achieve a control efficiency of approximately 75 percent as stated in 2012 EIR Exhibit B.

Sensitive Receptors

Cancer, chronic, and acute risks were modeled at residences, which are considered sensitive receptors, in the vicinity of the PCRA disturbance areas. The closest residential area is approximately 3,000 to 3,500 feet to the east of the proposed PCRP disturbance areas, south of Stevens Creek Boulevard and west of South Foothill Boulevard. These receptors were modeled for cancer, chronic, and acute health risks.

In addition, the HRA modeled risks for the Historical Society caretaker's residence. A site caretaker once resided here, but the residence is no longer occupied and is not anticipated to be occupied during implementation of the PCRP. This analysis evaluates risk impacts at this location for informational purposes and for comparison to the 2012 EIR.

Non-residential receptors, where the public could have access on a short-term basis, were modeled for acute impacts from metals in fugitive dust. These areas include the PG&E trail approximately 3,400 feet north of the site and the Gate of Heaven cemetery to the northeast of the site.

HRA Methodology

Cancer risks are a function of exposure duration, exposure frequency, breathing rate, and age sensitivity factors, which are age-dependent. These factors together with the TAC concentration represent an inhalation dose. Chronic and acute impacts, however, do not factor in exposure duration, exposure frequency, breathing rate, and age sensitivity factors; thus, there is no difference for chronic and acute impacts between a child and adult exposed to the same pollutant concentration.

The HRA was conducted in the following three steps:

- Estimate the TAC emissions to which sensitive receptors are exposed (described above);

- Calculate the ground-level TAC concentrations of these emissions at the sensitive receptors, using a dispersion model; and
- Calculate the health risks from the modeled TAC concentrations using OEHHA toxicity and dose factors.

The concentrations were calculated using the U.S. EPA AERMOD dispersion model (version 19191) with 5 years of measured meteorology from the Moffett Field station in Mountain View. Concentrations were modeled at specific locations where residences are located and were defined by a Cartesian coordinate system. In addition, some locations where the public could have access on a short-term basis were modeled for acute impacts.

DPM, $PM_{2.5}$, and metals in PM_{10} fugitive dust would be emitted from the PCRP disturbance areas, plus paved and unpaved roads on site. The HRA included a portion of distance on Stevens Creek Boulevard approaching the property, as there are many residences (sensitive receptors) present along this road that trucks would travel past on their way to and from the site.

TAC emissions from PCRP-proposed creek restoration activities were modeled as polygon area sources, and TAC emissions from paved and unpaved roads were modeled as line area sources, as described in more detail below.

PCRP disturbance areas:

- Polygon area source of 1.5 acres for concrete channel, 3.4 acres for rock pile and channel widening, and 3.9 acres for material removal;
- Release height of 5 meters for construction equipment exhaust;
- Initial vertical dimension of 1.4 meters;
- Receptor flagpole height of 1.5 meters (ground-level receptor at breathing height); and
- Emissions occurring only between the hours of 8 a.m. and 6 p.m.[1];

Paved and unpaved roads:

- Line-area source of 1.6 miles paved from Stevens Creek Boulevard and Stonebridge/ Ridgeway Drive to the western end of the on-site paved road, and line area source of 1 mile unpaved to the material removal area;
- Release height of 2.55 meters for haul and vendor truck exhaust and re-suspended road dust;
- Initial vertical dimension of 2.37 meters;
- Emissions occurring only between the hours of 8 a.m. and 6 p.m.; and
- Receptor flagpole height of 1.5 meters (ground-level receptor at breathing height).

The sources were modeled with an emission rate of one gram per second to obtain a dispersion factor (unit concentration) at each receptor location. The DPM and $PM_{2.5}$ concentrations were calculated using the dispersion factors and the DPM and $PM_{2.5}$ emissions described above.

1 Construction hours would be limited to typical active workday hours for construction projects.

As discussed previously, for information and disclosure purposes, this HRA presents the health risk values using the 2015 OEHHA guidance. The 2015 OEHHA guidance for HRAs provides age sensitivity factors to apply to the cancer risk calculation. These factors reflect the increased sensitivity of children to the effects of carcinogens. To estimate the worst-case lifetime excess cancer risk, the resident at each receptor was assumed to be in the child age group below 2 years of age. In addition, children have higher breathing rates, which increases the intake of pollutants. The modeling exposure assumptions conservatively assume a child in the age group from birth to 2 years of age, which is the age group most susceptible to DPM emissions from a cancer risk perspective, could be living at the residence east of the Project site.

Figure 2-1 shows the locations of residents (sensitive receptors) closest to the Project site. Modeling assumptions, equations, the cancer risk calculations, and an illustration of the Project sites that were modeled as polygon area sources, in addition to the on-site roadways that were modeled as line area sources, are included in Exhibit B.

Odors

Impacts related to the PCRP creating or exposing a substantial number of people to objectionable odors is evaluated based on the potential for the PCRP to generate odors that could affect nearby sensitive receptors.

2.4.3 Impact Analysis

a) Implementation of the proposed project could conflict with or obstruct the implementation of an applicable air quality plan.

The most recently adopted air quality plan for the PCRP area is the 2017 CAP. The 2017 CAP focuses on two closely-related goals: protecting public health and protecting the climate. The 2017 CAP is an update to the BAAQMD's 2010 Ozone Strategy to comply with State air quality planning requirements. The 2017 CAP also serves as a multi-pollutant air quality plan to protect public health and the climate. The 2017 CAP control strategy includes revised, updated, and new measures in the three control measure categories: stationary sources, transportation, and buildings and energy.

Any project that would not support the 2017 Clean Air Plan goals would not be considered consistent with the 2017 CAP. The BAAQMD-recommended measure for determining PCRP support of these goals is consistency with CEQA thresholds of significance. If the CEQA thresholds of significance are exceeded, then the PCRP would not be considered to support the 2017 Clean Air Plan goals, and the associated impact would be significant. As presented in the Impact AQ-1 discussions below, the PCRP would not exceed the BAAQMD significance thresholds; therefore, the PCRP would be considered to support the primary goals of the 2017 CAP, and there would be no impact.

2017 CAP Transportation Control Measure TR22, *Construction, Freight, and Farming Equipment*, appears to be the only measure applicable to the PCRP. It provides incentives for the early deployment of electric, Tier 3, and Tier 4 off-road engines used in construction, freight, and framing equipment. Lack of consistency with these incentives could be considered a significant

impact associated with conflict or obstruction of implementation of the applicable air quality plan. The Applicant has committed to using off-road diesel construction equipment compliant with U.S. EPA Tier 4 Final engine standards. Therefore, the PCRP would be consistent with the intent of Transportation Measure TR22, and there would be no impact.

In summary and same as disclosed in the 2012 EIR, the PCRP would support the primary goals of the 2017 CAP, it would include all applicable 2017 CAP control measures, and it would not disrupt or hinder implementation of any 2017 CAP control measures. Therefore, the PCRP would not conflict with or obstruct implementation of the 2017 CAP and there would be no impact.

---

b) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)

Impact AQ-1: The PCRP would generate emissions of criteria air pollutants which could contribute to existing nonattainment conditions and further degrade air quality. (Less than Significant Impact)

As presented in the *Emissions Estimates* discussion in Section 2.4.2.2, *Criteria Pollutants*, the criteria pollutant emissions that would be generated associated with the PCPR would be short-term and periodic in nature and would occur during the dry seasons of years 2024 through 2029. Below are summaries of the PCRP emissions estimate results in terms of total PCRP emissions estimates, PCRP emissions estimates that were not considered in the 2012 EIR and are applicable to the County's SEIR, and PCRP emission estimates compared to the SEIR CEQA baseline.

PCRP Total Emissions Estimates

Table 2-9 presents a summary of the PCRP total average pounds per day emissions estimates, prior to the use of applicability factors to remove the emissions considered to have already been evaluated in the 2012 EIR.

TABLE 2-9
PCRP TOTAL AVERAGE DAILY CRITERIA POLLUTANT EMISSIONS (POUNDS/DAY)

Scenario	PM_{10}	$PM_{2.5}$	NO_x	ROG	CO	SO_2
Concrete Channel (2024)	41.32	5.50	0.72	0.10	0.67	0.00
Channel Widening - Phase 1 (2024)	173.72	23.68	7.18	0.75	12.06	0.05
Rock Pile Area - Phase 1 (2025)	186.97	25.07	9.54	1.27	31.29	0.09
Rock Pile Area - Phase 2 (2026)	186.96	25.07	9.06	1.24	31.17	0.09
Channel Widening - Phase 2 (2027)	173.70	23.67	5.81	0.67	11.74	0.05
Old Crusher (2028)	38.21	3.87	0.52	0.08	0.60	0.00
Material Removal - Phase 1 (2028)	366.33	42.91	7.80	1.11	27.46	0.09
Material Removal - Phase 2 (2029)	367.61	43.03	7.49	1.09	27.24	0.09

SOURCE: Exhibit A.

Table 2-10 presents a summary of the PCRP total annual tons emissions estimates, prior to the use of applicability factors to remove the emissions considered to have already been evaluated in the 2012 EIR.

TABLE 2-10
PCRP TOTAL ANNUAL CRITERIA POLLUTANT EMISSIONS (TONS/YEAR)

Scenario	PM_{10}	$PM_{2.5}$	NO_x	ROG	CO	SO_2
Concrete Channel (2024)	1.90	0.28	0.05	0.01	0.04	0.00
Channel Widening - Phase 1 (2024)	10.72	1.61	0.47	0.05	0.80	0.00
Rock Pile Area - Phase 1 (2025)	11.64	1.75	0.63	0.08	2.06	0.01
Rock Pile Area - Phase 2 (2026)	11.63	1.77	0.60	0.08	2.06	0.01
Channel Widening - Phase 2 (2027)	11.12	1.66	0.38	0.04	0.78	0.00
Old Crusher (2028)	1.67	0.25	0.03	0.01	0.04	0.00
Material Removal - Phase 1 (2028)	23.21	2.90	0.51	0.07	1.79	0.01
Material Removal - Phase 2 (2029)	23.38	2.92	0.49	0.07	1.78	0.01

SOURCE: Exhibit A.

PCRP Emission Estimates Applicable to the County's SEIR

Table 2-11 presents a summary of the PCRP average pounds per day emissions estimates that are applicable to the County's environmental review of the PCRP. The emissions are estimated using the identified applicability factors applied to the total PCRP emissions presented in Table 2-9.

TABLE 2-11
PCRP AVERAGE DAILY CRITERIA POLLUTANT EMISSIONS APPLICABLE TO SEIR (POUNDS/DAY)

Scenario	% Covered in SIER	PM_{10}	$PM_{2.5}$	NO_x	ROG	CO	SO_2
Concrete Channel (2024)	100%	41.32	5.50	0.72	0.10	0.67	0.00
Channel Widening - Phase 1 (2024)	89%	154.88	21.12	6.40	0.67	10.75	0.04
Rock Pile Area - Phase 1 (2025)	89%	166.70	22.36	8.51	1.13	27.90	0.08
Rock Pile Area - Phase 2 (2026)	89%	166.70	22.35	8.08	1.11	27.79	0.08
Channel Widening - Phase 2 (2027)	89%	154.87	21.10	5.18	0.59	10.47	0.04
Old Crusher (2028)	0%	0.00	0.00	0.00	0.00	0.00	0.00
Material Removal - Phase 1 (2028)	20%	73.61	8.62	1.57	0.22	5.52	0.02
Material Removal - Phase 2 (2029)	20%	73.87	8.65	1.51	0.22	5.47	0.02

SOURCE Exhibit A.

Table 2-12 presents a summary of the PCRP tons per year emissions estimates that are applicable to the County's environmental review of the PCRP. The emissions are estimated using the identified applicability factors applied to the total PCRP emissions presented in Table 2-10.

TABLE 2-12
PCRP ANNUAL CRITERIA POLLUTANT EMISSIONS APPLICABLE TO SEIR (TONS/YEAR)

Scenario	% Covered in SIER	PM_{10}	$PM_{2.5}$	NO_x	ROG	CO	SO_2
Concrete Channel (2024)	100%	1.90	0.28	0.05	0.01	0.04	0.00
Channel Widening - Phase 1 (2024)	89%	9.55	1.44	0.42	0.04	0.71	0.00
Rock Pile Area - Phase 1 (2025)	89%	10.37	1.56	0.56	0.07	1.84	0.01
Rock Pile Area - Phase 2 (2026)	89%	10.37	1.58	0.53	0.07	1.83	0.01
Channel Widening - Phase 2 (2027)	89%	9.92	1.48	0.34	0.04	0.69	0.00
Old Crusher (2028)	0%	0.00	0.00	0.00	0.00	0.00	0.00
Material Removal - Phase 1 (2028)	20%	4.66	0.58	0.10	0.01	0.36	0.00
Material Removal - Phase 2 (2029)	20%	4.70	0.59	0.10	0.01	0.36	0.00

SOURCE: Exhibit A.

For the PCRP emissions estimates to be compared to the CEQA baseline, the total emissions generated for each year must be combined. **Table 2-13** presents a summary of the PCRP combined average pounds per day emissions estimates that are applicable to the County's environmental review of the PCRP for each year.

TABLE 2-13
PCRP COMBINED AVERAGE DAILY CRITERIA POLLUTANT EMISSIONS APPLICABLE TO SEIR (POUNDS/DAY)

Scenario	PM_{10}	$PM_{2.5}$	NO_x	ROG	CO	SO_2
Concrete Channel and Channel Widening - Phase 1 (2024)	196.20	26.62	7.12	0.77	11.42	0.05
Rock Pile Area - Phase 1 (2025)	166.70	22.36	8.51	1.13	27.90	0.08
Rock Pile Area - Phase 2 (2026)	166.70	22.35	8.08	1.11	27.79	0.08
Channel Widening - Phase 2 (2027)	154.87	21.10	5.18	0.59	10.47	0.04
Old Crusher and Material Removal - Phase 1 (2028)	73.61	8.62	1.57	0.22	5.52	0.02
Material Removal - Phase 2 (2029)	73.87	8.65	1.51	0.22	5.47	0.02

SOURCE Exhibit A.

Table 2-14 presents a summary of the PCRP combined tons per year emissions estimates that are applicable to the County's environmental review of the PCRP.

TABLE 2-14
PCRP COMBINED ANNUAL CRITERIA POLLUTANT EMISSIONS APPLICABLE TO SEIR (TONS/YEAR)

Scenario	PM_{10}	$PM_{2.5}$	NO_x	ROG	CO	SO_2
Concrete Channel and Channel Widening - Phase 1 (2024)	11.45	1.71	0.47	0.05	0.75	0.00
Rock Pile Area - Phase 1 (2025)	10.37	1.56	0.56	0.07	1.84	0.01
Rock Pile Area - Phase 2 (2026)	10.37	1.58	0.53	0.07	1.83	0.01
Channel Widening - Phase 2 (2027)	9.92	1.48	0.34	0.04	0.69	0.00
Old Crusher and Material Removal - Phase 1 (2028)	4.66	0.58	0.10	0.01	0.36	0.00
Material Removal - Phase 2 (2029)	4.70	0.59	0.10	0.01	0.36	0.00

SOURCE: Exhibit A.

PCRP Emission Estimates Compared to CEQA Baseline

Table 2-15 presents the net maximum pounds per day emissions relative to the PCRP emissions that were not evaluated in the 2012 EIR combined with the 2012 Reclamation Plan Amendment maximum daily incremental change emissions disclosed in 2012 EIR. As shown in the table, the PCRP maximum daily emissions are not substantial and reflect a slight increase in net emissions compared to the maximum daily incremental change emissions disclosed in the 2012 EIR.

TABLE 2-15
MAXIMUM DAILY NET CRITERIA POLLUTANT EMISSIONS FOR SEIR CONSIDERATION (POUNDS/DAY)

Scenario	PM_{10}	$PM_{2.5}$	NO_x	ROG	CO	SO_2
Reclamation Plan Amendment Maximum Daily Incremental Change Disclosed in 2012 EIR[a]	(3,441)	(582)	(316)	(44)	(750)	5
PCRP Maximum Daily Emissions not Evaluated in the 2012 EIR	196.20	26.62	8.51	1.13	27.90	0.08
Net Emissions	(3,245)	(555)	(307)	(43)	(722)	5
BAAQMD Threshold	82	54	54	54	None	None
Significant Impact (Yes or No)?	No	No	No	No	--[b]	--[c]

NOTES:

a. Values in (parentheses) are net reductions for Reclamation Plan Amendment Project presented in the 2012 EIR minus baseline emissions.
b. See Impact AQ-2 for a discussion of CO significance.
c. The Bay Area is attainment for SO_2 standards so a CEQA threshold of significance has not been established by the BAAQMD.

SOURCE: Draft 2012 EIR Section 4.3.5.1, Table 4.3-3; Exhibit A.

Table 2-16 presents the net maximum tons per year emissions relative to the PCRP emissions that were not evaluated in the 2012 EIR combined with the 2012 Reclamation Plan Amendment maximum annual incremental change emissions disclosed in 2012 EIR. As shown in the table, the PCRP maximum annual emissions are not substantial and reflect only a slight increase in net emissions compared to the maximum annual incremental change emissions disclosed in the 2012 EIR.

TABLE 2-16
MAXIMUM ANNUAL NET CRITERIA POLLUTANT EMISSIONS FOR SEIR CONSIDERATION (TONS/YEAR)

Scenario	PM10	PM2.5	NO_x	ROG	CO	SO_2
Reclamation Plan Amendment Maximum Daily Incremental Change Disclosed in 2012 EIR[a]	(463)	(77)	(23)	(6)	(66)	2
PCRP Maximum Annual Emissions (2023) not Evaluated in the 2012 EIR	11.45	1.71	0.56	0.07	1.84	0.01
Maximum Annual Incremental Change	(452)	(75)	(22)	(6)	(64)	2
BAAQMD Threshold	15	10	10	10	None	None
Significant Impact (Yes or No)?	No	No	No	No	--[c]	--[d]

NOTES:

a. Values in (parentheses) are net reductions for Reclamation Plan Amendment Project presented in the 2012 EIR minus baseline emissions.
b. See Impact AQ-2 for a discussion of CO significance.
c. The Bay Area is attainment for SO_2 standards so a CEQA threshold of significance has not been established by the BAAQMD.

SOURCE: Draft 2012 EIR Section 4.3.5.1, Table 4.3-4; Exhibit A.

Impact Conclusion

As can be seen from the data in Tables 2-15 and 2-16, implementation of the PCRP would continue to result in net emissions reductions for all nonattainment air pollutants (PM_{10}, $PM_{2.5}$, and the ozone precursors NOx and ROG), and therefore would not exceed the BAAQMD daily or annual thresholds of significance.

Same as identified in the County's 2012 EIR, this would be a less-than-significant impact and the PCRP would not have the potential to cause a new or more significant direct, indirect, and/or cumulative impacts relative to contributing to existing nonattainment conditions.

The significance of CO emissions from the Project is addressed in Impact AQ-2, below.

Impact AQ-2: PCRP-related traffic would generate localized CO emissions on roadways and at intersections in the PCRP vicinity. (Less than Significant Impact)

The 2017 BAAQMD CEQA Air Quality Guidelines recommends use of the same screening criteria for the evaluation of CO emissions on roadways and intersections as recommended in the 2012 Guidelines that were used in the 2012 EIR analysis. The recommended criteria are a project would result in a less-than-significant impact to localized CO concentrations if the following screening criteria are met:

1. Project is consistent with an applicable congestion management program established by the county congestion management agency for designated roads or highways, regional transportation plan, and local congestion management agency plans.
2. The project traffic would not increase traffic volumes at affected intersections to more than 44,000 vehicles per hour.

3. The project traffic would not increase traffic volumes at affected intersections to more than 24,000 vehicles per hour where vertical and/or horizontal mixing is substantially limited (e.g., tunnel, parking garage, bridge underpass, natural or urban street canyon, below-grade roadway).

The PCRP would result in the temporary generation of vehicle trips but would not exceed the standards included in the Santa Clara County Congestion Management Plan established by the Santa Clara Valley Transportation Authority (SCVTA). In regard to the second and third criteria, intersection traffic volumes (including external PCRP traffic) would be substantially less than 44,000 and 24,000 vehicles per hour, respectively. The estimated increase in traffic volumes caused by reclamation-related traffic (a maximum of approximately 127 round trips per day) would not be substantial, nor would PCRP traffic significantly disrupt daily traffic flow on area roadways.

Based on the BAAQMD's criteria, PCRP-related traffic would not lead to violations of the CO standards and therefore, no further analysis is required for CO impacts of the PCRP and same as disclosed in the 2012 EIR, the impact continues to be less than significant.

Impact AQ-3a: The PCRP would expose sensitive receptors to increased levels of toxic air contaminants, which could lead to an increase in the risk of cancer. ***(Less than Significant Impact)***

Cancer risks were modeled for activities that would emit DPM and metals, which include diesel equipment and fugitive dust containing metals at the PCRP disturbance areas, as well as diesel trucks and fugitive dust containing metals on paved and unpaved roads. Cancer risk was calculated using the resulting DPM and metals concentrations modeled with AERMOD, along with equations and factors from the OEHHA 2003 *Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments* (OEHHA 2003; BAAQMD 2016). Cancer risk represents a cumulative exposure over the duration of the project.

Table 2-17 presents the modeled cancer risk of 0.51 in one million at the maximally exposed individual receptor (MEIR) location, which is a residence just south of Stevens Creek Boulevard, approximately 2,500 feet east of the Permanente Quarry entrance. This represents the cancer risk for the PCRP duration from 2024 through 2029, as cancer risk is cumulative over the exposure duration.

The MEIR identified in the 2012 EIR was modeled at the caretaker's residence, and the second-highest cancer risk was modeled at a residence near Stevens Creek Boulevard. For the purposes of this analysis, this is assumed to be the same residence as this HRA's MEIR. Cancer risk values for the 2012 EIR and this HRA are shown for the caretaker's residence and the residence just south of Stevens Creek Boulevard.

As shown in **Table 2-17**, the incremental risk at the MEIR, when added to the value from the 2012 EIR, is below the BAAQMD CEQA threshold of 10 in one million. This is also true for the value

at the caretaker's residence. The majority of the cancer risk is due to DPM that would be generated from on-road diesel trucks traveling past neighborhoods close to Stevens Creek Boulevard.

TABLE 2-17
ESTIMATED CANCER RISK AT THE MEIR AND CARETAKER'S RESIDENCE

Risk	MEIR - Child Resident South of Stevens Creek Blvd. (per million)	Caretaker's Residence (per million)
Cancer - PCRP	0.51	0.03
Cancer – Draft 2012 EIR	8.98	8.66
Combined Total	9.49	8.70
BAAQMD significance thresholds	10	10
Exceeds threshold?	No	No

SOURCE: 2012 EIR Section 4.3.5.1; Tables 4.3-11 and 4.3-12; Exhibit B.

For information and disclosure purposes, while the 2015 OEHHA guidance was not available nor was its release reasonably foreseeable at the time the 2012 EIR was certified, the health risk values based on the exposure parameters from the OEHHA 2015 *Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments* (OEHHA 2015), are provided herein. Using the exposure parameters from the 2015 OEHHA guidance, the cancer risk value for the 2012 EIR would be approximately 12.34 in one million and the cancer risk value for the PCRP would be approximately 0.78 in one million, for a total risk of approximately 13.12 in one million. The 2012 EIR risk was multiplied by a factor of 1.37 to adjust it to 2015 OEHHA exposure parameters. This factor was derived from breathing rate ratios from the 2015 OEHHA guidance to the 2003 OEHHA guidance. Based on the exposure parameters from the 2015 OEHHA guidance, the risk from the PCRP on its own would neither cause a new significant impact nor result in a substantially greater significant impact than disclosed in the 2012 EIR.

Impact AQ-3b: The PCRP would expose sensitive receptors to increased levels of toxic air contaminants, which could increase chronic and acute health risks. (*Less than Significant Impact*)

Chronic and acute, non-cancer health risks were evaluated based on emissions of pollutants with these health effects. DPM and some of the metals found in the fugitive dust at the PCRP disturbance areas and in road dust result in chronic health effects. In addition, some of the metals result in acute (short-term) health effects, but DPM does not have a short-term, acute health risk effect. Acute impacts were modeled at residential receptors and at locations where the public could have access on a short-term basis. These receptors include the trails north of the Project site and the Gate of Heaven cemetery to the northeast of the Project site, discussed above.

Non-cancer adverse health risks, both for acute (short-term) and chronic (long-term) timeframes, are measured against a hazard index, which is defined as the ratio of the incremental exposure concentrations of the various non-carcinogens from the project to published reference exposure

levels (RELs) that can cause adverse health effects. The RELs are established by OEHHA based on epidemiological evidence. The ratio (referred to as the Hazard Quotient) of each substance with a non-carcinogenic effect that affects a certain organ system is added to produce an overall Hazard Index for that organ system. As a worst case, it was assumed that all of the toxic substances with established RELs would affect the same organ and the individual Hazard Quotients were summed to calculate an overall Hazard Index. If the Hazard Index exceeds 1.0, the potential health impact would be significant.

Table 2-18 presents the maximum chronic hazard index, plus the maximum acute hazard index. The maximum impact location for both the chronic and acute hazard indices is the MEIR located just south of Stevens Creek Boulevard. Both maximum chronic and acute hazard index values would occur based on activities in the years 2025 and 2029, respectively. As shown in **Table 2-18**, the maximum chronic and acute hazard indices for the PCRP combined with the 2012 EIR index values indicates that the impacts associated with the revised Reclamation Plan Amendment would continue to be less than significant, and there would be no new significant impact. The maximum acute hazard index would be due primarily to nickel (as a component in fugitive dust from the roadway).

TABLE 2-18
ESTIMATED CHRONIC AND ACUTE HAZARD IMPACTS

Health Risk	PCRP Hazard Index	Location	Year	2012 EIR Value[a]
Chronic	0.01	MEIR	2025	0.13
Acute	0.06	MEIR	2029	0.52

NOTES:

a. The chronic and acute risk values from the 2012 EIR were reported for the caretaker's residence.

SOURCE: Draft 2012 EIR Section 4.3.5.1; Tables 4.3-13 and 4.3-14, Exhibit B.

Impact AQ-3c: The PCRP would increase exhaust emissions of $PM_{2.5}$, which could adversely affect human health. *(Less than Significant)*

An analysis was conducted to determine the maximum annual increase in $PM_{2.5}$ exhaust concentrations for sensitive receptors in the vicinity of the PCRP. BAAQMD policy is to conduct this analysis for exhaust emissions only. Under the PCRP, the Applicant would continue to comply with its existing Fugitive Dust Control Plan (dated January 21, 2011).

As shown in **Table 2-19**, the maximum incremental annual $PM_{2.5}$ concentration at the MEIR south of Stevens Creek Boulevard would be 0.001 $\mu g/m^3$, which would be below the BAAQMD threshold of 0.3 $\mu g/m^3$ and would therefore result in a less-than-significant impact. Therefore, implementation of the PCRP would not result in a new or more significant $PM_{2.5}$ concentration impact than was disclosed in the 2012 EIR.

TABLE 2-19
ESTIMATED PM2.5 CONCENTRATION IMPACTS (µg/m^3)

Location	Annual Average Concentration
PCRP MEIR – South of Stevens Creek Boulevard	0.001
2012 EIR Value – South of Stevens Creek Boulevard	Not Reported
PCRP MEIR – Caretaker's Residence	<0.001
2012 EIR Value – Caretaker's Residence	0.29
Total at Caretaker's Residence	0.29

SOURCE: See Exhibit B.

---

e) Result in other emissions (such as those leading odors) adversely affecting a substantial number of people.

Land uses that typically pose potential odor problems include agriculture, wastewater treatment plants, food processing and rendering facilities, chemical plants, composting facilities, landfills, waste transfer stations, and dairies. The PCRP does not include any of these land uses or similar land uses. In addition, in the context of existing Permanente Quarry operations, equipment emissions from PCRP implementation would not result in any new odor sources. Therefore, as disclosed in the 2012 EIR, the PCRP would not create objectionable odors that would affect a substantial number of people. There would be no impact.

2.5 References

Bay Area Air Quality Management District (BAAQMD), 2005. Health Risk Screening Analysis Guidelines. Available: https://www.baaqmd.gov/~/media/files/engineering/policy_and_procedures/appendix_d_06-06-05.pdf, accessed February 13, 2023.

BAAQMD, 2016. Air Toxics NSR Program Health Risk Assessment (HRA) Guidelines, January 2016, http://www.baaqmd.gov/~/media/files/planning-and-research/rules-and-regs/workshops/2016/reg-2-5/hra-guidelines_clean_jan_2016-pdf.pdf?la=en, accessed June 2020.

BAAQMD, 2017a. Air Quality Standards and Attainment Status, last updated January 5, 2017. Available: http://www.baaqmd.gov/research-and-data/air-quality-standards-and-attainment-status#five. Accessed April 7, 2021.

BAAQMD, 2017b. Final 2017 Clean Air Plan, Spare the Air Cool the Climate, A Blueprint for Clean Air and Climate Protection in the Bay Area. Adopted April 19, 2017.

BAAQMD, 2017c. California Environmental Quality Act Air Quality Guidelines, Updated May 2017.

BAAQMD, 2019. Santa Clara County, Last Updated: 2/14/2019. Available: https://www.baaqmd.gov/about-the-air-district/in-your-community/santa-clara-county. Accessed April 6, 2021.

BAAQMD, 2020. Air Quality Advisory for Wildfire Smoke, for immediate release: August 16, 2020. Available: https://www.baaqmd.gov/~/media/files/communications-and-outreach/publications/news-releases/2020/aqadvisory_200816_2020_049-pdf.pdf?la=en. Accessed November 18, 2022.

California Air Resources Board (CARB), 2010, Estimate of Premature Deaths Associated with Fine Particle Pollution (PM2.5) in California Using a U.S. Environmental Protection Agency Methodology, August 21, 2010. Available: https://www.arb.ca.gov/research/health/pm-mort/pm-report_2010.pdf. Accessed April 7, 2021.

CARB, 2016. Ambient Air Quality Standards, updated May 4, 2016. Available: https://www.arb.ca.gov/research/aaqs/aaqs2.pdf. Accessed April 6, 2021.

CARB, 2021. California Identified Toxic Air Contaminants. Available: https://ww2.arb.ca.gov/resources/documents/carb-identified-toxic-air-contaminants. Accessed April 7, 2021.

CARB, 2022. iADAM Air Quality Data Statistics. Available: http://www.arb.ca.gov/adam/index.html. Accessed November 18, 2022.

Lehigh Southwest Cement Co. (Lehigh), 2021. PLN17-2250: Permanente Creek Restoration Plan SEIR Coordination Call, Personal Communication of Erika Guerra, June 8, 2021.

Lehigh, 2023. Updated Equipment Data Form, provided to Santa Clara County Planning Department by Nicole Granquist, January 24, 2023.

Office of Environmental Health Hazard Assessment (OEHHA), 2003. Air Toxics Hot Spots Program Risk Assessment Guidelines: The Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments. August.

OEHHA, 2015. Air Toxics Hot Spots Program Risk Assessment Guidelines: Guidance Manual for Preparation of Health Risk Assessments, adopted February 2015. Available: http://oehha.ca.gov/air/hot_spots/hotspots2015.html. Accessed May 1, 2017.

Santa Clara County, 1994. Santa Clara County General Plan, Adopted December 20, 1994.

South Coast Air Quality Management District (SCAQMD), 2014. Application of the South Coast Air Quality Management District for Leave to File Brief of Amicus Curiae in Support of Neither Party and Brief of Amicus Curiae. In the Supreme Court of California. Sierra Club, Revive the San Joaquin, and League of Women Voters of Fresno v. County of Fresno.

San Joaquin Valley Air Pollution Control District (SJVAPCD), 2014. Application for Leave to File Brief of Amicus Curiae Brief of San Joaquin Valley Unified Air Pollution Control District in Support of Defendant and Respondent, County of Fresno and Real Party In Interest and Respondent, Friant Ranch, L.P. In the Supreme Court of California. Sierra

Club, Revive the San Joaquin, and League of Women Voters of Fresno v. County of Fresno.

U.S. Environmental Protection Agency (U.S. EPA), 1998. AP-42: Compilation of Air Emissions Factors, Chapter 11.9 Western Surface Coal Mining. October. Available: https://www.epa.gov/sites/production/files/2020-10/documents/c11s09.pdf. Accessed June 2021.

U.S. EPA, 2006. AP-42: Compilation of Air Emissions Factors, Chapter 13.2.2 Unpaved Roads. November. Available: https://www.epa.gov/sites/production/files/2020-10/documents/13.2.2_unpaved_roads.pdf. Accessed June 2021.

U.S. EPA, 2011. AP-42: Compilation of Air Emissions Factors, Chapter 13.2.1 Paved Roads. January. Available: https://www.epa.gov/sites/production/files/2020-10/documents/13.2.1_paved_roads.pdf. Accessed June 2021.

U.S. EPA, 2021a. Health Effects of Ozone Pollution. Available: https://www.epa.gov/ground-level-ozone-pollution/health-effects-ozone-pollution. Accessed April 6, 2021.

U.S. EPA, 2021b. Basic Information about NO_2. Available: https://www.epa.gov/no2-pollution/basic-information-about-no2#Effects. Accessed April 6, 2021.

U.S. EPA, 2022. Health Effects of Ozone Pollution, last updated June 14, 2022. Available: https://www.epa.gov/ground-level-ozone-pollution/health-effects-ozone-pollution. Accessed February 13, 2023.

Western Regional Climate Center (WRCC), 2016. San José Wind Rose. Available: http://www.raws.dri.edu/cgi-bin/wea_windrose2.pl. Accessed October 11, 2016.

WRCC, 2021. Period of Record Monthly Climate Summaries for San José, California. Available: https://wrcc.dri.edu/cgi-bin/cliMAIN.pl?ca7821. Accessed April 6, 2021.

CHAPTER 3
Greenhouse Gas Emissions Technical Analysis

3.1 Greenhouse Gas Emissions

This section describes the environmental and regulatory setting of the Project site and surrounding area with respect to greenhouse gas (GHG) emissions, and documents an analysis of potential impacts related to GHG emissions from the Project. For the purposes of this assessment, the following topics are considered: an overview of climate change; a review of the various GHGs that have been identified as drivers of climate change; pertinent regulations, including those relevant at federal, state, and local levels; significance criteria for potential environmental impacts; and potential impacts and appropriate mitigation measures associated with project construction and operation. Air quality emissions, including criteria air pollutants, are considered in Section 3.3, *Air Quality*. If needed, best management practices (BMPs) identified by BAAQMD and mitigation measures to avoid or reduce significant impacts are also identified.

3.1.1 Environmental Setting

Climate Change

There is general scientific consensus that climate change is occurring and is almost certainly attributed to human activities. Man-made emissions of GHGs, if not sufficiently curtailed, are likely to contribute further to continued increases in global temperatures. Strong scientific evidence documents that the climate is changing and that its impacts are widespread and occurring now. In California, this evidence includes increases in extreme heat, wildfires, extreme storms, coastal flooding and erosion, and reductions in Sierra Nevada springtime snowpack and threats to water availability (CARB 2014). Globally, climate change has the potential to adversely affect numerous environmental resources through potential, though uncertain, impacts related to future air and water temperatures, precipitation patterns, and an array of other factors. According to the International Panel on Climate Change (IPCC), several indicators of climate change are advancing faster than in previous assessments (IPCC 2014):

- Changing precipitation and snow melt patterns;
- Negative effect on crop yield;
- Increased heat waves, drought, flood, wildfires, and storm events;

- Reduced renewable water resources in most dry subtropical regions; and
- Ocean acidification damage to marine ecosystems.

Also, there are many secondary effects projected to result from global warming, including impacts to agriculture, changes in disease vectors, changes in habitat suitability, and potential for reduction of biodiversity. While the possible outcomes and the feedback mechanisms involved are not fully understood and much research remains to be done, the potential for substantial environmental, social, and economic consequences over the long term may be great.

Greenhouse Gases

State-regulated GHG emissions that result from human activities primarily include carbon dioxide (CO_2), with much smaller amounts of nitrous oxide (N_2O), methane (CH_4, often from unburned natural gas), sulfur hexafluoride (SF_6) from high-voltage power equipment, nitrogen trifluoride (NF_3) from microelectronics and semi-conductor manufacturing, and hydrofluorocarbons (HFCs) and perfluorocarbons (PFCs) from refrigeration/chiller equipment. Because these GHGs have different warming potentials (i.e., the amount of heat trapped in the atmosphere by a certain mass of the gas), and CO_2 is the most common reference gas for climate change, GHG emissions are often quantified and reported as CO_2-equivalent (CO_2e) emissions. For example, while SF_6 represents a small fraction of the total annual GHGs emitted worldwide, this gas is very potent, with 22,800 times the global warming potential (GWP) of CO_2. Therefore, an emission of 1 metric ton of SF_6 would be reported as 22,800 metric tons CO_2e. The GWP of CH_4 and N_2O are 25 times and 298 times that of CO_2, respectively (CARB 2016).

In 2019, the United States emitted about 6.56 billion tons of CO_2e, representing a 1.7 percent decrease from 2018. This decrease was driven largely by a decrease in emissions from fossil fuel combustion resulting from a decrease in total energy use in 2019 compared to 2018 and a continued shift from coal to natural gas and renewables in the electric power sector. Of the five major sectors nationwide (residential and commercial, industry, agriculture, transportation, and electricity), transportation accounts for the highest fraction of GHG emissions (approximately 29 percent), followed closely by the electric power industry (approximately 25 percent) and general industry (approximately 23 percent) (U.S. EPA 2021).

Statewide emissions of GHG from relevant source categories for 2014 through 2020 are summarized in **Table 3-1**. Specific contributions from individual air basins, such as the San Francisco Bay Area Air Basin, which encompasses the Project site, are included in the emissions inventory but are not itemized by air basin. In 2020, California produced 369.1 million gross metric tons of CO_2e emissions, which was a 9 percent drop in emissions compared to 2019 due to the Covid-19 pandemic-related economic shutdown. Transportation was the source of 37 percent of the state's GHG emissions, followed by industrial at 20 percent, electricity generation at 16 percent, commercial and residential sources at 11 percent, agriculture at 9 percent, high global warming potential emissions at 6 percent, and recycling and waste comprising the remaining 2 percent (CARB 2022a).

TABLE 3-1
CALIFORNIA GREENHOUSE GAS EMISSIONS (MILLION METRIC TONS CO_2E)

Emission Inventory Category	2014	2015	2016	2017	2018	2019	2020	
Transportation	157.7	161.5	165.2	166.6	165.3	162.4	135.8	36.8%
Electric Power	89.8	86.0	70.4	64.2	65.0	60.2	59.5	16.1%
Industrial	85.2	83.2	81.6	81.7	81.9	80.4	73.3	19.9%
Commercial & Residential	35.6	36.3	37.2	37.6	37.4	40.5	38.7	10.5%
Agriculture	33.9	32.6	32.2	31.7	32.2	31.4	31.6	8.6%
High GWP	17.7	18.6	19.4	20.1	20.5	20.7	21.3	5.8%
Recycling and Waste	8.3	8.4	8.5	8.6	8.7	8.8	8.9	2.4%
Total Gross Emissions	428.2	426.6	414.5	410.5	411.0	404.4	369.1	100.0%

SOURCE: CARB 2022a.

3.2 Regulatory Setting

3.2.1 Federal Regulations

The federal regulation (i.e., the GHG Reporting Rule) identified in the 2012 EIR is supplemented with the following information.

U.S. Environmental Protection Agency (U.S. EPA)

In Massachusetts v. U.S. EPA (2007) 549 US 497, the Supreme Court found that GHGs are air pollutants covered by the Clean Air Act. The Court held that the U.S. EPA must determine whether emissions of GHGs from new motor vehicles cause or contribute to air pollution, which may reasonably be anticipated to endanger public health or welfare, or whether the science is too uncertain to make a reasoned decision. In making these decisions, the U.S. EPA is required to follow the language of Section 202(a) of the Clean Air Act, which obligates it to prescribe (and from time-to-time revise) standards applicable to the emission of any air pollutant from any class or classes of new motor vehicles or new motor vehicle engines. The Supreme Court decision resulted from a petition for rulemaking under Section 202(a) filed by more than a dozen environmental, renewable energy, and other organizations.

On April 17, 2009, the U.S. EPA Administrator signed proposed "endangerment" and "cause or contribute" findings for GHGs under Section 202(a) of the Clean Air Act. The U.S. EPA found that six GHGs, taken in combination, endanger both the public health and the public welfare of current and future generations. The U.S. EPA also found that the combined emissions of these GHGs from new motor vehicles and new motor vehicle engines contribute to the greenhouse effect as air pollution that endangers public health and welfare under Clean Air Act Section 202(a). Pursuant to 40 CFR Part 52, Proposed Prevention of Significant Deterioration and Title V Greenhouse Gas Tailoring Rule, U.S. EPA has mandated that Prevention of Significant Deterioration (PSD) and Title V requirements apply to facilities whose stationary source CO_2e emissions exceed 100,000 tons per year (U.S. EPA 2019).

U.S. Supreme Court Decision in Utility Air Regulatory Group v. U.S. EPA

In Utility Air Regulatory Group v. U.S. EPA (2014), the U.S. Supreme Court held that U.S. EPA may not treat GHG emissions as an air pollutant for purposes of determining whether a source is a major source required to obtain a PSD or Title V permit. The Court also held that PSD permits that are otherwise required (based on emissions of other pollutants) may continue to require limitations on GHG emissions based on the application of best available control technology (BACT). In accordance with the Supreme Court decision, on April 10, 2015, the D.C. Circuit issued an amended judgment in Coalition for Responsible Regulation, Inc. v. U.S. Environmental Protection Agency, which vacated the PSD and Title V regulations under review in that case to the extent that they require a stationary source to obtain a PSD or Title V permit solely because the source emits or has the potential to emit GHGs above the applicable major source thresholds. The D.C. Circuit also directed U.S. EPA to consider whether any further revisions to its regulations are appropriate, and if so, to undertake to make such revisions. In response to the Supreme Court decision and the D.C. Circuit's amended judgment, the U.S. EPA intends to conduct future rulemaking action to make appropriate revisions to the PSD and operating permit rules (U.S. EPA, 2019).

3.2.2 State Regulations

There are a variety of statewide rules and regulations that have been implemented or are in development in California that mandate the quantification or reduction of GHGs. Under CEQA, analysis and mitigation of GHG emissions and climate change in relation to a proposed project is required where the lead agency determines that a project would result in a significant addition of GHGs to the atmosphere. State regulations identified in the 2012 EIR are supplemented with the following information.

Executive Order B-30-15

In April 2015, Governor Edmund G. Brown Jr. issued an executive order to establish a California GHG reduction target of 40 percent below 1990 levels by 2030. Reaching this emission reduction target will make it possible for California to reach its ultimate goal of reducing emissions 80 percent under 1990 levels by 2050, as identified in Executive Order S-3-05. Executive Order B-30-15 also specifically addresses the need for climate adaptation and directs state government to:

- Incorporate climate change impacts into the state's Five-Year Infrastructure Plan;
- Update the Safeguarding California Plan, the state climate adaption strategy to identify how climate change will affect California infrastructure and industry and what actions the state can take to reduce the risks posed by climate change;
- Factor climate change into state agencies' planning and investment decisions; and
- Implement measures under existing agency and departmental authority to reduce GHG emissions (OGB 2015).

Executive Order B-30-15 required CARB to update the Assembly Bill 32 (AB 32) Climate Change Scoping Plan to incorporate the State's target from 2020 to 2030. CARB adopted the 2017 Scoping Plan for achieving the 2030 target, which takes into account the key programs

associated with implementation of the AB 32 Scoping Plan--such as GHG reduction programs for cars, trucks, fuels, industry, and electrical generation--and builds upon, in particular, existing programs related to the Cap-and-Trade Regulation; the Low Carbon Fuel Standard; much cleaner cars, trucks, and freight movement; power generation for the State using cleaner renewable energy; and strategies to reduce methane emissions from agricultural and other wastes by using it to meet the State's energy needs. The 2017 Scoping Plan also addresses, for the first time, GHG emissions from natural and working lands, including the energy, transportation, industry, water, waste management, agriculture, and natural and working lands sectors (CARB 2017). The 2017 Scoping Plan does not address construction or restoration projects such as the PCRP.

The 2022 Scoping Plan for Achieving Carbon Neutrality (2022 Scoping Plan) lays out a path to achieve targets for carbon neutrality and reduce anthropogenic GHG emissions by 85 percent below 1990 levels no later than 2045. The actions and outcomes in the plan are intended to achieve significant reductions in fossil fuel combustion by deploying clean technologies and fuels, further reductions in short-lived climate pollutants, support for sustainable development, increased action on natural and working lands to reduce emissions and sequester carbon, and the capture and storage of carbon. The 2022 Scoping Plan identities a construction equipment sector action for the Scoping Plan Scenario that commits to 25 percent of energy demand to be electrified by 2030 and 75 percent electrified by 2045 (CARB 2022b).

Senate Bill 32 and Assembly Bill 197

On August 23, 2016, the California Assembly passed SB 32, legislation that would extend California's landmark climate change legislation to require that California reduce its emissions to 40 percent below 1990 levels by 2030, an extension of AB 32's goal to reduce emissions to 1990 levels. SB 32 became fully enacted the next day when AB 197 was passed, as an amendment to SB 32 stated that it would only become operative if AB 197 was enacted. AB 197's key components are:

- Directs CARB to enact environmental justice and social costs when designing climate change regulations.
- Creates a new entity called the Joint Legislative Committee on Climate Change Policies, authorized to do fact-finding and make recommendations to the Legislature regarding the state's climate change programs.
- Makes substantial changes to how CARB functions, increasing the board member size, adjusting the terms of service, and strengthens the board member service disqualification process.
- Intention to decrease CARB's reliance on cap-and-trade to achieve reductions and instead directs CARB to prioritize direct emission reductions at large stationary sources.

3.2.3 Local Regulations

Bay Area Air Quality Management District

The BAAQMD lays the groundwork for GHG emissions reductions through the 2017 Clean Air Plan (2017 CAP). The 2017 CAP provides a long-term vision of how the Bay Area could and function in a year 2050 post-carbon economy and describes a control strategy to be implemented by BAAQMD. The 2017 CAP also includes measures designed for the purpose of reducing GHG emissions; however, the measures do not address construction or restoration projects such as the PCRP (BAAQMD 2017a).

County of Santa Clara

In September 2009, the County released its *County of Santa Clara Climate Action Plan for Operations and Facilities* (County of Santa Clara 2009). This plan presented several solutions and policies that focus on County operations, facilities, and employee actions to reduce GHG emissions associated with energy and water consumption, solid waste, and fuel consumption. Since the plan focuses primarily on steps needed to reach the 10 percent reduction (13,346 MT) goal by 2015, it is now outdated. In addition, this plan applies to County government operations and facilities only, it would not pertain to the PCRP.

On December 18, 2018, the Board of Supervisors of the County of Santa Clara adopted Resolution BOS-2018-145 to reaffirm and augment the County's GHG emissions reduction targets and establish a 100 percent carbon neutral by 2045 commitment for County of Santa Clara operations (County of Santa Clara 2018). The resolution applies to County government operations and facilities only, it would not pertain to the PCRP.

3.3 CEQA Baseline Emissions

The CEQA baseline for this GHG emissions analysis includes the baseline conditions identified in the 2012 EIR, the 2012 Reclamation Plan Amendment emissions, as well as the approved 2012 EIR Mitigation Measures that are conditions of the 2012 Reclamation Plan approval.

3.3.1 2012 EIR Baseline

The baseline for the 2012 EIR reflects the same physical environmental conditions in the vicinity of the PCRP as identified in the Section 2.3.1 for the air quality analysis. The baseline GHG emissions identified in the 2012 EIR analysis are based on an average over the 11-year period from January 1, 2000, to December 31, 2010, which includes periods of relatively high production as well as relatively low production at the Permanente Quarry in response to changing market demands. The annual 2012 EIR baseline GHG emissions are shown in **Table 3-2**.

3.3.2 2012 Emissions and Analysis

Baseline and maximum annual 2012 Reclamation Plan Amendment GHG emissions are summarized in **Table 3-2**, and the net change is compared to the BAAQMD annual significant

threshold. As shown in Table 3-2, the 2012 Reclamation Plan Amendment was found to result in net GHG emissions that would exceed the significance threshold, and therefore was disclosed to result in a significant impact.

TABLE 3-2
2012 RECLAMATION PLAN AMENDMENT MAXIMUM ANNUAL GHG EMISSIONS (METRIC TONS/YEAR)

Scenario	CO_2	CH_4	N_2O	Total CO_2e
Baseline Emissions	15,707	<1	<1	15,842
Reclamation Plan Amendment Emissions	20,587	1	<1	20,762
Maximum Annual Incremental Change	4,880	<1	<1	4,920
BAAQMD Threshold	--	--	--	1,100
Significant Impact (Yes or No)?	--	--	--	Yes

SOURCE: Draft 2012 EIR Section 4.8.5, Table 4.8-2.

3.3.3 2012 EIR Mitigation Measures

As stated above in Section 3.3.2, the 2012 EIR identified a significant GHG emissions impact, which was mitigated to a less-than-significant level by the implementation of Mitigation Measures 4.8-1a and 4.8-1b. Mitigation Measures 4.8-1a and 4.8-1b are described below followed by a summary of how the mitigation measures will be considered for the County's environmental review process for the PCRP.

> **Mitigation Measure 4.8-1a: Develop Annual GHG Inventory.** The Applicant shall become a reporting member of The Climate Registry. Beginning with the first year of the [2012 Reclamation Plan Amendment] Project and continuing for the duration of the Project, the Applicant shall conduct an annual inventory of GHG emissions and shall report those emissions to The Climate Registry. The annual inventory shall be conducted according to The Climate Registry protocols and third-party verified by a verification body accredited through The Climate Registry.
>
> **SEIR Baseline Consideration**
>
> The Applicant would be required to implement 2012 EIR Mitigation Measure 4.8-1a as defined above during implementation of the PCRP.
>
> **Mitigation Measure 4.8-1b: Greenhouse Gas Emissions Reduction Plan.** The Applicant shall prepare, submit for County and BAAQMD approval, make available to the public, and implement a Greenhouse Gas Emissions Reduction Plan (GHG Plan) containing quantifiable strategies to ensure that the [2012 Reclamation Plan Amendment] Project-related incremental increase of GHG emissions does not exceed 1,100 MT CO_2e per year. The GHG Plan shall include, but not be limited to, the following measures:
>
> 1. Replacement of on-road and off-road vehicles and construction equipment with lower GHG-emitting engines, such as electric or hybrid.

2. Use of the Overland Conveyor System, powered by electric motors, to move more than 75 percent of the waste rock from the WMSA to reclaim the Quarry pit.

If the Applicant is unable to reduce the Project-related incremental increase of GHG emissions to below 1,100 MT CO_2e per year using the above measures, the Applicant shall offset all remaining Project incremental emissions above that threshold. Any offset of Project emissions shall be demonstrated to be real, permanent, verifiable, enforceable, and additional. To the maximum extent feasible, as determined by the County in coordination with the BAAQMD, offsets shall be implemented locally. Offsets may include but are not limited to, the following (in order of preference):

1. Onsite offset of Project emissions, for example through development of a renewable energy generation facility or a carbon sequestration project (such as a forestry or wetlands project for which inventory and reporting protocols have been adopted). If the Applicant develops an offset project, it must be registered with the Climate Action Reserve or otherwise approved by the BAAQMD in order to be used to offset Project emissions. The number of offset credits produced would then be included in the annual inventory, and the net (emissions minus offsets) calculated.
2. Funding of local projects, subject to review and approval by the BAAQMD, that would result in real, permanent, verifiable, enforceable, and additional reduction in GHG emissions. If the BAAQMD or County of Santa Clara develops a GHG mitigation fund, the Applicant may instead pay into this fund to offset Project incremental GHG emissions in excess of the significance threshold.
3. Purchase of carbon credits to offset Project incremental emissions to below the significance threshold. Carbon offset credits must be verified and registered with The Climate Registry, the Climate Action Reserve, or other source that is approved by the California Air Resources Board as being consistent with the policies and guidelines of the California Global Warming Solution Act of 2006 (AB 32), or available through a County- or BAAQMD-approved local GHG mitigation bank or fund.

SEIR Baseline Consideration

The Applicant would be required to implement 2012 EIR Mitigation Measure 4.8-1b as defined above during implementation of the PCRP.

3.4 Analysis, Impacts, and Mitigation

3.4.1 Significance Criteria

Consistent with CEQA Guidelines Appendix G, the PCRP would have a significant impact if it would:

a) Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment; or

b) Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHG.

3.4.2 Methodology

Greenhouse Gas Emissions

Significance Thresholds

The 2012 EIR relied on the methods and significance threshold identified in the BAAQMD's 2010 CEQA Guidelines as supported by Appendix D of the BAAQMD Guidelines and BAAQMD's Revised Draft Options and Justification Report. After adoption of the 2012 EIR, the BAAQMD updated its CEQA Guidelines in 2017 to address the California Supreme Court's opinion in California Building Industry Association v. BAAQMD (2015) 62 Cal.4th 369 (BAAQMD 2017b). However, the methods and GHG emissions significance criteria identified in the 2017 BAAQMD CEQA Guidelines for GHG emissions are the same as those identified in the 2010 BAAQMD CEQA Air Quality Guidelines (BAAQMD 2010).

In accordance with the BAAQMD *CEQA Air Quality Guidelines*, the 2012 EIR considered implementation of the Reclamation Plan Amendment to have a significant impact if it would emit GHG emissions greater than the BAAQMD's 1,100 MT per year CO_2e from operational sources other than permitted stationary sources (the 2012 Reclamation Plan Amendment did not propose any new or expanded stationary sources that emit GHGs). The 1,100 MT CO_2e per year significance threshold was designed for the BAAQMD to meet the AB 32 goal of reducing GHG emissions to 1990 levels by 2020 by accounting for the Bay Area's share of land use sector GHG emissions reductions beyond that achievable at the state level. It is based on the AB 32 GHG reduction goals and a "gap analysis" that attributes an appropriate share of GHG emissions reductions to new land use development projects in BAAQMD's jurisdiction. The BAAQMD has not yet developed a corresponding mass emissions threshold that extends beyond 2020 to be aligned with the SB 32 target for 2030. Although use of the 1,100 MT CO_2e significance threshold was appropriate at the time of the 2012 EIR certification, that threshold is no longer appropriate for analyzing the GHG impacts of post-2020 proposed projects without an adjustment to be consistent with SB 32.

The PCRP would not involve long-term operational emissions and short-term construction emissions would cease in 2027. AB 32 includes a statewide GHG reduction target to achieve 1990 levels by the year 2020, while SB 32 extends the statewide target to a reduction of 40 percent below 1990 levels by 2030. Since emissions associated with the PCRP would no longer be generated by 2030, a 2020 GHG significance threshold based on AB 32 is more appropriate for the PCRP than a threshold based on the SB 32 reduction target. An even more appropriate threshold is one that is adjusted to account for the SB 32 target, recognizing that important State initiatives (most notably, the vehicle fuel efficiency standards and the Renewables Portfolio Standard) are scheduled to reduce emissions substantially as the decade progresses. The most conservative approach would be to use a threshold based on the 2030 target, which would be consistent with a 2016 white paper by the Association of Environmental Professionals (AEP) Climate Change Committee recommendation that when a project is built out before the next milestone target year adopted by the State, the milestone year should be used as the basis for the project-level threshold (AEP 2016). Note that the AEP white paper is advisory only and is not binding guidance or an adopted set of CEQA thresholds.

Because BAAQMD has not adopted GHG-related CEQA significance thresholds for the SB 32 horizon year of 2030, and the County does not currently have a "qualified" GHG reduction strategy available, a specific project-level threshold has been identified consistent with CEQA Guidelines section 15064.4. The 2020 mass emission threshold is adjusted downward by 40 percent to be consistent with the 2030 SB 32 horizon year target, as shown below. Since the significance threshold used in 2012 EIR was appropriate at the time of its certification, the total 2012 Reclamation Plan Amendment emissions, as revised to include the proposed PCRP emissions, are evaluated in this analysis using the 1,100 MT CO_2e significance threshold; however, for purposes of full disclosure, the proposed PCRP would also be deemed to result in a new significant impact if its incremental emissions beyond the emissions estimated for the 2012 Reclamation Plan Amendment in the 2012 EIR would exceed the adjusted 2030 emissions threshold that is 40 percent below the 2020 mass emissions threshold of 1,100 MT CO_2e per year, which is equivalent to 660 MT CO_2e per year.

The significance thresholds discussed above are designed for long-term operational emissions. Because the PCRP would result in short-term activities to restore and modify approximately 9,000 linear feet of Permanente Creek and would not involve long-term operations, its total short-term emissions were amortized over the 20-year life of the 2012 Reclamation Plan Amendment (see 2012 EIR Section 2.1) before comparison to the significance thresholds.

Emission Estimates

Project-related GHG emissions typically fall into two categories: short-term emissions due to construction, and long-term emissions due to project operations; however, regarding the PCRP, GHG emissions would be generated on a short-term basis during construction over a period of approximately 6 years, and there would be no long-term sustained operational emissions. The PCRP would generate GHG exhaust emissions from construction equipment and vehicles. The construction-related scheduling, equipment, and trips assumptions and methods used to estimate GHG emissions associated with the PCRP are generally the same as those described for the air quality analysis (see Section 2.4.2.1, *Criteria Pollutants*). To estimate CO_2e emissions, global warming potentials from the Intergovernmental Panel on Climate Change (IPCC) Fourth Assessment Report (AR4) were applied to the CH_4 and N_2O emissions.

Same as for the criteria pollutants, the modeled GHG emissions for each construction phase were then multiplied by the percent of emissions to be evaluated for the given construction phase based on the proposed creek reach area outside of the previously evaluated 2012 EIR disturbance areas to allow for evaluation of the applicable emissions in the County's environmental review of the PCRP (see Section 1.1, *Emissions Analysis for the SEIR*). Calculated emissions for the County's consideration were then summed, amortized over the 20-year life of the 2012 Reclamation Plan Amendment, and added to the baseline emissions (see Section 2.3, *CEQA Baseline Emissions*) for comparison to BAAQMD's regional significance threshold to determine if the PCRP would have the potential for new significant direct, indirect, and/or cumulative environmental effects compared with the creek restoration project previously analyzed in the 2012 EIR. The incremental amortized PCRP emissions are also compared to the adjusted emissions threshold for full disclosure (refer to *Significance Thresholds* discussion above). Detailed emissions

assumptions and summaries, including the CalEEMod and EMFAC2021 assumptions and output are included in Exhibit A.

Conflicts with Applicable Plans, Policies, or Regulations

The BAAQMD CEQA Guidelines state that a project or plan that is consistent with an adopted GHG Reduction Strategy would be considered to have a less-than-significant impact. As noted above in Section 3.2, *Regulatory Setting*, the State has adopted the 2017 Scoping Plan and the 2022 Scoping Plan, the BAAQMD has adopted the 2017 CAP, and the County has adopted a Climate Action Plan for reducing GHG emissions. These plans, however, are not directly applicable to emissions generated by projects such as the PCRP.

Regarding SB 32, California's climate change legislation updated to require California to reduce its emissions to 40 percent below 1990 levels by 2030, PCRP's consistency with this goal is addressed through the comparison of its estimated incremental emissions to the adjusted significance threshold of 660 MT CO_2e (see Section 3.4.2.2, above).

3.4.3 Impact Analysis

a) Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment

Impact GHG-1: The PCRP could result in an increase in greenhouse gas emissions and contribute to climate change. ***(Less than Significant Impact with Mitigation Incorporated)***

As presented in the *Emissions Estimates* discussion in Section 3.4.2.2, *GHG Emissions*, the GHG emissions that would be generated by the PCPR would be short-term and periodic in nature and would occur during the dry seasons of 2024 through 2029. Below are summaries of the PCRP GHG emissions estimate results in terms of total PCRP emissions, PCRP emissions that were not considered in the 2012 EIR and are applicable to the County's environmental review of the PCRP, and PCRP emissions relative to the SEIR CEQA baseline.

PCRP Total Emissions

Table 3-3 presents a summary of the PCRP total annual emissions estimates, prior to the use of Applicability Factors to remove the emissions considered to have already been evaluated in the 2012 EIR. For the percent of PCRP total annal emissions already evaluated in the 2012 EIR, refer to Table 1-1, *Emissions Applicability Factors*.

TABLE 3-3
PCRP TOTAL ANNUAL GHG EMISSIONS (METRIC TONS/YEAR)

Scenario	CO_2	CH_4	N_2O	Total CO_2e
Concrete Channel (2024)	24.62	0.00	0.00	25.61
Channel Widening - Phase 1 (2024)	300.17	0.04	0.03	309.57
Rock Pile Area - Phase 1 (2025)	561.51	0.12	0.03	573.83
Rock Pile Area - Phase 2 (2026)	559.87	0.12	0.03	572.11
Channel Widening - Phase 2 (2027)	296.41	0.04	0.03	305.63
Old Crusher (2028)	24.03	0.00	0.00	24.97
Material Removal - Phase 1 (2028)	503.71	0.10	0.03	515.12
Material Removal - Phase 2 (2029)	503.90	0.10	0.03	515.32

SOURCE: Exhibit A.

PCRP Emissions Applicable to the County's SEIR

Table 3-4 presents a summary of the PCRP annual emissions estimates that are applicable to the County's SEIR analysis. The table presents the emissions by calendar year, and total amortized emissions assuming a Project life of 20 years. The emissions are estimated by applying the applicability factors described in Table 1-1 and presented below in Table 3-4, to the total PCRP emissions presented in Table 3-3, above.

TABLE 3-4
PCRP GHG EMISSIONS APPLICABLE TO SEIR (METRIC TONS/YEAR)

Scenario	% Covered in SIER	CO_2	CH_4	N_2O	Total CO_2e
Concrete Channel (2024)	100%	24.62	0.00	0.00	25.61
Channel Widening - Phase 1 (2024)	89%	267.63	0.03	0.03	276.01
Rock Pile Area - Phase 1 (2025)	89%	500.65	0.10	0.03	511.62
Rock Pile Area - Phase 2 (2026)	89%	499.18	0.10	0.03	510.09
Channel Widening - Phase 2 (2027)	89%	264.28	0.03	0.02	272.50
Old Crusher (2028)	0%	0.00	0.00	0.00	0.00
Material Removal - Phase 1 (2028)	20%	101.21	0.02	0.01	103.51
Material Removal - Phase 2 (2029)	20%	101.25	0.02	0.01	103.55
Total Emissions		1,758.82	0.32	0.12	1,802.89
Amortized Emissions (20 years)		87.94	0.02	0.01	90.14

SOURCE: Exhibit A.

PCRP Emissions Compared to CEQA Baseline

Table 3-5 presents the net annual emissions relative to the PCRP emissions that were not evaluated in the 2012 EIR combined with the 2012 Reclamation Plan Amendment maximum annual incremental change emissions disclosed in 2012 EIR. As shown in the table, the PCRP amortized emissions would not be substantial and reflect a slight increase of approximately nine percent in emissions compared to the maximum annual emissions disclosed in the 2012 EIR.

TABLE 3-5
MAXIMUM ANNUAL NET GHG EMISSIONS FOR SEIR CONSIDERATION (METRIC TONS/YEAR)

Scenario	CO_2	CH_4	N_2O	Total CO_2e
Reclamation Plan Amendment Maximum Annual Incremental Change Disclosed in 2012 EIR*	1,060	<1	<1	1,100
PCRP Amortized Emissions not Evaluated in the 2012 EIR	87.90	<1	<1	90.14
Net Emissions	1,148	<1	<1	1,190
BAAQMD Threshold	---	---	---	1,100
Significant Impact (Yes or No)?				Yes

* Reclamation Plan Amendment emissions reflect implementation of 2012 EIR Mitigation Measures 4.8-1a and 4.8-1b.

SOURCE: Draft 2012 EIR Section 4.8.5, Table 4.8-2, Exhibit A.

Impact Conclusion

As shown in the data in Table 3-5, implementation of the PCRP would result in revised emissions that would continue to exceed the BAAQMD's annual operational significance threshold of 1,100 MT CO_2e per year, requiring the continued implementation of 2012 EIR Mitigation Measures 4.8-1a and 4.8-1b to reduce the impact to a less-than-significant level. In addition, the proposed PCRP incremental amortized emissions would be substantially less than the adjusted significance threshold of 660 MT CO_2e per year, indicating that the proposed PCRP would be aligned with the SB 32 emissions reduction target for 2030. Implementation of the PCRP would not result in a new or more severe significant impact than was disclosed in the 2012 EIR.

Impact GHG-2: The PCRP could conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHG. ***(Less than Significant Impact)***

As noted above in Section 3.2, *Regulatory Setting*, the State has adopted the 2017 Climate Change Scoping Plan, the BAAQMD has adopted the 2017 CAP, and the County has adopted a Climate Action Plan for reducing GHG emissions. These plans, however, are not applicable or have limited applicability to emissions generated by projects such as the PCRP. Regarding SB 32, the PCRP's consistency with this goal is addressed through the comparison of its estimated incremental emissions to the adjusted significance threshold of 660 MT CO_2e per year (see Impact GHG-1, above).

Also, the 2017 Climate Change Scoping Plan includes a mobile source strategy that relies on the implementation of the federal phase 2 standards for medium- and heavy-duty vehicles and deploying increasing numbers of zero-emission trucks primarily for classes 3 through 7 last mile delivery trucks. While these strategies are not applied at a project-level, truck fleets would be subject to regulations adopted pursuant to these strategies including those truck fleets used to transport materials to and from the Project site.

In addition, the 2022 Scoping Plan identities a construction equipment sector action for the Scoping Plan Scenario that commits to 25 percent of energy demand to be electrified by 2030 and 75 percent electrified by 2045. A similar commitment is not proposed for the PCRP-related construction equipment. However, the PCRP would be completed prior to the 2030 compliance date associated with the construction equipment sector action; therefore, it would not be directly applicable to the PCRP.

In summary, the PCPR would not conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing GHG emissions. Therefore, this impact would be less than significant and implementation of the PCRP would not result in a new or more sever significant impact than was disclosed in the 2012 EIR.

3.4.4 References

Association of Environmental Professionals (AEP), 2016, Final White Paper - Beyond 2020 and Newhall: A Field Guide to New CEQA Greenhouse Gas Thresholds and Climate Action Plan Targets for California, October 18. Available at: https://califaep.org/docs/AEP-2016_Final_White_Paper.pdf. Accessed June 2021.

Bay Area Air Quality Management District (BAAQMD), 2010. California Environmental Quality Act Air Quality Guidelines, May 2010.

BAAQMD, 2017a. The Spare the Air Cool the Climate, a Blueprint for Clean Air and Climate Protection in the Bay Area, January 2017.

BAAQMD, 2017b. California Environmental Quality Act Air Quality Guidelines, Updated May 2017.California Air Resources Board (CARB), 2014. First Update to the Climate Change Scoping Plan; Building on the Framework Pursuant to AB32, The California Global Warming Solutions Action of 2006. May 2014.

CARB, 2016. Global Warming Potentials. Available: https://www.arb.ca.gov/cc/inventory/background/gwp.htm. Accessed September 29, 2016.

CARB, 2017. California's 2017 Climate Change Scoping Plan, a strategy for achieving California's 2030 greenhouse gas target, November 2017.

CARB, 2018. California Greenhouse Gas Inventory for 2000 – 2018 – by Sector and Activity. Last updated October 15, 2020. Available: https://ww2.arb.ca.gov/ghg-inventory-data. Accessed April 14, 2021.

CARB, 2022a. California Greenhouse Gas Emission Inventory - 2022 Edition. Data available at: https://ww3.arb.ca.gov/cc/inventory/data/data.htm. Accessed February 2023.

CARB, 2022b. 2022 Scoping Plan for Achieving Carbon Neutrality, November 16, 2022.

County of Santa Clara, 2009. County of Santa Clara Climate Action Plan for Operations and Facilities, September 2009.

County of Santa Clara, 2018. County of Santa Clara California Resolution BOS-2016-145, Adopted by Board of Supervisors on December 18, 2018.

Intergovernmental Panel on Climate Change (IPCC), 2014. Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II, and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]. IPCC, Geneva, Switzerland, 151 pp.

Office of Governor Edmund G. Brown Jr (OGB), 2015. News Release – Governor Brown Established Most Ambitious Greenhouse Gas Reduction Target in North America, April 29, 2015. Available: https://www.gov.ca.gov/news.php?id=18938. Accessed September 29, 2016.

U.S. Environmental Protection Agency (U.S. EPA), 1998. AP-42: Compilation of Air Emissions Factors, Chapter 11.9 Western Surface Coal Mining. October. Available: https://www.epa.gov/sites/production/files/2020-10/documents/c11s09.pdf. Accessed June 2021.

2011. Haul Road Workgroup Recommendations Final Report. November. Available at https://www.epa.gov/sites/production/files/2020-10/documents/haul_road_workgroup-final_report_package-20120302.pdf.

U.S. EPA, 2019. Clean Air Act Permitting for Greenhouse Gases. Available: https://www.epa.gov/nsr/clean-air-act-permitting-greenhouse-gases. Last updated December 10, 2019.

U.S. EPA, 2021. Sources of Greenhouse Gas Emissions, Available: https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks. Last updated April 14, 2021.

This page intentionally left blank

Exhibit A
Criteria Pollutants and Greenhouse Gas Emissions

ESA

A-1 Criteria Pollutant and Greenhouse Gas Emissions Calculations Excel Worksheets

Permanente Creek Restoration Plan Supplemental EIR -
Constrution Assumptions

Estimated Construction Schedule

Construction Phases	From	To	No. of workdays/ week	No. of Workdays*
Concrete Channel/Channel Widening (Phase 1)	4/15/2024	10/15/2024	5	132
Rock Pile Area Year (Phase 1)	4/15/2025	10/15/2025	5	132
Rock Pile Area Year (Phase 2)	4/15/2026	10/15/2026	5	132
Channel Widening (Phase 2)	4/15/2027	10/15/2027	5	132
Material Removal Area (Phase 1)/Old Crusher Foundation	4/15/2028	10/15/2028	5	130
Material Removal Area (Phase 2)	4/15/2029	10/15/2029	5	131

Source: Lehigh Responses to Data Request provided 1/24/2023.
*Some workdays are 1 to 2 days greater than provided by the Applicant due to adjustments assocaited with the provided construction schedule.

Modeled Construction Equipment for Each Phase-Year

Concrete Channel

Equipment	Number	Horsepower	No. of Days used	Hrs/day used	Total Hrs	Ave Hrs/day - Phase
Clearing Saw	1	81	4	8	32	0.2

Channel Widening

Equipment	Number	Horsepower	No. of Days used	Hrs/day used	Total Hrs	Ave Hrs/ day - Phase
Caterpillar 350 Excavator	1	286	63	6	378	2.9
Caterpillar 313 Excavator	1	108	31	6	186	1.4
Caterpillar 740 (40 ton truck)	2	452	59	6	708	5.4
Caterpillar 980 Loader	1	393	7	4	28	0.2
Caterpillar 299 (tracked skid ste	2	110	48	4	384	2.9
Dump truck (10 cy)	1	402	9	4	36	0.3
Hydroseeding Truck (1.5K g)	1	402	1	8	8	0.1
Water Truck (3,000 gallons)	1	402	60	4	240	1.8
Caterpillar D8 Bulldozer	1	347	13	6	78	0.6

Rock Pile Area

Equipment	Number	Horsepower	No. of Days used	Hrs/day used	Total Hrs	Ave Hrs/day - Phase
Caterpillar 350 Excavator	2	286	72	8	1152	8.7
Caterpillar 313 Excavator	1	108	71	8	568	4.3
Caterpillar 740 (40 ton truck)	4	452	95	8	3040	23.0
Caterpillar 980 Loader	1	393	13	4	52	0.4
Caterpillar 299 (tracked skid ste	1	110	46	4	184	1.4
Dump truck (10 cy)	1	402	13	4	52	0.4
Hydroseeding Truck (1.5K g)	1	402	1	8	8	0.1
Water Truck (3,000 gallons)	1	402	60	4	240	1.8
Caterpillar Compactor CP56	1	156	8	6	48	0.4
Caterpillar D8 Bulldozer	1	347	20	6	120	0.9

Old Crusher Foundation

Equipment	Number	Horsepower	No. of Days used	Hrs/day used	Total Hrs	Ave Hrs/day - Phase
7500 Watt Generator	1	84	7	6	42	0.3

Permanente Creek Restoration Plan Supplemental EIR -

Constrution Assumptions

Material Removal Area (Phase 1)

Equipment	Number	Horsepower	No. of Days used	Hrs/day used	Total Hrs	Ave Hrs/ day - Phase
Caterpillar 350 Excavator	2	286	61	8	976	7.5
Caterpillar 313 Excavator	1	108	60	8	480	3.7
Caterpillar 740 (40 ton truck)	4	452	82	8	2624	20.2
Caterpillar 980 Loader	1	393	14	4	56	0.4
Caterpillar 299 (tracked skid ste	1	110	37	4	148	1.1
Dump truck (10 cy)	1	402	9	4	36	0.3
Hydroseeding Truck (1.5K g)	1	402	3	8	24	0.2
Water Truck (3,000 gallons)	1	402	60	4	240	1.8
Caterpillar D8 Bulldozer	1	347	20	6	120	0.9

Material Removal Area (Phase 2)

Equipment	Number	Horsepower	No. of Days used	Hrs/day used	Total Hrs	Ave Hrs/ day - Phase
Caterpillar 350 Excavator	2	286	61	8	976	7.5
Caterpillar 313 Excavator	1	108	60	8	480	3.7
Caterpillar 740 (40 ton truck)	4	452	82	8	2624	20.0
Caterpillar 980 Loader	1	393	14	4	56	0.4
Caterpillar 299 (tracked skid ste	1	110	37	4	148	1.1
Dump truck (10 cy)	1	402	9	4	36	0.3
Hydroseeding Truck (1.5K g)	1	402	3	8	24	0.2
Water Truck (3,000 gallons)	1	402	60	4	240	1.8
Caterpillar D8 Bulldozer	1	347	20	6	120	0.9

Equipment Specifications

Caterpillar 350 Excavator Specs, Dimensions, Comparisons : CEG (constructionequipmentguide.com)
Caterpillar D8T Crawler Tractor Specs & Dimensions :: RitchieSpecs
Caterpillar 14M Motor Grader Specs & Dimensions :: RitchieSpecs
Water Truck, 4,000 to 4,999 gal. for Rent - United Rentals
740 GC Articulated Haul Truck | Cat | Caterpillar
980M Wheel Loader | Cat | Caterpillar
Stihl FS 70 R String Trimmer (mainstreetmower.com)
313 Hydraulic Excavator | Cat | Caterpillar

Vehicle Trips

Construction Phase	Worker Commute trips/day	Vendor Truck Trips/day	Haul Truck Trips Total	Haul Trips/ year
Concrete Channel	8	25	2	2
Channel Widening (Phase 1)	12	216		171.5
Channel Widening (Phase 2)	12	216	343	171.5
Rock Pile Area (Phase 1)	16	216		740.5
Rock Pile Area (Phase 2)	16	216	1481	740.5
Old Crusher Foundation	8	25	2	2
Material Removal Area (Phase 1)	16	216		638
Material Removal Area (Phase 2)	16	216	1276	638
Average miles per trip (CalEEMod default values)*	10.8	6.6	20	20

*Per revised assumptions provided January 24, 2023, the Applicant does not know the average miles per trip.

PCRP Acres Compared to PCRA Acres Addressed by 2012 EIR

Area	Acres
Total PCRP Project Site	135.55
PCRP Outside Existing Rec. Plan Boundary	2.57
PCRP Outside of PCRA, but Inside Rec. Plan Boundary	12.79
PCRP Outside of PCRA Disturbance Area, but Inside Rec. Plan Boundary	13.66

Phase (Year)	PCRP Outside of PCRA Disturbance (Acres)	PCRP Disturbance Area (Acres)	% Covered in 2012 EIR	% Covered in SEIR	Notes
Concrete Channel	0.66	0.66	0%	100%	Completely outside of PCRA Disturbance Area
Rock Pile Area	12.42	13.93	11%	89%	The 2012 EIR analyzed the types of activities proposed, so the percent of
Channel Widening	12.42	13.93	11%	89%	emissions presented in the SEIR is equal the percent of area not covered in
Old Crusher	0	0.002	100%	0%	Completely within PCRA Disturbance Area and the 2012 analyzed the types of activities proposed.
Material Removal	3.1509	15.6809	80%	20%	The 2012 EIR analyzed the types of activities proposed, so the percent of emissions presented in the SEIR is equal the percent of area not covered in the 2012 EIR.

Reach	PCRA Sub Area	PCRA Acres	PCRA Disturbance Area	Creek Reaches (blue lines)	Creek Reaches Acres	Creek Reaches Outside Rec. Plan Boundary	Creek Reaches Outside of PCRA	Creek Reaches Outside of PCRA Disturbance Areas
6				Concrete Channel	0.66	0.66	0.66	0.66
7								
8					1.83	1.79	1.83	1.83
9					2.28	0.12	2.28	2.28
10					1.68	0	1.68	1.68
11	7	0.18	0.02	Channel Widening	3.74	0	3.56	3.72
12	7	1.06	0.42	and Rock	3.14	0	2.71	2.73
13	7	3.81	1.07	Pile Limits	0.69	0	0.02	0.18
14	7	4.48	2.47			0	0	0
15	6	2.64	1.21			0	0	0
	7	3.46						
16	5	1.66	1.52			0	0	0
	6	5.36						
17	4	3.9	5.8	Material Grading	6.65	0	2.62	2.89
	5	5.35		Old Crusher	0.002	0	0	0
18	4	2.77	1.44	Material Grading	1.06	0		0.26
19	2	10.3	5.29	Material Grading	0.01	0	0	0.0009
	3	10.58						
	4	1.56						
20	2	23.04	7.5			0	0	0
21	1	14.13	19.41			0	0	0
	2	20.42						
22	1	5.49	2.95			0	0	0
Total		120.19	49.10			2.57	15.36	16.23

Maximum Annual Criteria Pollutant Emissions for SEIR (tons/year)

Scenario	PM10	PM2.5	NO_x	ROG	CO	SO_2
Maximum Daily Incremental Change for Reclamation Plan Amendment Disclosed in 2012 EIR	-463	-77	-23	-6	-66	2
PCRP Emissions not Evaluated in the 2012 EIR	11.45	1.71	0.56	0.07	1.84	0.01
Maximum Annual Incremental Change	-452	-75	-22	-6	-64	2
BAAQMD Threshold	15	10	10	10	None	None
Significant Impact (Yes or No)?	No	No	No	No	--	--

Maximum Daily Criteria Pollutant Emissions for SEIR (pounds/day)

Scenario	PM_{10}	$PM_{2.5}$	NO_x	ROG	CO	SO_2
Maximum Daily Incremental Change for Reclamation Plan Amendment Disclosed in 2012 EIR	-3,441	-582	-316	-44	-750	5
PCRP Emissions not Evaluated in the 2012 EIR	196.20	26.62	8.51	1.13	27.90	0.08
Net Emissions	-3245	-555	-307	-43	-722	5
BAAQMD Threshold	82	54	54	54	None	None
Significant Impact (Yes or No)?	No	No	No	No	--[b]	--[c]

Emissions Summary for SEIR - Tons/Year

Phase (Year)	ROG	NOx	PM10	PM2.5	CO	SOx
Concrete Channel and Channel Widening - Phase 1 (2024)	0.05	0.47	11.45	1.71	0.75	0.00
Rock Pile Area - Phase 1 (2025)	0.07	0.56	10.37	1.56	1.84	0.01
Rock Pile Area - Phase 2 (2026)	0.07	0.53	10.37	1.58	1.83	0.01
Channel Widening - Phase 2 (2027)	0.04	0.34	9.92	1.48	0.69	0.00
Old Crusher and Material Removal - Phase 1 (2028)	0.01	0.10	4.66	0.58	0.36	0.00
Material Removal - Phase 2 (2029)	0.01	0.10	4.70	0.59	0.36	0.00

Emissions Summary for SEIR - Average Pounds/Day

Phase (Year)	ROG	NOx	PM10	PM2.5	CO	SOx
Concrete Channel and Channel Widening - Phase 1 (2024)	0.77	7.12	196.20	26.62	11.42	0.05
Rock Pile Area - Phase 1 (2025)	1.13	8.51	166.70	22.36	27.90	0.08
Rock Pile Area - Phase 2 (2026)	1.11	8.08	166.70	22.35	27.79	0.08
Channel Widening - Phase 2 (2027)	0.59	5.18	154.87	21.10	10.47	0.04
Old Crusher and Material Removal - Phase 1 (2028)	0.22	1.57	73.61	8.62	5.52	0.02
Material Removal - Phase 2 (2029)	0.22	1.51	73.87	8.65	5.47	0.02

Emissions Summary for SEIR - Tons/Phase-Year

Phase (Year)	% Covered in SEIR	ROG	NOx	PM10	PM2.5	CO	SOx
Concrete Channel (2024)	100%	0.01	0.05	1.90	0.28	0.04	0.00
Channel Widening - Phase 1 (2024)	89%	0.04	0.42	9.55	1.44	0.71	0.00
Rock Pile Area - Phase 1 (2025)	89%	0.07	0.56	10.37	1.56	1.84	0.01
Rock Pile Area - Phase 2 (2026)	89%	0.07	0.53	10.37	1.58	1.83	0.01
Channel Widening - Phase 2 (2027)	89%	0.04	0.34	9.92	1.48	0.69	0.00
Old Crusher (2028)	0%	0.00	0.00	0.00	0.00	0.00	0.00
Material Removal - Phase 1 (2028)	20%	0.01	0.10	4.66	0.58	0.36	0.00
Material Removal - Phase 2 (2029)	20%	0.01	0.10	4.70	0.59	0.36	0.00

Off-road Equipment Exhaust Emissions Summary for SEIR - Total Tons/Year

Phase (Year)	% Covered in SEIR	PM10	PM2.5
Concrete Channel (2024)	100%	0.0000	0.0000
Channel Widening - Phase 1 (2024)	89%	0.0019	0.0019
Rock Pile Area - Phase 1 (2025)	89%	0.0059	0.0059
Rock Pile Area - Phase 2 (2026)	89%	0.0059	0.0219
Channel Widening - Phase 2 (2027)	89%	0.0019	0.0019
Old Crusher (2028)	0%	0.0000	0.0000
Material Removal - Phase 1 (2028)	20%	0.0012	0.0012
Material Removal - Phase 2 (2029)	20%	0.0012	0.0012

Emissions Summary for SEIR - Average Pounds/Phase-Day

Phase (Year)	% Covered in SEIR	ROG	NOx	PM10	PM2.5	CO	SOx
Concrete Channel (2024)	100%	0.10	0.72	41.32	5.50	0.67	0.00
Channel Widening - Phase 1 (2024)	89%	0.67	6.40	154.88	21.12	10.75	0.04
Rock Pile Area - Phase 1 (2025)	89%	1.13	8.51	166.70	22.36	27.90	0.08
Rock Pile Area - Phase 2 (2026)	89%	1.11	8.08	166.70	22.35	27.79	0.08
Channel Widening - Phase 2 (2027)	89%	0.59	5.18	154.87	21.10	10.47	0.04
Old Crusher (2028)	0%	0.00	0.00	0.00	0.00	0.00	0.00
Material Removal - Phase 1 (2028)	20%	0.22	1.57	73.61	8.62	5.52	0.02
Material Removal - Phase 2 (2029)	20%	0.22	1.51	73.87	8.65	5.47	0.02

Total Off-road Equipment Exhaust Emissions Summary - Tons/Year

Phase (Year)	PM10	PM2.5
Concrete Channel (2024)	0.0000	0.0000
Channel Widening - Phase 1 (2024)	0.0022	0.0022
Rock Pile Area - Phase 1 (2025)	0.0066	0.0066
Rock Pile Area - Phase 2 (2026)	0.0066	0.0246
Channel Widening - Phase 2 (2027)	0.0022	0.0022
Old Crusher (2028)	0.0000	0.0000
Material Removal - Phase 1 (2028)	0.0058	0.0058
Material Removal - Phase 2 (2029)	0.0058	0.0058

Total Emissions Summary - Tons/Phase-Year

Phase (Year)	ROG	NOx	PM10	PM2.5	CO	SOx
Concrete Channel (2024)	0.01	0.05	1.90	0.28	0.04	0.00
Channel Widening - Phase 1 (2024)	0.05	0.47	10.72	1.61	0.80	0.00
Rock Pile Area - Phase 1 (2025)	0.08	0.63	11.64	1.75	2.06	0.01
Rock Pile Area - Phase 2 (2026)	0.08	0.60	11.63	1.77	2.06	0.01
Channel Widening - Phase 2 (2027)	0.04	0.38	11.12	1.66	0.78	0.00
Old Crusher (2028)	0.01	0.03	1.67	0.25	0.04	0.00
Material Removal - Phase 1 (2028)	0.07	0.51	23.21	2.90	1.79	0.01
Material Removal - Phase 2 (2029)	0.07	0.49	23.38	2.92	1.78	0.01

Total Emissions Summary - Average Pounds/Phase-Day

Phase (Year)	ROG	NOx	PM10	PM2.5	CO	SOx
Concrete Channel (2024)	0.10	0.72	41.32	5.50	0.67	0.00
Channel Widening - Phase 1 (2024)	0.75	7.18	173.72	23.68	12.06	0.05
Rock Pile Area - Phase 1 (2025)	1.27	9.54	186.97	25.07	31.29	0.09
Rock Pile Area - Phase 2 (2026)	1.24	9.06	186.96	25.07	31.17	0.09
Channel Widening - Phase 2 (2027)	0.67	5.81	173.70	23.67	11.74	0.05
Old Crusher (2028)	0.08	0.52	38.21	3.87	0.60	0.00
Material Removal - Phase 1 (2028)	1.11	7.80	366.33	42.91	27.46	0.09
Material Removal - Phase 2 (2029)	1.09	7.49	367.61	43.03	27.24	0.09

Concrete Channel (2024 tons)

Source	ROG	NOx	PM10	PM2.5	CO	SOx
Off-road Equipment Exhaust	0.00	0.00	0.00	0.00	0.01	0.00
On-road Vehicles	0.01	0.05	0.00	0.00	0.04	0.00
Fugitive Dust			1.89	0.27		
Total	0.01	0.05	1.90	0.28	0.04	0.00

Concrete Channel (2024 average daily pounds)

Source	ROG	NOx	PM10	PM2.5	CO	SOx
Off-road Equipment Exhaust	0.00	0.01	0.00	0.00	0.10	0.00
On-road Vehicles	0.10	0.71	0.05	0.02	0.57	0.00
Fugitive Dust			41.27	5.48		
Total	0.10	0.72	41.32	5.50	0.67	0.00

Channel Widening - Phase 1 (2024 tons)

Source	ROG	NOx	PM10	PM2.5	CO	SOx
Off-road Equipment Exhaust	0.02	0.07	0.00	0.00	0.63	0.00
On-road Vehicles	0.03	0.40	0.02	0.01	0.16	0.00
Fugitive Dust			10.69	1.60		
Total	0.05	0.47	10.72	1.61	0.80	0.00

Channel Widening - Phase 1 (2024 average daily pounds)

Source	ROG	NOx	PM10	PM2.5	CO	SOx
Off-road Equipment Exhaust	0.25	1.07	0.03	0.03	9.60	0.02
On-road Vehicles	0.50	6.11	0.37	0.19	2.46	0.03
Fugitive Dust			173.31	23.47		
Total	0.75	7.18	173.72	23.68	12.06	0.05

Rock Pile Area - Phase 1 (2025 tons)

Source	ROG	NOx	PM10	PM2.5	CO	SOx
Off-road Equipment Exhaust	0.05	0.22	0.01	0.01	1.88	0.00
On-road Vehicles	0.03	0.41	0.03	0.01	0.19	0.00
Fugitive Dust			11.60	1.73		
Total	0.08	0.63	11.64	1.75	2.06	0.01

Rock Pile Area - Phase 1 (2025 average daily pounds)

Source	ROG	NOx	PM10	PM2.5	CO	SOx
Off-road Equipment Exhaust	0.75	3.26	0.10	0.10	28.42	0.06
On-road Vehicles	0.52	6.28	0.39	0.19	2.87	0.03
Fugitive Dust			186.47	24.78		
Total	1.27	9.54	186.97	25.07	31.29	0.09

Rock Pile Area - Phase 2 (2026 tons)

Source	ROG	NOx	PM10	PM2.5	CO	SOx
Off-road Equipment Exhaust	0.05	0.22	0.01	0.02	1.88	0.00
On-road Vehicles	0.03	0.38	0.03	0.01	0.18	0.00
Fugitive Dust			11.60	1.73		
Total	0.08	0.60	11.63	1.77	2.06	0.01

Rock Pile Area - Phase 2 (2026 average daily pounds)

Source	ROG	NOx	PM10	PM2.5	CO	SOx
Off-road Equipment Exhaust	0.75	3.26	0.10	0.10	28.42	0.06
On-road Vehicles	0.49	5.80	0.39	0.18	2.75	0.03
Fugitive Dust			186.47	24.78		
Total	1.24	9.06	186.96	25.07	31.17	0.09

Channel Widening - Phase 2 (2027 tons)

Source	ROG	NOx	PM10	PM2.5	CO	SOx
Off-road Equipment Exhaust	0.02	0.07	0.00	0.00	0.63	0.00
On-road Vehicles	0.03	0.31	0.02	0.01	0.14	0.00
Fugitive Dust			11.10	1.64		
Total	0.04	0.38	11.12	1.66	0.78	0.00

Channel Widening - Phase 2 (2027 average daily pounds)

Source	ROG	NOx	PM10	PM2.5	CO	SOx
Off-road Equipment Exhaust	0.25	1.07	0.03	0.03	9.60	0.02
On-road Vehicles	0.42	4.75	0.35	0.17	2.14	0.03
Fugitive Dust			173.31	23.47		
Total	0.67	5.81	173.70	23.67	11.74	0.05

Old Crusher (2028 tons)

Source	ROG	NOx	PM10	PM2.5	CO	SOx
Off-road Equipment Exhaust	0.00	0.00	0.00	0.00	0.01	0.00
On-road Vehicles	0.01	0.03	0.00	0.00	0.03	0.00
Fugitive Dust			1.66	0.25		
Total	0.01	0.03	1.67	0.25	0.04	0.00

Old Crusher (2028 average daily pounds)

Source	ROG	NOx	PM10	PM2.5	CO	SOx
Off-road Equipment Exhaust	0.00	0.01	0.00	0.00	0.15	0.00
On-road Vehicles	0.08	0.51	0.04	0.02	0.45	0.00
Fugitive Dust			38.17	3.85		
Total	0.08	0.52	38.21	3.87	0.60	0.00

Materal Removal Area - Phase 1 (2028 tons)

Source	ROG	NOx	PM10	PM2.5	CO	SOx
Off-road Equipment Exhaust	0.04	0.19	0.01	0.01	1.62	0.00
On-road Vehicles	0.03	0.32	0.02	0.01	0.16	0.00
Fugitive Dust			23.18	2.88		
Total	0.07	0.51	23.21	2.90	1.79	0.01

Material Removal Area - Phase 1 (2028 average daily pounds)

Source	ROG	NOx	PM10	PM2.5	CO	SOx
Off-road Equipment Exhaust	0.66	2.87	0.09	0.09	24.96	0.05
On-road Vehicles	0.44	4.92	0.37	0.17	2.50	0.03
Fugitive Dust			365.87	42.65		
Total	1.11	7.80	366.33	42.91	27.46	0.09

Material Removal Area - Phase 2 (2029 tons)

Source	ROG	NOx	PM10	PM2.5	CO	SOx
Off-road Equipment Exhaust	0.04	0.19	0.01	0.01	1.62	0.00
On-road Vehicles	0.03	0.30	0.02	0.01	0.16	0.00
Fugitive Dust			23.35	2.90		
Total	0.07	0.49	23.38	2.92	1.78	0.01

Material Removal Area - Phase 2 (2029 average daily pounds)

Source	ROG	NOx	PM10	PM2.5	CO	SOx
Off-road Equipment Exhaust	0.66	2.85	0.09	0.09	24.79	0.05
On-road Vehicles	0.43	4.64	0.37	0.17	2.44	0.03
Fugitive Dust			367.15	42.77		
Total	1.09	7.49	367.61	43.03	27.24	0.09

Permanente Creek Restoration Project - EMFAC2021 Criteria Pollutant Emissions Calculations for *Off-Site Exhaust Emissions*

Accounts for trucks and passenger vehicles driving to and from the site

Emissions Summary

Tons Per Year

Construction Phase(s)	Year	ROG	NOx	PM10	PM2.5	CO	SOx
Concrete Channel	2024	0.01	0.05	0.00	0.00	0.04	0.00
Channel Widening (Phase 1)	2024	0.03	0.40	0.02	0.01	0.16	0.00
Rock Pile Area (Phase 1)	2025	0.03	0.41	0.03	0.01	0.19	0.00
Rock Pile Area (Phase 2)	2026	0.03	0.38	0.03	0.01	0.18	0.00
Channel Widening (Phase 2)	2027	0.03	0.31	0.02	0.01	0.14	0.00
Old Crusher Foundation	2028	0.01	0.03	0.00	0.00	0.03	0.00
Material Removal Area (Phase 1)	2028	0.03	0.32	0.02	0.01	0.16	0.00
Material Removal Area (Phase 2)	2029	0.03	0.30	0.02	0.01	0.16	0.00

Average Daily Pounds

Construction Phase(s)	Year	ROG	NOx	PM10	PM2.5	CO	SOx
Concrete Channel	2024	0.10	0.71	0.05	0.02	0.57	0.00
Channel Widening (Phase 1)	2024	0.50	6.11	0.37	0.19	2.46	0.03
Rock Pile Area (Phase 1)	2025	0.52	6.28	0.39	0.19	2.87	0.03
Rock Pile Area (Phase 2)	2026	0.49	5.80	0.39	0.18	2.75	0.03
Channel Widening (Phase 2)	2027	0.42	4.75	0.35	0.17	2.14	0.03
Old Crusher Foundation	2028	0.08	0.51	0.04	0.02	0.45	0.00
Material Removal Area (Phase 1)	2028	0.44	4.92	0.37	0.17	2.50	0.03
Material Removal Area (Phase 2)	2029	0.43	4.64	0.37	0.17	2.44	0.03

Background Information

Conversions

Tons	Pounds	Grams
1	2000	907185

Annual Work Days	Year
132	2024
132	2025
132	2026
132	2027
130	2028
131	2029

One-Way Trip Info

	Concrete Channel	Channel Widening (Phase 1)	Channel Widening (Phase 2)	Rock Pile Area (Phase 1)	Rock Pile Area (Phase 2)	Old Crusher	Material Removal (Phase 1)	Material Removal (Phase 2)
Employee Trips								
Daily One-Way Trips	8	12	12	16	16	8	16	16
Annual One-Way Trips	1,056	1,584	1,584	2,112	2,112	1,040	2,080	2,096
Trip Length	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8
Vendor Truck Trips								
Daily One-Way Trips	25	216	216	216	216	25	216	216
Annual One-Way Trips	3,300	28,512	28,512	28,512	28,512	3,250	28,080	28,296
Trip Length	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6
Haul Truck Trips								
Annual One-Way Trips	2	171.5	171.5	740.5	740.5	2	638	638
Trip Length	20	20	20	20	20	20	20	20

On-Site Roads Length

	meters	miles
Paved Road[1]	2639.5	1.64
Unpaved Road	1612.3	1.00
Paved Road to Concrete Channel[1]	800.91	0.50
Unpaved Road near Concrete Channel	242.7	0.15

[1]Paved road modeling sources measured from Ridgeway Drive along Stevens Creek Blvd into the Plant.

EMFAC2021 Output for 2024

Region	Calendar Year	Vehicle Category	Model Year	Speed	Fuel	NOx_RUNEX	NOx_IDLEX	NOx_STREX	PM2.5_RUNEX	PM2.5_IDLEX	PM2.5_STREX	PM2.5_PMTW	PM2.5_PMBW	PM10_RUNEX	PM10_IDLEX	PM10_STREX	PM10_PMTW	PM10_PMBW	ROG_RUNEX	ROG_IDLEX	ROG_STREX	ROG_HOTSOAK	ROG_RUNLOSS	ROG_DIURN	CO_RUNEX	CO_IDLEX	CO_STREX	SOx_RUNEX	SOx_IDLEX	SOx_STREX
Santa Clara	2024	HHDT	Aggregate	Aggregate	Diesel	1.89457	62.32042	2.89887	0.02567	0.03017	0.00000	0.00877	0.02745	0.02683	0.03153	0.00000	0.03508	0.07844	0.01673	5.09458	0.00000	0.00000	0.00000	0.00000	0.08252	74.10576	0.00000	0.01547	0.11360	0.00000
Santa Clara	2024	LDT1	Aggregate	Aggregate	Gasoline	0.12836	0.00000	0.38129	0.00174	0.00000	0.00268	0.00200	0.00324	0.00189	0.00000	0.00291	0.00800	0.00926	0.02774	0.00000	0.53932	0.16533	0.47248	2.66716	1.42762	0.00000	5.25305	0.00324	0.00000	0.00085
Santa Clara	2024	LHDT1	Aggregate	Aggregate	Diesel	1.56302	1.92168	0.00000	0.03506	0.02680	0.00000	0.00300	0.02730	0.03664	0.02802	0.00000	0.01200	0.07800	0.17236	0.10976	0.00000	0.00000	0.00000	0.00000	0.47359	0.90975	0.00000	0.00598	0.00124	0.00000
Santa Clara	2024	LHDT2	Aggregate	Aggregate	Diesel	1.26610	1.89540	0.00000	0.03205	0.02700	0.00000	0.00300	0.03185	0.03350	0.02822	0.00000	0.01200	0.09100	0.15944	0.10976	0.00000	0.00000	0.00000	0.00000	0.41186	0.90975	0.00000	0.00717	0.00199	0.00000
Santa Clara	2024	MHDT	Aggregate	Aggregate	Diesel	1.23282	13.11952	1.64273	0.01440	0.02990	0.00000	0.00300	0.01594	0.01505	0.03125	0.00000	0.01200	0.04555	0.03245	0.24932	0.00000	0.00000	0.00000	0.00000	0.12087	7.55603	0.00000	0.01086	0.02129	0.00000
		HDT Mix				1.35398	5.64553	0.54758	0.02717	0.02790	0.00000	0.00300	0.02503	0.02840	0.02916	0.00000	0.01200	0.07152	0.12142	0.15628	0.00000	0.00000	0.00000	0.00000	0.33544	3.12517	0.00000	0.00801	0.00817	0.00000

Emissions Calcs for Concrete Channel

							Tons per Year						Tons per Year			Tons per Year					Tons per Year				Tons per Year			Tons per Year		
Tons/Year	g/ton	907185					ROG	ROG	ROG	ROG	ROG	ROG	NOx	NOx	NOx	PM10	PM10	PM10	PM10	PM10	PM2.5	PM2.5	PM2.5	PM2.5	PM2.5	CO	CO	CO	SOx	SOx	SOx
				g/mi	g/trip	g/vehicle/day	g/mi	g/vehicle/day	g/trip	g/trip	g/trip	g/vehicle/day	g/mi	g/vehicle/day	g/trip	g/mi	g/vehicle/day	g/trip	g/mi	g/mi	g/mi	g/vehicle/day	g/trip	g/mi	g/mi	g/mi	g/vehicle/day	g/trip	g/mi	g/vehicle/day	g/trip
Row Index No.		Trips	mi/trip	tot mi	tot trip	tot veh	ROG_RUNEX	ROG_IDLEX	ROG_STREX	ROG_HOTSOAK	ROG_RUNLOSS	ROG_RESTLOSS	NOx_RUNEX	NOx_IDLEX	NOx_STREX	PM10_RUNEX	PM10_IDLEX	PM10_STREX	PM10_PMTW	PM10_PMBW	PM10_RUNEX	PM10_IDLEX	PM10_STREX	PM10_PMTW	PM10_PMBW	CO_RUNEX	CO_IDLEX	CO_STREX	SOx_RUNEX	SOx_IDLEX	SOx_STREX
3	HHDT	2	20	40	2	1	0.00000	0.00001	0.00000	0.00000	0.00000	0.00000	0.00008	0.00007	0.00001	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00008	0.00000	0.00000	0.00000	0.00000
4	LDT1	1,056	10.8	11,405	1,056	528	0.00035	0.00000	0.00063	0.00019	0.00055	0.00155	0.00161	0.00000	0.00044	0.00002	0.00000	0.00000	0.00010	0.00012	0.00002	0.00000	0.00000	0.00003	0.00004	0.01795	0.00000	0.00611	0.00004	0.00000	0.00000
5	HDT Mix	3,300	6.6	21,780	3,300	1,650	0.00292	0.00028	0.00000	0.00000	0.00000	0.00000	0.03251	0.01027	0.00199	0.00068	0.00005	0.00000	0.00029	0.00172	0.00065	0.00005	0.00000	0.00007	0.00060	0.00805	0.00568	0.00000	0.00019	0.00001	0.00000

Off-Site Exhaust Emissions for Concrete Channel

Tons/Year	ROG	NOx	PM10	PM2.5	CO	SOx
HHDT	0.0000	0.0002	0.0000	0.0000	0.0001	0.0000
LDT1	0.0033	0.0021	0.0002	0.0001	0.0241	0.0000
HDT Mix	0.0032	0.0448	0.0027	0.0014	0.0137	0.0002
Total	0.0065	0.0470	0.0030	0.0015	0.0379	0.0002

Ave. Daily Pounds	ROG	NOx	PM10	PM2.5	PM2.5	PM2.5
HHDT	0.0001	0.0024	0.0001	0.0000	0.0013	0.0000
LDT1	0.0496	0.0312	0.0037	0.0014	0.3646	0.0006
HDT Mix	0.0485	0.6783	0.0415	0.0208	0.2081	0.0031
Total	0.0981	0.7119	0.0453	0.0223	0.5740	0.0038

For HRA paved road (tpy)

PM10	PM2.5
1.55E-07	6.87E-08
2.07E-04	1.04E-04
total DPM **2.07E-04**	**1.04E-04**

For HRA unpaved road (tpy)

PM10	PM2.5
4.69E-08	2.08E-08
6.26E-05	3.14E-05
total DPM **6.27E-05**	**3.15E-05**

Emissions Calcs for Channel Widening (Phase 1)

							Tons per Year						Tons per Year			Tons per Year					Tons per Year				Tons per Year			Tons per Year		
Tons/Year	g/ton	907185					ROG	ROG	ROG	ROG	ROG	ROG	NOx	NOx	NOx	PM10	PM10	PM10	PM10	PM10	PM2.5	PM2.5	PM2.5	PM2.5	PM2.5	CO	CO	CO	SOx	SOx	SOx
				g/mi	g/trip	g/vehicle/day	g/mi	g/vehicle/day	g/trip	g/trip	g/trip	g/vehicle/day	g/mi	g/vehicle/day	g/trip	g/mi	g/vehicle/day	g/trip	g/mi	g/mi	g/mi	g/vehicle/day	g/trip	g/mi	g/mi	g/mi	g/vehicle/day	g/trip	g/mi	g/vehicle/day	g/trip
Row Index No.		Trips	mi/trip	tot mi	tot trip	tot veh	ROG_RUNEX	ROG_IDLEX	ROG_STREX	ROG_HOTSOAK	ROG_RUNLOSS	ROG_RESTLOSS	NOx_RUNEX	NOx_IDLEX	NOx_STREX	PM10_RUNEX	PM10_IDLEX	PM10_STREX	PM10_PMTW	PM10_PMBW	PM10_RUNEX	PM10_IDLEX	PM10_STREX	PM10_PMTW	PM10_PMBW	CO_RUNEX	CO_IDLEX	CO_STREX	SOx_RUNEX	SOx_IDLEX	SOx_STREX
3	HHDT	172	20	3,430	172	86	0.00006	0.00048	0.00000	0.00000	0.00000	0.00000	0.00716	0.00589	0.00055	0.00010	0.00000	0.00000	0.00013	0.00030	0.00010	0.00000	0.00000	0.00003	0.00010	0.00031	0.00700	0.00000	0.00006	0.00001	0.00000
4	LDT1	1,584	10.8	17,107	1,584	792	0.00052	0.00000	0.00094	0.00029	0.00082	0.00233	0.00242	0.00000	0.00067	0.00004	0.00000	0.00001	0.00015	0.00017	0.00003	0.00000	0.00000	0.00004	0.00006	0.02692	0.00000	0.00917	0.00006	0.00000	0.00000
5	HDT Mix	28,512	6.6	188,179	28,512	14,256	0.02519	0.00246	0.00000	0.00000	0.00000	0.00000	0.28086	0.08872	0.01721	0.00589	0.00046	0.00000	0.00249	0.01483	0.00564	0.00044	0.00000	0.00062	0.00519	0.06958	0.04911	0.00000	0.00166	0.00013	0.00000

Permanente Creek Restoration Project - EMFAC2021 Criteria Pollutant Emissions Calculations for *Off-Site Exhaust Emissions*

Accounts for trucks and passenger vehicles driving to and from the site

Off-Site Exhaust Emissions for Channel Widening (Phase 1)

Tons/Year	ROG	NOx	PM10	PM2.5	CO	SOx
HHDT	0.0005	0.0136	0.0005	0.0002	0.0073	0.0001
LDT1	0.0049	0.0031	0.0004	0.0001	0.0361	0.0001
HDT Mix	0.0276	0.3868	0.0237	0.0119	0.1187	0.0018
Total	0.0331	0.4035	0.0246	0.0123	0.1621	0.0019

Ave. Daily Pounds	ROG	NOx	PM10	PM2.5	PM2.5	PM2.5
HHDT	0.0083	0.2061	0.0081	0.0036	0.1109	0.0010
LDT1	0.0743	0.0468	0.0055	0.0021	0.5469	0.0009
HDT Mix	0.4188	5.8604	0.3587	0.1801	1.7984	0.0271
Total	0.5014	6.1132	0.3723	0.1858	2.4561	0.0291

For HRA paved road (tpy)

PM10	PM2.5
1.33E-05	5.89E-06
1.79E-03	8.96E-04
total DPM **1.80E-03**	**9.02E-04**

For HRA unpaved road (tpy)

PM10	PM2.5
4.02E-06	1.79E-06
5.41E-04	2.72E-04
total DPM **5.45E-04**	**2.73E-04**

EMFAC2021 Output for 2025

Region	Calendar Year	Vehicle Category	Model Year	Speed	Fuel	NOx_RUNEX	NOx_IDLEX	NOx_STREX	PM2.5_RUNEX	PM2.5_IDLEX	PM2.5_STREX	PM2.5_PMTW	PM2.5_PMBW	PM10_RUNEX	PM10_IDLEX	PM10_STREX	PM10_PMTW	PM10_PMBW	ROG_RUNEX	ROG_IDLEX	ROG_STREX	ROG_HOTSOAK	ROG_RUNLOSS	ROG_DIURN	CO_RUNEX	CO_IDLEX	CO_STREX	SOx_RUNEX	SOx_IDLEX	SOx_STREX
Santa Clara	2025	HHDT	Aggregate	Aggregate	Diesel	1.82519	60.91449	2.93199	0.02533	0.02894	0.00000	0.00877	0.02742	0.02648	0.03025	0.00000	0.03509	0.07835	0.01614	5.07867	0.00000	0.00000	0.00000	0.00000	0.07808	74.00904	0.00000	0.01523	0.11132	0.00000
Santa Clara	2025	LDT1	Aggregate	Aggregate	Gasoline	0.11536	0.00000	0.35972	0.00164	0.00000	0.00254	0.00200	0.00324	0.00178	0.00000	0.00277	0.00800	0.00926	0.02471	0.00000	0.49882	0.15696	0.44230	2.52236	1.31742	0.00000	4.88612	0.00318	0.00000	0.00083
Santa Clara	2025	LHDT1	Aggregate	Aggregate	Diesel	1.37924	1.82341	0.00000	0.03235	0.02669	0.00000	0.00300	0.02730	0.03381	0.02790	0.00000	0.01200	0.07800	0.16078	0.10976	0.00000	0.00000	0.00000	0.00000	0.43509	0.90975	0.00000	0.00595	0.00123	0.00000
Santa Clara	2025	LHDT2	Aggregate	Aggregate	Diesel	1.13929	1.80266	0.00000	0.03030	0.02700	0.00000	0.00300	0.03185	0.03167	0.02823	0.00000	0.01200	0.09100	0.15162	0.10976	0.00000	0.00000	0.00000	0.00000	0.38790	0.90975	0.00000	0.00711	0.00196	0.00000
Santa Clara	2025	MHDT	Aggregate	Aggregate	Diesel	1.12815	12.48973	1.64656	0.01246	0.02479	0.00000	0.00300	0.01594	0.01302	0.02591	0.00000	0.01200	0.04555	0.02820	0.23590	0.00000	0.00000	0.00000	0.00000	0.10965	7.53539	0.00000	0.01081	0.02111	0.00000
		HDT Mix				1.21556	5.37193	0.54885	0.02503	0.02616	0.00000	0.00300	0.02503	0.02617	0.02735	0.00000	0.01200	0.07152	0.11353	0.15181	0.00000	0.00000	0.00000	0.00000	0.31088	3.11829	0.00000	0.00796	0.00810	0.00000

Emissions Calcs for Rock Pile Area (Phase 1)

							Tons per Year						Tons per Year			Tons per Year						Tons per Year						Tons per Year			Tons per Year		
Tons/Year	g/ton	907185					ROG	ROG	ROG	ROG	ROG	ROG	NOx	NOx	NOx	PM10	PM10	PM10	PM10	PM10	PM2.5	PM2.5	PM2.5	PM2.5	PM2.5	CO	CO	CO	SOx	SOx	SOx
				g/mi	g/trip	g/vehicle/day	g/mi	g/vehicle/day	g/trip	g/trip	g/trip	g/vehicle/day	g/mi	g/vehicle/day	g/trip	g/mi	g/vehicle/day	g/trip	g/mi	g/mi	g/mi	g/vehicle/day	g/trip	g/mi	g/mi	g/mi	g/mi	g/vehicle/day	g/trip	g/mi	g/vehicle/day	g/trip
Row Index No.		Trips	mi/trip	tot mi	tot trip	tot veh	ROG_RUNEX	ROG_IDLEX	ROG_STREX	ROG_HOTSOAK	ROG_RUNLOSS	ROG_RESTLOSS	NOx_RUNEX	NOx_IDLEX	NOx_STREX	PM10_RUNEX	PM10_IDLEX	PM10_STREX	PM10_PMTW	PM10_PMBW	PM10_RUNEX	PM10_IDLEX	PM10_STREX	PM10_PMTW	PM10_PMBW	CO_RUNEX	CO_IDLEX	CO_STREX	SOx_RUNEX	SOx_IDLEX	SOx_STREX
3	HHDT	741	20	14,810	741	370	0.00026	0.00207	0.00000	0.00000	0.00000	0.00000	0.02980	0.02486	0.00239	0.00043	0.00001	0.00000	0.00057	0.00128	0.00041	0.00001	0.00000	0.00014	0.00045	0.00127	0.03021	0.00000	0.00025	0.00005	0.00000
4	LDT1	2,112	10.8	22,810	2,112	1,056	0.00062	0.00000	0.00116	0.00037	0.00103	0.00294	0.00290	0.00000	0.00084	0.00004	0.00000	0.00001	0.00020	0.00023	0.00004	0.00000	0.00001	0.00005	0.00008	0.03312	0.00000	0.01138	0.00008	0.00000	0.00000
5	HDT Mix	28,512	6.6	188,179	28,512	14,256	0.02355	0.00239	0.00000	0.00000	0.00000	0.00000	0.25215	0.08442	0.01725	0.00543	0.00043	0.00000	0.00249	0.01483	0.00519	0.00041	0.00000	0.00062	0.00519	0.06449	0.04900	0.00000	0.00165	0.00013	0.00000

Off-Site Exhaust Emissions for Rock Pile Area (Phase 1)

Tons/Year	ROG	NOx	PM10	PM2.5	CO	SOx
HHDT	0.0023	0.0571	0.0023	0.0010	0.0315	0.0003
LDT1	0.0061	0.0037	0.0005	0.0002	0.0445	0.0001
HDT Mix	0.0259	0.3538	0.0232	0.0114	0.1135	0.0018
Total	0.0344	0.4146	0.0260	0.0126	0.1895	0.0022

Ave. Daily Pounds	ROG	NOx	PM10	PM2.5	PM2.5	PM2.5
HHDT	0.0354	0.8644	0.0348	0.0154	0.4770	0.0045
LDT1	0.0926	0.0566	0.0074	0.0027	0.6742	0.0012
HDT Mix	0.3930	5.3608	0.3512	0.1730	1.7195	0.0269
Total	0.5210	6.2819	0.3934	0.1911	2.8707	0.0326

For HRA paved road (tpy)

PM10	PM2.5
1.88E-04	8.33E-05
5.76E-03	2.84E-03
total DPM **5.95E-03**	**2.92E-03**

EMFAC2021 Output for 2026

Region	Calendar Year	Vehicle Category	Model Year	Speed	Fuel	NOx_RUNEX	NOx_IDLEX	NOx_STREX	PM2.5_RUNEX	PM2.5_IDLEX	PM2.5_STREX	PM2.5_PMTW	PM2.5_PMBW	PM10_RUNEX	PM10_IDLEX	PM10_STREX	PM10_PMTW	PM10_PMBW	ROG_RUNEX	ROG_IDLEX	ROG_STREX	ROG_HOTSOAK	ROG_RUNLOSS	ROG_DIURN	CO_RUNEX	CO_IDLEX	CO_STREX	SOx_RUNEX	SOx_IDLEX	SOx_STREX
Santa Clara	2026	HHDT	Aggregate	Aggregate	Diesel	1.76111	59.43678	2.95547	0.02520	0.02777	0.00000	0.00877	0.02751	0.02633	0.02902	0.00000	0.03510	0.07861	0.01560	5.06551	0.00000	0.00000	0.00000	0.00000	0.07407	73.94194	0.00000	0.01499	0.10915	0.00000
Santa Clara	2026	LDT1	Aggregate	Aggregate	Gasoline	0.10400	0.00000	0.34004	0.00155	0.00000	0.00242	0.00200	0.00324	0.00168	0.00000	0.00263	0.00800	0.00926	0.02205	0.00000	0.46164	0.14873	0.41724	2.37730	1.21935	0.00000	4.54917	0.00312	0.00000	0.00082
Santa Clara	2026	LHDT1	Aggregate	Aggregate	Diesel	1.21928	1.73248	0.00000	0.03002	0.02660	0.00000	0.00300	0.02730	0.03138	0.02781	0.00000	0.01200	0.07800	0.15058	0.10976	0.00000	0.00000	0.00000	0.00000	0.40172	0.90975	0.00000	0.00592	0.00121	0.00000
Santa Clara	2026	LHDT2	Aggregate	Aggregate	Diesel	1.03007	1.71794	0.00000	0.02877	0.02701	0.00000	0.00300	0.03185	0.03007	0.02824	0.00000	0.01200	0.09100	0.14468	0.10976	0.00000	0.00000	0.00000	0.00000	0.36731	0.90975	0.00000	0.00706	0.00194	0.00000
Santa Clara	2026	MHDT	Aggregate	Aggregate	Diesel	1.02886	11.86253	1.64414	0.01080	0.02038	0.00000	0.00300	0.01594	0.01128	0.02130	0.00000	0.01200	0.04555	0.02442	0.22431	0.00000	0.00000	0.00000	0.00000	0.09956	7.52082	0.00000	0.01075	0.02093	0.00000
		HDT Mix				1.09274	5.10432	0.54805	0.02320	0.02467	0.00000	0.00300	0.02503	0.02425	0.02578	0.00000	0.01200	0.07152	0.10656	0.14794	0.00000	0.00000	0.00000	0.00000	0.28953	3.11344	0.00000	0.00791	0.00803	0.00000

Emissions Calcs for Rock Pile Area (Phase 2)

							Tons per Year						Tons per Year			Tons per Year						Tons per Year						Tons per Year			Tons per Year		
Tons/Year	g/ton	907185					ROG	ROG	ROG	ROG	ROG	ROG	NOx	NOx	NOx	PM10	PM10	PM10	PM10	PM10	PM2.5	PM2.5	PM2.5	PM2.5	PM2.5	CO	CO	CO	SOx	SOx	SOx
				g/mi	g/trip	g/vehicle/day	g/mi	g/vehicle/day	g/trip	g/trip	g/trip	g/vehicle/day	g/mi	g/vehicle/day	g/trip	g/mi	g/vehicle/day	g/trip	g/mi	g/mi	g/mi	g/vehicle/day	g/trip	g/mi	g/mi	g/mi	g/mi	g/vehicle/day	g/trip	g/mi	g/vehicle/day	g/trip
Row Index No.		Trips	mi/trip	tot mi	tot trip	tot veh	ROG_RUNEX	ROG_IDLEX	ROG_STREX	ROG_HOTSOAK	ROG_RUNLOSS	ROG_RESTLOSS	NOx_RUNEX	NOx_IDLEX	NOx_STREX	PM10_RUNEX	PM10_IDLEX	PM10_STREX	PM10_PMTW	PM10_PMBW	PM10_RUNEX	PM10_IDLEX	PM10_STREX	PM10_PMTW	PM10_PMBW	CO_RUNEX	CO_IDLEX	CO_STREX	SOx_RUNEX	SOx_IDLEX	SOx_STREX
3	HHDT	741	20	14,810	741	370	0.00025	0.00207	0.00000	0.00000	0.00000	0.00000	0.02875	0.02426	0.00241	0.00043	0.00001	0.00000	0.00057	0.00128	0.00041	0.00001	0.00000	0.00014	0.00045	0.00121	0.03018	0.00000	0.00024	0.00004	0.00000
4	LDT1	2,112	10.8	22,810	2,112	1,056	0.00055	0.00000	0.00107	0.00035	0.00097	0.00277	0.00261	0.00000	0.00079	0.00004	0.00000	0.00001	0.00020	0.00023	0.00004	0.00000	0.00001	0.00005	0.00008	0.03066	0.00000	0.01059	0.00008	0.00000	0.00000
5	HDT Mix	28,512	6.6	188,179	28,512	14,256	0.02210	0.00232	0.00000	0.00000	0.00000	0.00000	0.22667	0.08021	0.01722	0.00503	0.00041	0.00000	0.00249	0.01483	0.00481	0.00039	0.00000	0.00062	0.00519	0.06006	0.04893	0.00000	0.00164	0.00013	0.00000

Off-Site Exhaust Emissions for Rock Pile Area (Phase 2)

Tons/Year	ROG	NOx	PM10	PM2.5	CO	SOx
HHDT	0.0023	0.0554	0.0023	0.0010	0.0314	0.0003
LDT1	0.0057	0.0034	0.0005	0.0002	0.0412	0.0001
HDT Mix	0.0244	0.3241	0.0228	0.0110	0.1090	0.0018
Total	0.0325	0.3829	0.0255	0.0122	0.1816	0.0021

Ave. Daily Pounds	ROG	NOx	PM10	PM2.5	PM2.5	PM2.5
HHDT	0.0352	0.8397	0.0348	0.0154	0.4756	0.0044
LDT1	0.0866	0.0516	0.0073	0.0027	0.6250	0.0012
HDT Mix	0.3701	4.9107	0.3448	0.1669	1.6513	0.0268
Total	0.4919	5.8020	0.3869	0.1849	2.7518	0.0324

For HRA paved road (tpy)

PM10	PM2.5
1.88E-04	8.32E-05
5.66E-03	2.74E-03
total DPM **5.84E-03**	**2.82E-03**

EMFAC2021 Output for 2027

Region	Calendar Year	Vehicle Category	Model Year	Speed	Fuel	NOx_RUNEX	NOx_IDLEX	NOx_STREX	PM2.5_RUNEX	PM2.5_IDLEX	PM2.5_STREX	PM2.5_PMTW	PM2.5_PMBW	PM10_RUNEX	PM10_IDLEX	PM10_STREX	PM10_PMTW	PM10_PMBW	ROG_RUNEX	ROG_IDLEX	ROG_STREX	ROG_HOTSOAK	ROG_RUNLOSS	ROG_DIURN	CO_RUNEX	CO_IDLEX	CO_STREX	SOx_RUNEX	SOx_IDLEX	SOx_STREX
Santa Clara	2027	HHDT	Aggregate	Aggregate	Diesel	1.70404	58.05742	2.95803	0.02506	0.02678	0.00000	0.00878	0.02767	0.02620	0.02800	0.00000	0.03511	0.07906	0.01510	5.05686	0.00000	0.00000	0.00000	0.00000	0.07046	73.92424	0.00000	0.01474	0.10712	0.00000
Santa Clara	2027	LDT1	Aggregate	Aggregate	Gasoline	0.09363	0.00000	0.32228	0.00145	0.00000	0.00229	0.00200	0.00324	0.00158	0.00000	0.00250	0.00800	0.00926	0.01964	0.00000	0.42772	0.14096	0.39724	2.28612	1.12869	0.00000	4.23978	0.00307	0.00000	0.00080
Santa Clara	2027	LHDT1	Aggregate	Aggregate	Diesel	1.08439	1.64968	0.00000	0.02806	0.02651	0.00000	0.00300	0.02730	0.02933	0.02771	0.00000	0.01200	0.07800	0.14181	0.10976	0.00000	0.00000	0.00000	0.00000	0.37372	0.90975	0.00000	0.00590	0.00120	0.00000
Santa Clara	2027	LHDT2	Aggregate	Aggregate	Diesel	0.93974	1.64220	0.00000	0.02750	0.02701	0.00000	0.00300	0.03185	0.02874	0.02823	0.00000	0.01200	0.09100	0.13873	0.10976	0.00000	0.00000	0.00000	0.00000	0.35053	0.90975	0.00000	0.00701	0.00193	0.00000
Santa Clara	2027	MHDT	Aggregate	Aggregate	Diesel	0.93945	11.29117	1.63578	0.00940	0.01681	0.00000	0.00300	0.01594	0.00983	0.01757	0.00000	0.01200	0.04555	0.02124	0.21502	0.00000	0.00000	0.00000	0.00000	0.09092	7.51207	0.00000	0.01069	0.02075	0.00000
		HDT Mix				0.98786	4.86102	0.54526	0.02165	0.02344	0.00000	0.00300	0.02503	0.02263	0.02450	0.00000	0.01200	0.07152	0.10060	0.14485	0.00000	0.00000	0.00000	0.00000	0.27173	3.11052	0.00000	0.00787	0.00796	0.00000

Emissions Calcs for Channel Widening (Phase 2)

							Tons per Year						Tons per Year			Tons per Year						Tons per Year						Tons per Year			Tons per Year		
Tons/Year	g/ton	907185					ROG	ROG	ROG	ROG	ROG	ROG	NOx	NOx	NOx	PM10	PM10	PM10	PM10	PM10	PM2.5	PM2.5	PM2.5	PM2.5	PM2.5	CO	CO	CO	SOx	SOx	SOx
				g/mi	g/trip	g/vehicle/day	g/mi	g/vehicle/day	g/trip	g/trip	g/trip	g/vehicle/day	g/mi	g/vehicle/day	g/trip	g/mi	g/vehicle/day	g/trip	g/mi	g/mi	g/mi	g/vehicle/day	g/trip	g/mi	g/mi	g/mi	g/mi	g/vehicle/day	g/trip	g/mi	g/vehicle/day	g/trip
Row Index No.		Trips	mi/trip	tot mi	tot trip	tot veh	ROG_RUNEX	ROG_IDLEX	ROG_STREX	ROG_HOTSOAK	ROG_RUNLOSS	ROG_RESTLOSS	NOx_RUNEX	NOx_IDLEX	NOx_STREX	PM10_RUNEX	PM10_IDLEX	PM10_STREX	PM10_PMTW	PM10_PMBW	PM10_RUNEX	PM10_IDLEX	PM10_STREX	PM10_PMTW	PM10_PMBW	CO_RUNEX	CO_IDLEX	CO_STREX	SOx_RUNEX	SOx_IDLEX	SOx_STREX
3	HHDT	172	20	3,430	172	86	0.00006	0.00048	0.00000	0.00000	0.00000	0.00000	0.00644	0.00549	0.00056	0.00010	0.00000	0.00000	0.00013	0.00030	0.00009	0.00000	0.00000	0.00003	0.00010	0.00027	0.00699	0.00000	0.00006	0.00001	0.00000
4	LDT1	1,584	10.8	17,107	1,584	792	0.00037	0.00000	0.00075	0.00025	0.00069	0.00200	0.00177	0.00000	0.00056	0.00003	0.00000	0.00000	0.00015	0.00017	0.00003	0.00000	0.00000	0.00004	0.00006	0.02128	0.00000	0.00740	0.00006	0.00000	0.00000
5	HDT Mix	28,512	6.6	188,179	28,512	14,256	0.02087	0.00228	0.00000	0.00000	0.00000	0.00000	0.20491	0.07639	0.01714	0.00469	0.00039	0.00000	0.00249	0.01483	0.00449	0.00037	0.00000	0.00062	0.00519	0.05636	0.04888	0.00000	0.00163	0.00013	0.00000

Permanente Creek Restoration Project - EMFAC2021 Criteria Pollutant Emissions Calculations for *Off-Site Exhaust Emissions*

Accounts for trucks and passenger vehicles driving to and from the site

Off-Site Exhaust Emissions for Channel Widening (Phase 2)

Tons/Year	ROG	NOx	PM10	PM2.5	CO	SOx
HHDT	0.0005	0.0125	0.0005	0.0002	0.0073	0.0001
LDT1	0.0041	0.0023	0.0004	0.0001	0.0287	0.0001
HDT Mix	0.0231	0.2984	0.0224	0.0107	0.1052	0.0018
Total	0.0277	0.3133	0.0233	0.0110	0.1412	0.0019

Ave. Daily Pounds	ROG	NOx	PM10	PM2.5	PM2.5	PM2.5
HHDT	0.0081	0.1892	0.0081	0.0036	0.1099	0.0010
LDT1	0.0614	0.0353	0.0054	0.0020	0.4347	0.0009
HDT Mix	0.3507	4.5218	0.3394	0.1617	1.5946	0.0266
Total	0.4202	4.7463	0.3530	0.1673	2.1392	0.0285

For HRA paved road (tpy)

PM10	PM2.5
4.37E-05	1.93E-05
5.57E-03	2.65E-03
5.61E-03	**2.67E-03**

total DPM

EMFAC2021 Output for 2028

Region	Calendar Year	Vehicle Category	Model Year	Speed	Fuel	NOx_RUNEX	NOx_IDLEX	NOx_STREX	PM2.5_RUNEX	PM2.5_IDLEX	PM2.5_STREX	PM2.5_PMTW	PM2.5_PMBW	PM10_RUNEX	PM10_IDLEX	PM10_STREX	PM10_PMTW	PM10_PMBW	ROG_RUNEX	ROG_IDLEX	ROG_STREX	ROG_HOTSOAK	ROG_RUNLOSS	ROG_DIURN	CO_RUNEX	CO_IDLEX	CO_STREX	SOx_RUNEX	SOx_IDLEX	SOx_STREX
Santa Clara	2028	HHDT	Aggregate	Aggregate	Diesel	1.64973	56.82184	2.94011	0.02493	0.02582	0.00000	0.00878	0.02783	0.02606	0.02699	0.00000	0.03512	0.07951	0.01462	5.05308	0.00000	0.00000	0.00000	0.00000	0.06712	73.97201	0.00000	0.01447	0.10520	0.00000
Santa Clara	2028	LDT1	Aggregate	Aggregate	Gasoline	0.08431	0.00000	0.30583	0.00136	0.00000	0.00217	0.00200	0.00324	0.00148	0.00000	0.00236	0.00800	0.00926	0.01759	0.00000	0.39718	0.13556	0.39042	2.26173	1.05141	0.00000	3.96401	0.00302	0.00000	0.00078
Santa Clara	2028	LHDT1	Aggregate	Aggregate	Diesel	0.96940	1.57457	0.00000	0.02642	0.02645	0.00000	0.00300	0.02730	0.02761	0.02764	0.00000	0.01200	0.07800	0.13422	0.10976	0.00000	0.00000	0.00000	0.00000	0.35015	0.90975	0.00000	0.00588	0.00119	0.00000
Santa Clara	2028	LHDT2	Aggregate	Aggregate	Diesel	0.86504	1.57490	0.00000	0.02645	0.02700	0.00000	0.00300	0.03185	0.02765	0.02822	0.00000	0.01200	0.09100	0.13371	0.10976	0.00000	0.00000	0.00000	0.00000	0.33717	0.90975	0.00000	0.00697	0.00191	0.00000
Santa Clara	2028	MHDT	Aggregate	Aggregate	Diesel	0.86061	10.76300	1.60803	0.00825	0.01392	0.00000	0.00300	0.01594	0.00862	0.01455	0.00000	0.01200	0.04555	0.01862	0.20752	0.00000	0.00000	0.00000	0.00000	0.08370	7.50718	0.00000	0.01063	0.02058	0.00000
		HDT Mix				0.89835	4.63749	0.53601	0.02037	0.02246	0.00000	0.00300	0.02503	0.02129	0.02347	0.00000	0.01200	0.07152	0.09552	0.14235	0.00000	0.00000	0.00000	0.00000	0.25701	3.10889	0.00000	0.00783	0.00789	0.00000

Emissions Calcs for Material Removal Area (Phase 1)

							Tons per Year						Tons per Year			Tons per Year						Tons per Year						Tons per Year			Tons per Year		
Tons/Year	g/ton	907185					ROG	ROG	ROG	ROG	ROG	ROG	NOx	NOx	NOx	PM10	PM10	PM10	PM10	PM10	PM2.5	PM2.5	PM2.5	PM2.5	PM2.5	CO	CO	CO	SOx	SOx	SOx
				g/mi	g/trip	g/vehicle/day	g/mi	g/vehicle/day	g/trip	g/trip	g/trip	g/vehicle/day	g/mi	g/vehicle/day	g/trip	g/mi	g/vehicle/day	g/trip	g/mi	g/mi	g/mi	g/vehicle/day	g/trip	g/mi	g/mi	g/mi	g/mi	g/vehicle/day	g/trip	g/mi	g/vehicle/day	g/trip
Row Index No.		Trips	mi/trip	tot mi	tot trip	tot veh	ROG_RUNEX	ROG_IDLEX	ROG_STREX	ROG_HOTSOAK	ROG_RUNLOSS	ROG_RESTLOSS	NOx_RUNEX	NOx_IDLEX	NOx_STREX	PM10_RUNEX	PM10_IDLEX	PM10_STREX	PM10_PMTW	PM10_PMBW	PM10_RUNEX	PM10_IDLEX	PM10_STREX	PM10_PMTW	PM10_PMBW	CO_RUNEX	CO_IDLEX	CO_STREX	SOx_RUNEX	SOx_IDLEX	SOx_STREX
3	HHDT	638	20	12,760	638	319	0.00021	0.00178	0.00000	0.00000	0.00000	0.00000	0.02320	0.01998	0.00207	0.00037	0.00001	0.00000	0.00049	0.00112	0.00035	0.00001	0.00000	0.00012	0.00039	0.00094	0.02601	0.00000	0.00020	0.00004	0.00000
4	LDT1	2,080	10.8	22,464	2,080	1,040	0.00044	0.00000	0.00091	0.00031	0.00090	0.00259	0.00209	0.00000	0.00070	0.00004	0.00000	0.00001	0.00020	0.00023	0.00003	0.00000	0.00000	0.00005	0.00008	0.02604	0.00000	0.00909	0.00007	0.00000	0.00000
5	HDT Mix	28,080	6.6	185,328	28,080	14,040	0.01951	0.00220	0.00000	0.00000	0.00000	0.00000	0.18352	0.07177	0.01659	0.00435	0.00036	0.00000	0.00245	0.01461	0.00416	0.00035	0.00000	0.00061	0.00511	0.05250	0.04811	0.00000	0.00160	0.00012	0.00000

Off-Site Exhaust Emissions Material Removal Area (Phase 1)

Tons/Year	ROG	NOx	PM10	PM2.5	CO	SOx
HHDT	0.0020	0.0453	0.0020	0.0009	0.0270	0.0002
LDT1	0.0051	0.0028	0.0005	0.0002	0.0351	0.0001
HDT Mix	0.0217	0.2719	0.0218	0.0102	0.1006	0.0017
Total	0.0288	0.3199	0.0242	0.0113	0.1627	0.0020

Ave. Daily Pounds	ROG	NOx	PM10	PM2.5	PM2.5	PM2.5
HHDT	0.0305	0.6962	0.0306	0.0135	0.4147	0.0037
LDT1	0.0792	0.0429	0.0072	0.0026	0.5404	0.0012
HDT Mix	0.3341	4.1829	0.3350	0.1575	1.5480	0.0265
Total	0.4437	4.9220	0.3728	0.1735	2.5030	0.0314

For HRA paved road (tpy)

PM10	PM2.5
1.63E-04	7.17E-05
5.41E-03	2.54E-03
5.57E-03	**2.62E-03**

total DPM

For HRA unpaved road (tpy)

PM10	PM2.5
9.96E-05	4.38E-05
3.31E-03	1.55E-03
3.40E-03	**1.60E-03**

total DPM

Emissions Calcs for Old Crusher

							Tons per Year						Tons per Year			Tons per Year						Tons per Year						Tons per Year			Tons per Year		
Tons/Year	g/ton	907185					ROG	ROG	ROG	ROG	ROG	ROG	NOx	NOx	NOx	PM10	PM10	PM10	PM10	PM10	PM2.5	PM2.5	PM2.5	PM2.5	PM2.5	CO	CO	CO	SOx	SOx	SOx
				g/mi	g/trip	g/vehicle/day	g/mi	g/vehicle/day	g/trip	g/trip	g/trip	g/vehicle/day	g/mi	g/vehicle/day	g/trip	g/mi	g/vehicle/day	g/trip	g/mi	g/mi	g/mi	g/vehicle/day	g/trip	g/mi	g/mi	g/mi	g/mi	g/vehicle/day	g/trip	g/mi	g/vehicle/day	g/trip
Row Index No.		Trips	mi/trip	tot mi	tot trip	tot veh	ROG_RUNEX	ROG_IDLEX	ROG_STREX	ROG_HOTSOAK	ROG_RUNLOSS	ROG_RESTLOSS	NOx_RUNEX	NOx_IDLEX	NOx_STREX	PM10_RUNEX	PM10_IDLEX	PM10_STREX	PM10_PMTW	PM10_PMBW	PM10_RUNEX	PM10_IDLEX	PM10_STREX	PM10_PMTW	PM10_PMBW	CO_RUNEX	CO_IDLEX	CO_STREX	SOx_RUNEX	SOx_IDLEX	SOx_STREX
3	HHDT	2	20	40	2	1	0.00000	0.00001	0.00000	0.00000	0.00000	0.00000	0.00007	0.00006	0.00001	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00008	0.00000	0.00000	0.00000	0.00000
4	LDT1	1,040	10.8	11,232	1,040	520	0.00022	0.00000	0.00046	0.00016	0.00045	0.00130	0.00104	0.00000	0.00035	0.00002	0.00000	0.00000	0.00010	0.00011	0.00002	0.00000	0.00000	0.00002	0.00004	0.01302	0.00000	0.00454	0.00004	0.00000	0.00000
5	HDT Mix	3,250	6.6	21,450	3,250	1,625	0.00226	0.00025	0.00000	0.00000	0.00000	0.00000	0.02124	0.00831	0.00192	0.00050	0.00004	0.00000	0.00028	0.00169	0.00048	0.00004	0.00000	0.00007	0.00059	0.00608	0.00557	0.00000	0.00019	0.00001	0.00000

Off-Site Exhaust Emissions for Old Crusher

Tons/Year	ROG	NOx	PM10	PM2.5	CO	SOx
HHDT	0.0000	0.0001	0.0000	0.0000	0.0001	0.0000
LDT1	0.0026	0.0014	0.0002	0.0001	0.0176	0.0000
HDT Mix	0.0025	0.0315	0.0025	0.0012	0.0116	0.0002
Total	0.0051	0.0330	0.0028	0.0013	0.0293	0.0002

Ave. Daily Pounds	ROG	NOx	PM10	PM2.5	PM2.5	PM2.5
HHDT	0.0001	0.0022	0.0001	0.0000	0.0013	0.0000
LDT1	0.0396	0.0215	0.0036	0.0013	0.2702	0.0006
HDT Mix	0.0387	0.4841	0.0388	0.0182	0.1792	0.0031
Total	0.0783	0.5078	0.0425	0.0196	0.4506	0.0037

For HRA paved road (tpy)

PM10	PM2.5
5.11E-07	2.25E-07
6.26E-04	2.94E-04
6.27E-04	**2.95E-04**

total DPM

For HRA unpaved road (tpy)

PM10	PM2.5
3.12E-07	1.37E-07
3.83E-04	1.80E-04
3.83E-04	**1.80E-04**

total DPM

EMFAC2021 Output for 2029

Region	Calendar Year	Vehicle Category	Model Year	Speed	Fuel	NOx_RUNEX	NOx_IDLEX	NOx_STREX	PM2.5_RUNEX	PM2.5_IDLEX	PM2.5_STREX	PM2.5_PMTW	PM2.5_PMBW	PM10_RUNEX	PM10_IDLEX	PM10_STREX	PM10_PMTW	PM10_PMBW	ROG_RUNEX	ROG_IDLEX	ROG_STREX	ROG_HOTSOAK	ROG_RUNLOSS	ROG_DIURN	CO_RUNEX	CO_IDLEX	CO_STREX	SOx_RUNEX	SOx_IDLEX	SOx_STREX
Santa Clara	2029	HHDT	Aggregate	Aggregate	Diesel	1.60316	55.79259	2.91198	0.02484	0.02508	0.00000	0.00878	0.02799	0.02596	0.02622	0.00000	0.03513	0.07996	0.01424	5.05503	0.00000	0.00000	0.00000	0.00000	0.06432	74.08532	0.00000	0.01421	0.10349	0.00000
Santa Clara	2029	LDT1	Aggregate	Aggregate	Gasoline	0.07554	0.00000	0.29064	0.00127	0.00000	0.00205	0.00200	0.00324	0.00138	0.00000	0.00223	0.00800	0.00925	0.01567	0.00000	0.36864	0.12860	0.37501	2.19293	0.97851	0.00000	3.70420	0.00297	0.00000	0.00077
Santa Clara	2029	LHDT1	Aggregate	Aggregate	Diesel	0.87313	1.50655	0.00000	0.02501	0.02636	0.00000	0.00300	0.02730	0.02614	0.02755	0.00000	0.01200	0.07800	0.12766	0.10976	0.00000	0.00000	0.00000	0.00000	0.33053	0.90975	0.00000	0.00586	0.00118	0.00000
Santa Clara	2029	LHDT2	Aggregate	Aggregate	Diesel	0.80264	1.51432	0.00000	0.02558	0.02692	0.00000	0.00300	0.03185	0.02673	0.02814	0.00000	0.01200	0.09100	0.12947	0.10976	0.00000	0.00000	0.00000	0.00000	0.32647	0.90975	0.00000	0.00693	0.00190	0.00000
Santa Clara	2029	MHDT	Aggregate	Aggregate	Diesel	0.79158	10.29665	1.57412	0.00730	0.01157	0.00000	0.00300	0.01594	0.00763	0.01209	0.00000	0.01200	0.04555	0.01647	0.20145	0.00000	0.00000	0.00000	0.00000	0.07775	7.50557	0.00000	0.01057	0.02042	0.00000
		HDT Mix				0.82245	4.43917	0.52471	0.01930	0.02162	0.00000	0.00300	0.02503	0.02017	0.02259	0.00000	0.01200	0.07152	0.09120	0.14032	0.00000	0.00000	0.00000	0.00000	0.24492	3.10835	0.00000	0.00779	0.00783	0.00000

Emissions Calcs for Material Removal Area (Phase 2)

							Tons per Year						Tons per Year			Tons per Year						Tons per Year						Tons per Year			Tons per Year		
Tons/Year	g/ton	907185					ROG	ROG	ROG	ROG	ROG	ROG	NOx	NOx	NOx	PM10	PM10	PM10	PM10	PM10	PM2.5	PM2.5	PM2.5	PM2.5	PM2.5	CO	CO	CO	SOx	SOx	SOx
				g/mi	g/trip	g/vehicle/day	g/mi	g/vehicle/day	g/trip	g/trip	g/trip	g/vehicle/day	g/mi	g/vehicle/day	g/trip	g/mi	g/vehicle/day	g/trip	g/mi	g/mi	g/mi	g/vehicle/day	g/trip	g/mi	g/mi	g/mi	g/mi	g/vehicle/day	g/trip	g/mi	g/vehicle/day	g/trip
Row Index No.		Trips	mi/trip	tot mi	tot trip	tot veh	ROG_RUNEX	ROG_IDLEX	ROG_STREX	ROG_HOTSOAK	ROG_RUNLOSS	ROG_RESTLOSS	NOx_RUNEX	NOx_IDLEX	NOx_STREX	PM10_RUNEX	PM10_IDLEX	PM10_STREX	PM10_PMTW	PM10_PMBW	PM10_RUNEX	PM10_IDLEX	PM10_STREX	PM10_PMTW	PM10_PMBW	CO_RUNEX	CO_IDLEX	CO_STREX	SOx_RUNEX	SOx_IDLEX	SOx_STREX
3	HHDT	638	20	12,760	638	319	0.00020	0.00178	0.00000	0.00000	0.00000	0.00000	0.02255	0.01962	0.00205	0.00037	0.00001	0.00000	0.00049	0.00112	0.00035	0.00001	0.00000	0.00012	0.00039	0.00090	0.02605	0.00000	0.00020	0.00004	0.00000
4	LDT1	2,096	10.8	22,637	2,096	1,048	0.00039	0.00000	0.00085	0.00030	0.00087	0.00253	0.00188	0.00000	0.00067	0.00003	0.00000	0.00001	0.00020	0.00023	0.00003	0.00000	0.00000	0.00005	0.00008	0.02442	0.00000	0.00856	0.00007	0.00000	0.00000
5	HDT Mix	28,296	6.6	186,754	28,296	14,148	0.01877	0.00219	0.00000	0.00000	0.00000	0.00000	0.16931	0.06923	0.01637	0.00415	0.00035	0.00000	0.00247	0.01472	0.00397	0.00034	0.00000	0.00062	0.00515	0.05042	0.04848	0.00000	0.00160	0.00012	0.00000

Off-Site Exhaust Emissions Material Removal Area (Phase 2)

Tons/Year	ROG	NOx	PM10	PM2.5	CO	SOx
HHDT	0.0020	0.0442	0.0020	0.0009	0.0270	0.0002
LDT1	0.0049	0.0026	0.0005	0.0002	0.0330	0.0001
HDT Mix	0.0210	0.2549	0.0217	0.0101	0.0989	0.0017
Total	0.0279	0.3017	0.0242	0.0111	0.1588	0.0020

Ave. Daily Pounds	ROG	NOx	PM10	PM2.5	PM2.5	PM2.5
HHDT	0.0304	0.6802	0.0307	0.0135	0.4147	0.0036
LDT1	0.0760	0.0393	0.0072	0.0026	0.5073	0.0012
HDT Mix	0.3225	3.9217	0.3338	0.1551	1.5215	0.0265
Total	0.4289	4.6412	0.3717	0.1711	2.4435	0.0313

For HRA paved road (tpy)

PM10	PM2.5
1.63E-04	7.18E-05
5.39E-03	2.50E-03
5.56E-03	**2.58E-03**

total DPM

For HRA unpaved road (tpy)

PM10	PM2.5
9.98E-05	4.38E-05
3.29E-03	1.53E-03
3.39E-03	**1.57E-03**

total DPM

Permanente Creek Restoration Project

TRAVEL ON PAVED ROADS

Road Dust Equation

E [lb/VMT] = k*(sL)^0.91 * (W)^1.02 * (1-P/4N)

Where:
E = the particulate emission factor in units of pounds of particulate matter per VMT
k = the U.S. EPA AP-42 particle size multiplier (PM_{10} = 0.0022 lb/VMT),
Table 13.2.1-1 Particle Size Multipliers for Paved Road Equation of USEPA, 2011.
sL = the roadway-specific silt loading in grams/square meter (g/m^2)
W = the average weight of vehicles traveling the road (California statewide default 2.4 tons)
P = number of "wet" days, when at least one site per county received at least 0.01 inch of precipitation during the annual averaging period,[9] and
N = the number of days in the annual averaging period (default = 365)

Calculation Methodology: USEPA AP-42, Paved Roads, Section 13.2.1, Revised January 2011:
http://www.epa.gov/ttn/chief/ap42/ch13/final/c13s0201.pdf
Source: California Air Resources Board (CARB), Miscellaneous Process Methodology 7.9 — Entrained Road Travel, Paved Road Dust. Revised and updated March 2018.

No assumed control on paved roads

Silt Loading Factor

Source: CARB, 2018.

Table 3: California Default Statewide and Local Silt Loading Values

Silt Loadings (g/m2)			
Freeway	**Major**	**Collector**	**Local**
0.015	0.032	0.032	0.32

Total On-Site Paved Road Length 2639.5 meters 1.64 miles
Paved Road Length to Concrete Channel 800.9 meters 0.50 miles

Re-entrained PAVED Road Dust Emission Factors

	Pollutant	k	sL	W	P	N	E_{ext} (g/mi)
Employee	PM10	1.00	0.032	2.4	67	365	**0.10165**
Employee	PM2.5	0.15	0.032	2.4	67	365	**0.01525**
Vendor Truck	PM10	1.00	0.032	2.4	67	365	**0.10165**
Vendor Truck	PM2.5	0.15	0.032	2.4	67	365	**0.01525**
Haul Truck	PM10	1.00	0.032	2.4	67	365	**0.10165**
Haul Truck	PM2.5	0.15	0.032	2.4	67	365	**0.01525**

	Concrete Channel	Channel Widening (Phase 1)	Rock Pile Area (Phase 1)	Rock Pile Area (Phase 2)	Channel Widening (Phase 2)	Old Crusher	Material Removal (Phase 1)	Material Removal (Phase 2)
Annual One-Way Trips	1,056	1,584	2,112	2,112	1,584	1,040	2,080	2,096
Trip Length	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8
Vendor Annual One-Way Trips	3,300	28,512	28,512	28,512	28,512	3,250	28,080	28,296
Trip Length	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6
Haul Truck Annual One-	2	171.5	740.5	740.5	171.5	2	638	638
Trip Length	20	20	20	20	20	20	20	20
Days/Year	132	132	132	132	132	130	130	131

TRAVEL ON UNPAVED ROADS

Travel on Unpaved Surfaces

E [lb/VMT] = k*(s/12)^a * (W/3)^b

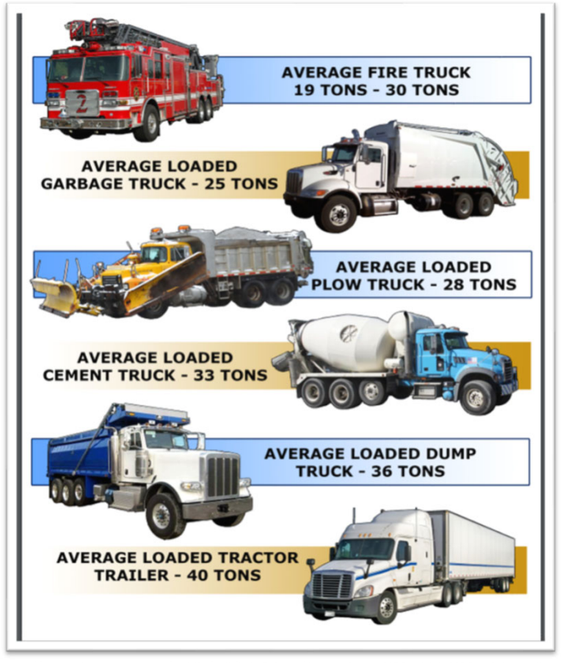
Where:
k = 1.5 for PM10 and 0.15 for PM2.5
a = 0.9 for both PM10 and PM2.5
b = 0.45 for both PM10 and PM2.5
s = surface material silt content (%)= 8.3
W = mean vehicle weight (tons) = 36
Calculation Methodology: USEPA AP-42, Unpaved Roads, Section 13.2.2, updated November 2006:
https://www.epa.gov/sites/production/files/2020-10/documents/13.2.2_unpaved_roads.pdf
Assumed control from watering= 75%
Unpaved Road Length 1612.3 meters 1.00 miles
Unpaved at Concrete Channel 242.7 meters 0.15 miles

Travel on Unpaved Surfaces

E [lb/VMT] = k*(s/12)^a * (W/3)^b

Area	Year	Pollutant	k	a	b	s	W	E (lb/VMT)	On-Site Round Trip VMT (Mi/Yr)	Emissions (ton/yr)	Controlled Emissions (ton/yr)	Emissions (lb/day)	Controlled Emissions (lb/day)
Concrete Channel Planting	2024	PM10	1.50	0.9	0.45	8.3	36	3.293	498.0	0.82	**0.20**	12.42	**3.11**
		PM2.5	0.15	0.9	0.45	8.3	36	0.329	498.0	0.08	**0.02**	1.24	**0.31**
Channel Widening[1]	2024	PM10	1.50	0.9	0.45	8.3	36	3.293	0	0	**0**	0	**0**
		PM2.5	0.15	0.9	0.45	8.3	36	0.329	0	0	**0**	0	**0**
Rock Pile Area[1]	2025	PM10	1.50	0.9	0.45	8.3	36	3.293	0	0	**0**	0	**0**
		PM2.5	0.15	0.9	0.45	8.3	36	0.329	0	0	**0**	0	**0**
Rock Pile Area[1]	2026	PM10	1.50	0.9	0.45	8.3	36	3.293	0	0	**0**	0	**0**
		PM2.5	0.15	0.9	0.45	8.3	36	0.329	0	0	**0**	0	**0**
Channel Widening[1]	2027	PM10	1.50	0.9	0.45	8.3	36	3.293	0	0	**0**	0	**0**
		PM2.5	0.15	0.9	0.45	8.3	36	0.329	0	0	**0**	0	**0**
Old Crusher[1]	2028	PM10	1.50	0.9	0.45	8.3	36	3.293	0	0	**0**	0	**0**
		PM2.5	0.15	0.9	0.45	8.3	36	0.329	0	0	**0**	0	**0**
Material Removal (Outside Subarea 4)	2028	PM10	1.50	0.9	0.45	8.3	36	3.293	28770.8	47.38	**11.84**	723.29	180.82
		PM2.5	0.15	0.9	0.45	8.3	36	0.329	28770.8	4.74	**1.18**	72.33	18.08
Material Removal (Outside Subarea 4)	2029	PM10	1.50	0.9	0.45	8.3	36	3.293	28987.2	47.73	**11.93**	728.73	182.18
		PM2.5	0.15	0.9	0.45	8.3	36	0.329	28987.2	4.77	**1.19**	72.87	18.22

[1]Road to Rock Pile, Channel Widening, and Old Crusher Area is paved



https://www.dot.state.pa.us/public/pdf/InfoBridge/Approximate%20vehicle%20weights.pdf

Re-entrained PAVED Road Dust Emissions By Activity/Year in Air Basin

		Concrete Channel			Channel Widening (Phase 1)			Rock Pile Area (Phase 1)			Rock Pile Area (Phase 2)			Channel Widening (Phase 2)			Old Crusher			Material Removal (Phase 1)			Material Removal (Phase 2)		
	Pollutant	Distance Traveled (Mi/Yr)	Emissions (ton/yr)	Emissions (lb/day)	Distance Traveled (Mi/Yr)	Emissions (ton/yr)	Emissions (lb/day)	Distance Traveled (Mi/Yr)	Emissions (ton/yr)	Emissions (lb/day)	Distance Traveled (Mi/Yr)	Emissions (ton/yr)	Emissions (lb/day)	Distance Traveled (Mi/Yr)	Emissions (ton/yr)	Emissions (lb/day)	Distance Traveled (Mi/Yr)	Emissions (ton/yr)	Emissions (lb/day)	Distance Traveled (Mi/Yr)	Emissions (ton/yr)	Emissions (lb/day)	Distance Traveled (Mi/Yr)	Emissions (ton/yr)	Emissions (lb/day)
Employee	PM10	11,405	0.58	8.78	17,107	0.87	13.17	22,810	1.16	17.56	22,810	1.16	17.56	17,107	0.87	13.17	11,232	0.57	8.78	22,464	1.14	17.56	22,637	1.15	17.56
Employee	PM2.5	11,405	0.09	1.32	17,107	0.13	1.98	22,810	0.17	2.63	22,810	0.17	2.63	17,107	0.13	1.98	11,232	0.09	1.32	22,464	0.17	2.63	22,637	0.17	2.63
Vendor Truck	PM10	21,780	1.11	16.77	188,179	9.56	144.91	188,179	9.56	144.91	188,179	9.56	144.91	188,179	9.56	144.91	21,450	1.09	16.77	185,328	9.42	144.91	186,754	9.49	144.91
Vendor Truck	PM2.5	21,780	0.17	2.52	188,179	1.43	21.74	188,179	1.43	21.74	188,179	1.43	21.74	188,179	1.43	21.74	21,450	0.16	2.52	185,328	1.41	21.74	186,754	1.42	21.74
Haul Truck	PM10	40	0.00	0.03	3,430	0.17	2.64	14,810	0.75	11.40	14,810	0.75	11.40	3,430	0.17	2.64	40	0.00	0.03	12,760	0.65	9.98	12,760	0.65	9.90
Haul Truck	PM2.5	40	0.00	0.00	3,430	0.03	0.40	14,810	0.11	1.71	14,810	0.11	1.71	3,430	0.03	0.40	40	0.00	0.00	12,760	0.10	1.50	12,760	0.10	1.49
	total PM10		1.689	25.585		10.608	160.725		11.476	173.879		11.476	173.879		10.608	160.725		1.663	25.586		11.209	172.452		11.291	172.376
	total PM2.5		0.253	3.838		1.591	22.133		1.721	23.447		1.721	23.447		1.591	22.133		0.249	2.520		1.681	23.233		1.694	23.222

Re-entrained PAVED Road Dust Emissions By Activity/Year On Site

		Concrete Channel			Channel Widening (Phase 1)			Rock Pile Area (Phase 1)			Rock Pile Area (Phase 2)			Channel Widening (Phase 2)			Old Crusher			Material Removal (Phase 1)			Material Removal (Phase 2)		
	Pollutant	Distance Traveled (Mi/Yr)	Emissions (ton/yr)	Emissions (lb/day)	Distance Traveled (Mi/Yr)	Emissions (ton/yr)	Emissions (lb/day)	Distance Traveled (Mi/Yr)	Emissions (ton/yr)	Emissions (lb/day)	Distance Traveled (Mi/Yr)	Emissions (ton/yr)	Emissions (lb/day)	Distance Traveled (Mi/Yr)	Emissions (ton/yr)	Emissions (lb/day)	Distance Traveled (Mi/Yr)	Emissions (ton/yr)	Emissions (lb/day)	Distance Traveled (Mi/Yr)	Emissions (ton/yr)	Emissions (lb/day)	Distance Traveled (Mi/Yr)	Emissions (ton/yr)	Emissions (lb/day)
Vendor Truck	PM10	1,642	0.08	1.26	46,763	2.38	36.01	46,763	2.38	36.01	46,763	2.38	36.01	46,763	2.38	36.01	5,330	0.27	4.17	46,054	2.34	36.01	46,409	2.36	36.01
Vendor Truck	PM2.5	1,642	0.01	0.19	46,763	0.36	5.40	46,763	0.36	5.40	46,763	0.36	5.40	46,763	0.36	5.40	5,330	0.04	0.63	46,054	0.35	5.40	46,409	0.35	5.40
Haul Truck	PM10	1	0.00	0.00	281	0.01	0.22	1,215	0.06	0.94	1,215	0.06	0.94	281	0.01	0.22	3	0.00	0.00	1,046	0.05	0.82	1,046	0.05	0.81
Haul Truck	PM2.5	1	0.00	0.00	3,430	0.03	0.40	1,215	0.01	0.14	1,215	0.01	0.14	281	0.00	0.03	3	0.00	0.00	1,046	0.01	0.12	1,046	0.01	0.12
	total PM10		0.084	1.265		2.391	36.227		2.438	36.946		2.438	36.946		2.391	36.227		0.271	4.170		2.394	36.829		2.412	36.822
	total PM2.5		0.013	0.190		0.383	5.798		0.366	5.542		0.366	5.542		0.359	5.434		0.041	0.626		0.359	5.524		0.362	5.523

Dozer Equipment Passes

EF_{PM10} [lb/VMT]= 0.052 * (S)^2.0 * F_{PM10}

$EF_{PM2.5}$ [lb/VMT] = 0.04 * (S)^2.5 * $F_{PM2.5}$

Where:

S = mean vehicle speed (mph) = 7.1 (AP-42 default)

$F_{PM2.5}$ = PM2.5 scaling factor = 0.031 (AP-42 default)

F_{PM10} = PM10 scaling factor = 0.6 (AP-42 default)

VMT/Day: 16

Calculation Methodology: USEPA AP-42, Section 11.9, Western Surface Coal Mining.

Assumed control efficiency from watering = 50%

Dust from Dozer Equipment

Area	Year	Pollutant	F	S	W_b	EF (lb/VMT)	No. of Grader Work Days	VMT	Emissions (lb/day)	Emissions (ton/yr)	Controlled Emissions (lb/day)	Controlled Emissions (ton/yr)
Concrete Channel Planting	2024	PM10	0.60	7.1	12.0	1.6	0.0	0	25.2	0.0	**12.58**	**0.00**
		PM2.5	0.031	7.1	12.0	0.2	0.0	0	2.7	0.0	**1.33**	**0.00**
Channel Widening	2024	PM10	0.60	7.1	12.0	1.6	13.0	208	25.2	0.2	**12.58**	**0.08**
		PM2.5	0.031	7.1	12.0	0.2	13.0	208	2.7	0.0	**1.33**	**0.01**
Rock Pile Area	2025	PM10	0.60	7.1	12.0	1.6	20.0	320	25.2	0.3	**12.58**	**0.13**
		PM2.5	0.031	7.1	12.0	0.2	20.0	320	2.7	0.0	**1.33**	**0.01**
Rock Pile Area	2026	PM10	0.60	7.1	12.0	1.6	20.0	320	25.2	0.3	**12.58**	**0.13**
		PM2.5	0.031	7.1	12.0	0.2	20.0	320	2.7	0.0	**1.33**	**0.01**
Channel Widening	2027	PM10	0.60	7.1	12.0	1.6	78.0	1248	25.2	1.0	**12.58**	**0.49**
		PM2.5	0.031	7.1	12.0	0.2	78.0	1248	2.7	0.1	**1.33**	**0.05**
Old Crusher	2028	PM10	0.60	7.1	12.0	1.6	0.0	0	25.2	0.0	**12.58**	**0.00**
		PM2.5	0.031	7.1	12.0	0.2	0.0	0	2.7	0.0	**1.33**	**0.00**
Material Removal	2028	PM10	0.60	7.1	12.0	1.6	20.0	320	25.2	0.3	**12.58**	**0.13**
		PM2.5	0.031	7.1	12.0	0.2	20.0	320	2.7	0.0	**1.33**	**0.01**
Material Removal	2029	PM10	0.60	7.1	12.0	1.6	20.0	320	25.2	0.3	**12.58**	**0.13**
		PM2.5	0.031	7.1	12.0	0.2	20.0	320	2.7	0.0	**1.33**	**0.01**

	Channel Planting	Channel Widening	Rock Pile Area	Rock Pile Area	Channel Widening	Old Crusher	Material Removal	Material Removal
Employee Annual One-Way Trips	1,056	1,584	2,112	2,112	1,584	1,040	2,080	2,096
Trip Length	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8
Vendor Annual One-Way Trips	3,300	28,512	28,512	28,512	28,512	3,250	28,080	28,296
Trip Length	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6
Haul Truck Annual One-Way Trips	2	171.5	740.5	740.5	171.5	2	638	638
Trip Length	20	20	20	20	20	20	20	20

DUST FROM MATERIAL MOVEMENT

Truck Loading

E [lb/ton] = k * 0.0032 * { [(U/5)^1.3] / (M/2)^1.4] }

Where:

E = particulate emission factor, lb/ton

k = particle size multiplier, PM10 0.35 PM2.5 = 0.053

U = mean wind speed = 4.9 mi/hr (2.2 m/s from CalEEMod App. D, converted to mi/hr)

M = material moisture content, 12 %, CalEEMod Appendix A pg. 11, ref: Table 13.2.2-1, Stone quarrying and processing, haul road to/from the pit

Calculation Methodology: USEPA AP-42, drop operation, page 13.2. ref:https://www.dot.state.pa.us/public/pdf/InfoBridge/Approximate%20vehicle%20weights.pdf 13.2.4_aggregate_handling_and_storage_piles.pdf.

Tons per cubic yard of dirt = 1.5

Source: https://www.soildirect.com/calculator/cubic-yard-calculator/#:~:text=As%20a%20general%20guide%2C%201,is%20equivalent%20to%201.5%20tons.

Total clean material brought to site = 27,099 cu. Yds.

Material transferred at pick-up and drop-off = 54,198 cu. Yds.

NOT IN HRA

Truck Loading

E [lb/ton] = k * 0.0032 * { [(U/5)^1.3] / (M/2)^1.4] }

	Pollutant	Variables k	U	M	E (lb/ton)	Amount Loaded (cu. Yds)	Amount Loaded (tons)	Emissions tons/yr	Emissions lb/day
Concrete Channel Planting	PM10	0.35	4.9	12.0	0.00009	35	52	0.0000	0.0000
	PM2.5	0.053	4.9	12.0	0.00001	35	52	0.0000	0.0000
Channel Widening	PM10	0.35	4.9	12.0	0.00009	2,995	4,492	0.0002	0.0030
	PM2.5	0.053	4.9	12.0	0.00001	2,995	4,492	0.0000	0.0005
Rock Pile Area	PM10	0.35	4.9	12.0	0.00009	12,930	19,394	0.0009	0.0130
	PM2.5	0.053	4.9	12.0	0.00001	12,930	19,394	0.0001	0.0020
Rock Pile Area	PM10	0.35	4.9	12.0	0.00009	12,930	19,394	0.0009	0.0130
	PM2.5	0.053	4.9	12.0	0.00001	12,930	19,394	0.0001	0.0020
Channel Widening	PM10	0.35	4.9	12.0	0.00009	2,995	4,492	0.0002	0.0030
	PM2.5	0.053	4.9	12.0	0.00001	2,995	4,492	0.0000	0.0005
Old Crusher	PM10	0.35	4.9	12.0	0.00009	35	52	0.0000	0.0000
	PM2.5	0.053	4.9	12.0	0.00001	35	52	0.0000	0.0000
Material Removal	PM10	0.35	4.9	12.0	0.00009	11,140	16,710	0.0007	0.0114
	PM2.5	0.053	4.9	12.0	0.00001	11,140	16,710	0.0001	0.0017
	PM10	0.35	4.9	12.0	0.00009	11,140	16,710	0.0007	0.0113

13.2.4.3 Predictive Emission Factor Equations

Total dust emissions from aggregate storage piles result from several distinct source activities within the storage cycle:

1. Loading of aggregate onto storage piles (batch or continuous drop operations).
2. Equipment traffic in storage area.
3. Wind erosion of pile surfaces and ground areas around piles.
4. Loadout of aggregate for shipment or for return to the process stream (batch or continuous drop operations).

Either adding aggregate material to a storage pile or removing it usually involves dropping the material onto a receiving surface. Truck dumping on the pile or loading out from the pile to a truck with a front-end loader are examples of batch drop operations. Adding material to the pile by a conveyor stacker is an example of a continuous drop operation.

(1)

$$E = k(0.0032)\ \frac{\left(\frac{U}{5}\right)^{1.3}}{\left(\frac{M}{2}\right)^{1.4}}\ \text{(pound [lb]/ton)}$$

where:

E = emission factor
k = particle size multiplier (dimensionless)
U = mean wind speed, meters per second (m/s) (miles per hour [mph])
M = material moisture content (%)

The particle size multiplier in the equation, k, varies with aerodynamic particle size range, as follows:

Aerodynamic Particle Size Multiplier (k) For Equation 1				
< 30 µm	< 15 µm	< 10 µm	< 5 µm	< 2.5 µm
0.74	0.48	0.35	0.20	0.053[a]

[a] Multiplier for < 2.5 µm taken from Reference 14.

The equation retains the assigned quality rating if applied within the ranges of source conditions that were tested in developing the equation, as follows. Note that silt content is included, even though silt content does not appear as a correction parameter in the equation. While it is reasonable to expect that silt content and emission factors are interrelated, no significant correlation between the 2 was found during the derivation of the equation, probably because most tests with high silt contents were conducted under lower winds, and vice versa. It is recommended that estimates from the equation be reduced 1 quality rating level if the silt content used in a particular application falls outside the range given:

Ranges Of Source Conditions For Equation 1			
Silt Content (%)	Moisture Content (%)	Wind Speed	
		m/s	mph
0.44 - 19	0.25 - 4.8	0.6 - 6.7	1.3 - 15

To retain the quality rating of the equation when it is applied to a specific facility, reliable correction parameters must be determined for specific sources of interest. The field and laboratory procedures for aggregate sampling are given in Reference 3. In the event that site-specific values for

Material Removal	PM2.5	0.053	4.9	12.0	0.00001	11,140	16,710	0.0001	0.0017

GHG Emissions Summary

Maximum Annual GHG Emissions for SEIR (metric tons/year)

Scenario	CO2	CH4	N2O	CO2e
Maximum Annual Incremental Change for Reclamation Plan Amendment Disclosed in 2012 EIR	1,060	0	0	1,100
PCRP Amortized Emissions not Evaluated in the 2012 EIR	87.94	0.02	0.01	90.14
Maximum Annual Incremental Change	1,148	0	0	1,190
BAAQMD Threshold				1,100
Significant Impact (Yes or No)?				Yes

Emissions Summary for SEIR - Metric Tons/Phase-Year

Phase (Year)	% Covered in SEIR	CO2	CH4	N2O	CO2e
Concrete Channel (2024)	100%	24.62	0.00	0.00	25.61
Channel Widening - Phase 1 (2024)	89%	267.63	0.03	0.03	276.01
Rock Pile Area - Phase 1 (2025)	89%	500.65	0.10	0.03	511.62
Rock Pile Area - Phase 2 (2026)	89%	499.18	0.10	0.03	510.09
Channel Widening - Phase 2 (2027)	89%	264.28	0.03	0.02	272.50
Old Crusher (2028)	0%	0.00	0.00	0.00	0.00
Material Removal - Phase 1 (2028)	20%	101.21	0.02	0.01	103.51
Material Removal - Phase 2 (2029)	20%	101.25	0.02	0.01	103.55
Total		1758.82	0.32	0.12	1802.89
Amortized (20 years)		87.94	0.02	0.01	90.14

Total Emissions Summary - Metric Tons/Phase-Year

Phase (Year)	CO2	CH4	N2O	CO2e
Concrete Channel (2024)	24.62	0.00	0.00	25.61
Channel Widening - Phase 1 (2024)	300.17	0.04	0.03	309.57
Rock Pile Area - Phase 1 (2025)	561.51	0.12	0.03	573.83
Rock Pile Area - Phase 2 (2026)	559.87	0.12	0.03	572.11
Channel Widening - Phase 2 (2027)	296.41	0.04	0.03	305.63
Old Crusher (2028)	24.03	0.00	0.00	24.97
Material Removal - Phase 1 (2028)	503.71	0.10	0.03	515.12
Material Removal - Phase 2 (2029)	503.90	0.10	0.03	515.32

Concrete Channel (2024 metric tons)

Source	CO2	CH4	N2O	CO2e
Off-road Equipment Exhaust	0.89	0.00	0.00	0.89
On-road Vehicles	23.73	0.00	0.00	24.72
Total	24.62	0.00	0.00	25.61

Channel Widening - Phase 1 (2024 metric tons)

Source	CO2	CH4	N2O	CO2e
Off-road Equipment Exhaust	116.45	0.04	0.00	117.39
On-road Vehicles	183.72	0.00	0.03	192.18
Total	300.17	0.04	0.03	309.57

Rock Pile Area - Phase 1 (2025 metric tons)

Source	CO2	CH4	N2O	CO2e
Off-road Equipment Exhaust	355.57	0.12	0.00	358.45
On-road Vehicles	205.94	0.00	0.03	215.38
Total	561.51	0.12	0.03	573.83

GHG Emissions Summary

Rock Pile Area - Phase 2 (2026 metric tons)

Source	CO2	CH4	N2O	CO2e
Off-road Equipment Exhaust	355.57	0.12	0.00	358.45
On-road Vehicles	204.30	0.00	0.03	213.66
Total	559.87	0.12	0.03	572.11

Channel Widening - Phase 2 (2027 metric tons)

Source	CO2	CH4	N2O	CO2e
Off-road Equipment Exhaust	116.42	0.04	0.00	117.36
On-road Vehicles	179.98	0.00	0.03	188.26
Total	296.41	0.04	0.03	305.63

Old Crusher (2028 metric tons)

Source	CO2	CH4	N2O	CO2e
Off-road Equipment Exhaust	1.38	0.00	0.00	1.38
On-road Vehicles	22.65	0.00	0.00	23.59
Total	24.03	0.00	0.00	24.97

Materal Removal Area - Phase 1 (2028 metric tons)

Source	CO2	CH4	N2O	CO2e
Off-road Equipment Exhaust	308.85	0.10	0.00	311.35
On-road Vehicles	194.86	0.00	0.03	203.78
Total	503.71	0.10	0.03	515.12

Material Removal Area - Phase 2 (2029 metric tons)

Source	CO2	CH4	N2O	CO2e
Off-road Equipment Exhaust	309.09	0.10	0.00	311.59
On-road Vehicles	194.82	0.00	0.03	203.73
Total	503.90	0.10	0.03	515.32

Permanente Creek Restoration Project - EMFAC2021 GHG Emissions Calculations for *Off-Site Exhaust Emissions*

Accounts for trucks and passenger vehicles driving to and from the site

Emissions Summary

Tons Per Year

Construction Phase(s)	Year	CO2	CH4	N2O	CO2e
Concrete Channel	2024	23.73	0.00	0.00	24.72
Channel Widening (Phase 1)	2024	183.72	0.00	0.03	192.18
Rock Pile Area (Phase 1)	2025	205.94	0.00	0.03	215.38
Rock Pile Area (Phase 2)	2026	204.30	0.00	0.03	213.66
Channel Widening (Phase 2)	2027	179.98	0.00	0.03	188.26
Old Crusher Foundation	2028	22.65	0.00	0.00	23.59
Material Removal Area (Phase 1)	2028	194.86	0.00	0.03	203.78
Material Removal Area (Phase 2)	2029	194.82	0.00	0.03	203.73

Background Information

Conversions

Metric Ton	Pounds	Grams
1	2,205	0

Annual Work Days	Year
132	2024
132	2025
132	2026
132	2027
130	2028
131	2029

Global Warming Potential Factors

CO2	CH4	N2O
1	25	298

One-Way Trip Info

	Concrete Channel	Channel Widening (Phase 1)	Channel Widening (Phase 2)	Rock Pile Area (Phase 1)	Rock Pile Area (Phase 2)	Old Crusher	Material Removal (Phase 1)	Material Removal (Phase 2)
Employee Trips								
Daily One-Way Trips	8	12	12	16	16	8	16	16
Annual One-Way Trips	1,056	1,584	1,584	2,112	2,112	1,040	2,080	2,096
Trip Length	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8
Vendor Truck Trips								
Daily One-Way Trips	25	216	216	216	216	25	216	216
Annual One-Way Trips	3,300	28,512	28,512	28,512	28,512	3,250	28,080	28,296
Trip Length	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6
Haul Truck Trips								
Annual One-Way Trips	2	171.5	171.5	740.5	740.5	2	638	638
Trip Length	20	20	20	20	20	20	20	20

EMFAC2021 Output for 2024

Region	Calendar Year	Vehicle Category	Model Year	Speed	Fuel	CO2_RUNEX	CO2_IDLEX	CO2_STREX	CH4_RUNEX	CH4_IDLEX	CH4_STREX	N2O_RUNEX	N2O_IDLEX	N2O_STREX
Santa Clara	2024	HHDT	Aggregate	Aggregate	Diesel	1634.10047	11997.01133	0.00000	0.00078	0.23663	0.00000	0.25745	1.89013	0.00000
Santa Clara	2024	LDT1	Aggregate	Aggregate	Gasoline	327.25709	0.00000	86.38434	0.00626	0.00000	0.10537	0.00942	0.00000	0.03869
Santa Clara	2024	LHDT1	Aggregate	Aggregate	Diesel	631.40078	131.15033	0.00000	0.00801	0.00510	0.00000	0.09948	0.02066	0.00000
Santa Clara	2024	LHDT2	Aggregate	Aggregate	Diesel	756.86825	209.56182	0.00000	0.00741	0.00510	0.00000	0.11924	0.03302	0.00000
Santa Clara	2024	MHDT	Aggregate	Aggregate	Diesel	1147.30919	2248.54716	0.00000	0.00151	0.01158	0.00000	0.18076	0.35426	0.00000
		HDT Mix				845.19274	863.08644	0.00000	0.00564	0.00726	0.00000	0.13316	0.13598	0.00000

Permanente Creek Restoration Project - EMFAC2021 GHG Emissions Calculations for *Off-Site Exhaust Emissions*

Accounts for trucks and passenger vehicles driving to and from the site

Emissions Calcs for Concrete Channel

							Metric Tons per Year			Metric Tons per Year			Metric Tons per Year		
Metric Tons/Year	g/MT	1,000,000					CO2	CO2	CO2	CH4	CH4	CH4	N2O	N2O	N2O
				g/mi	g/trip	g/vehicle/day	g/mi	g/vehicle/day	g/trip	g/mi	g/vehicle/day	g/trip	g/mi	g/vehicle/day	g/trip
Row Index No.		Trips	mi/trip	tot mi	tot trip	tot veh	CO2_RUNEX	CO2_IDLEX	CO2_STREX	CH4_RUNEX	CH4_IDLEX	CH4_STREX	N2O_RUNEX	N2O_IDLEX	N2O_STREX
3	HHDT	2	20	40	2	1	0.06536	0.01200	0.00000	0.00000	0.00000	0.00000	0.00001	0.00000	0.00000
4	LDT1	1,056	10.8	11,405	1,056	528	3.73230	0.00000	0.09122	0.00007	0.00000	0.00011	0.00011	0.00000	0.00004
5	HDT Mix	3,300	6.6	21,780	3,300	1,650	18.40830	1.42409	0.00000	0.00012	0.00001	0.00000	0.00290	0.00022	0.00000

Off-Site Exhaust Emissions for Concrete Channel

Metric Tons/Year	CO2	CH4	N2O	CO2e
HHDT	0.0774	0.0000	0.0000	0.0810
LDT1	3.8235	0.0002	0.0001	3.8723
HDT Mix	19.8324	0.0001	0.0031	20.7669
Total	23.7333	0.0003	0.0033	24.7202

Emissions Calcs for Channel Widening (Phase 1)

							Metric Tons per Year			Metric Tons per Year			Metric Tons per Year		
Metric Tons/Year	g/MT	1,000,000					CO2	CO2	CO2	CH4	CH4	CH4	N2O	N2O	N2O
				g/mi	g/trip	g/vehicle/day	g/mi	g/vehicle/day	g/trip	g/mi	g/vehicle/day	g/trip	g/mi	g/vehicle/day	g/trip
Row Index No.		Trips	mi/trip	tot mi	tot trip	tot veh	CO2_RUNEX	CO2_IDLEX	CO2_STREX	CH4_RUNEX	CH4_IDLEX	CH4_STREX	N2O_RUNEX	N2O_IDLEX	N2O_STREX
3	HHDT	172	20	3,430	172	86	5.60496	1.02874	0.00000	0.00000	0.00002	0.00000	0.00088	0.00016	0.00000
4	LDT1	1,584	10.8	17,107	1,584	792	5.59845	0.00000	0.13683	0.00011	0.00000	0.00017	0.00016	0.00000	0.00006
5	HDT Mix	28,512	6.6	188,179	28,512	14,256	159.04769	12.30416	0.00000	0.00106	0.00010	0.00000	0.02506	0.00194	0.00000

Off-Site Exhaust Emissions for Channel Widening (Phase 1)

Metric Tons/Year	CO2	CH4	N2O	CO2e
HHDT	6.6337	0.0000	0.0010	6.9457
LDT1	5.7353	0.0003	0.0002	5.8084
HDT Mix	171.3519	0.0012	0.0270	179.4259
Total	183.7208	0.0015	0.0283	192.1801

EMFAC2021 Output for 2025

Region	Calendar Year	Vehicle Category	Model Year	Speed	Fuel	CO2_RUNEX	CO2_IDLEX	CO2_STREX	CH4_RUNEX	CH4_IDLEX	CH4_STREX	N2O_RUNEX	N2O_IDLEX	N2O_STREX
Santa Clara	2025	HHDT	Aggregate	Aggregate	Diesel	1608.77639	11755.33723	0.00000	0.00075	0.23589	0.00000	0.25346	1.85206	0.00000
Santa Clara	2025	LDT1	Aggregate	Aggregate	Gasoline	321.48897	0.00000	84.45547	0.00562	0.00000	0.09855	0.00869	0.00000	0.03751
Santa Clara	2025	LHDT1	Aggregate	Aggregate	Diesel	628.07000	129.54724	0.00000	0.00747	0.00510	0.00000	0.09895	0.02041	0.00000
Santa Clara	2025	LHDT2	Aggregate	Aggregate	Diesel	750.35710	207.23965	0.00000	0.00704	0.00510	0.00000	0.11822	0.03265	0.00000
Santa Clara	2025	MHDT	Aggregate	Aggregate	Diesel	1141.32802	2229.37376	0.00000	0.00131	0.01096	0.00000	0.17982	0.35124	0.00000
		HDT Mix				839.91837	855.38688	0.00000	0.00527	0.00705	0.00000	0.13233	0.13477	0.00000

Emissions Calcs for Rock Pile Area (Phase 1)

							Metric Tons per Year			Metric Tons per Year			Metric Tons per Year		
Metric Tons/Year	g/MT	1,000,000					CO2	CO2	CO2	CH4	CH4	CH4	N2O	N2O	N2O
				g/mi	g/trip	g/vehicle/day	g/mi	g/vehicle/day	g/trip	g/mi	g/vehicle/day	g/trip	g/mi	g/vehicle/day	g/trip
Row Index No.		Trips	mi/trip	tot mi	tot trip	tot veh	CO2_RUNEX	CO2_IDLEX	CO2_STREX	CH4_RUNEX	CH4_IDLEX	CH4_STREX	N2O_RUNEX	N2O_IDLEX	N2O_STREX
3	HHDT	741	20	14,810	741	370	23.82598	4.35241	0.00000	0.00001	0.00009	0.00000	0.00375	0.00069	0.00000
4	LDT1	2,112	10.8	22,810	2,112	1,056	7.33303	0.00000	0.17837	0.00013	0.00000	0.00021	0.00020	0.00000	0.00008
5	HDT Mix	28,512	6.6	188,179	28,512	14,256	158.05517	12.19440	0.00000	0.00099	0.00010	0.00000	0.02490	0.00192	0.00000

Permanente Creek Restoration Project - EMFAC2021 GHG Emissions Calculations for *Off-Site Exhaust Emissions*

Accounts for trucks and passenger vehicles driving to and from the site

Off-Site Exhaust Emissions for Rock Pile Area (Phase 1)

Metric Tons/Year	CO2	CH4	N2O	CO2e
HHDT	28.1784	0.0001	0.0044	29.5038
LDT1	7.5114	0.0003	0.0003	7.6025
HDT Mix	170.2496	0.0011	0.0268	178.2701
Total	205.9394	0.0015	0.0315	215.3764

EMFAC2021 Output for 2026

Region	Calendar Year	Vehicle Category	Model Year	Speed	Fuel	CO2_RUNEX	CO2_IDLEX	CO2_STREX	CH4_RUNEX	CH4_IDLEX	CH4_STREX	N2O_RUNEX	N2O_IDLEX	N2O_STREX
Santa Clara	2026	HHDT	Aggregate	Aggregate	Diesel	1583.15114	11526.41341	0.00000	0.00072	0.23528	0.00000	0.24943	1.81599	0.00000
Santa Clara	2026	LDT1	Aggregate	Aggregate	Gasoline	315.79255	0.00000	82.57769	0.00506	0.00000	0.09224	0.00804	0.00000	0.03641
Santa Clara	2026	LHDT1	Aggregate	Aggregate	Diesel	625.22799	128.06640	0.00000	0.00699	0.00510	0.00000	0.09850	0.02018	0.00000
Santa Clara	2026	LHDT2	Aggregate	Aggregate	Diesel	744.68422	205.11327	0.00000	0.00672	0.00510	0.00000	0.11733	0.03232	0.00000
Santa Clara	2026	MHDT	Aggregate	Aggregate	Diesel	1134.95201	2210.32904	0.00000	0.00113	0.01042	0.00000	0.17881	0.34824	0.00000
		HDT Mix				834.95474	847.83623	0.00000	0.00495	0.00687	0.00000	0.13155	0.13358	0.00000

Emissions Calcs for Rock Pile Area (Phase 2)

							Metric Tons per Year			Metric Tons per Year			Metric Tons per Year		
Metric Tons/Year	g/MT	1,000,000					CO2	CO2	CO2	CH4	CH4	CH4	N2O	N2O	N2O
				g/mi	g/trip	g/vehicle/day	g/mi	g/vehicle/day	g/trip	g/mi	g/vehicle/day	g/trip	g/mi	g/vehicle/day	g/trip
Row Index No.		Trips	mi/trip	tot mi	tot trip	tot veh	CO2_RUNEX	CO2_IDLEX	CO2_STREX	CH4_RUNEX	CH4_IDLEX	CH4_STREX	N2O_RUNEX	N2O_IDLEX	N2O_STREX
3	HHDT	741	20	14,810	741	370	23.44647	4.26765	0.00000	0.00001	0.00009	0.00000	0.00369	0.00067	0.00000
4	LDT1	2,112	10.8	22,810	2,112	1,056	7.20310	0.00000	0.17440	0.00012	0.00000	0.00019	0.00018	0.00000	0.00008
5	HDT Mix	28,512	6.6	188,179	28,512	14,256	157.12111	12.08675	0.00000	0.00093	0.00010	0.00000	0.02475	0.00190	0.00000

Off-Site Exhaust Emissions for Rock Pile Area (Phase 2)

Metric Tons/Year	CO2	CH4	N2O	CO2e
HHDT	27.7141	0.0001	0.0044	29.0177
LDT1	7.3775	0.0003	0.0003	7.4628
HDT Mix	169.2079	0.0010	0.0267	177.1779
Total	204.2995	0.0014	0.0313	213.6585

EMFAC2021 Output for 2027

Region	Calendar Year	Vehicle Category	Model Year	Speed	Fuel	CO2_RUNEX	CO2_IDLEX	CO2_STREX	CH4_RUNEX	CH4_IDLEX	CH4_STREX	N2O_RUNEX	N2O_IDLEX	N2O_STREX
Santa Clara	2027	HHDT	Aggregate	Aggregate	Diesel	1556.12285	11312.43773	0.00000	0.00070	0.23488	0.00000	0.24517	1.78228	0.00000
Santa Clara	2027	LDT1	Aggregate	Aggregate	Gasoline	310.25293	0.00000	80.77512	0.00455	0.00000	0.08645	0.00745	0.00000	0.03541
Santa Clara	2027	LHDT1	Aggregate	Aggregate	Diesel	622.79522	126.72063	0.00000	0.00659	0.00510	0.00000	0.09812	0.01996	0.00000
Santa Clara	2027	LHDT2	Aggregate	Aggregate	Diesel	739.76861	203.20660	0.00000	0.00644	0.00510	0.00000	0.11655	0.03202	0.00000
Santa Clara	2027	MHDT	Aggregate	Aggregate	Diesel	1128.56265	2191.46242	0.00000	0.00099	0.00999	0.00000	0.17781	0.34527	0.00000
		HDT Mix				830.37550	840.46321	0.00000	0.00467	0.00673	0.00000	0.13083	0.13242	0.00000

Emissions Calcs for Channel Widening (Phase 2)

							Metric Tons per Year			Metric Tons per Year			Metric Tons per Year		
Metric Tons/Year	g/MT	1,000,000					CO2	CO2	CO2	CH4	CH4	CH4	N2O	N2O	N2O
				g/mi	g/trip	g/vehicle/day	g/mi	g/vehicle/day	g/trip	g/mi	g/vehicle/day	g/trip	g/mi	g/vehicle/day	g/trip
Row Index No.		Trips	mi/trip	tot mi	tot trip	tot veh	CO2_RUNEX	CO2_IDLEX	CO2_STREX	CH4_RUNEX	CH4_IDLEX	CH4_STREX	N2O_RUNEX	N2O_IDLEX	N2O_STREX
3	HHDT	172	20	3,430	172	86	5.33750	0.97004	0.00000	0.00000	0.00002	0.00000	0.00084	0.00015	0.00000
4	LDT1	1,584	10.8	17,107	1,584	792	5.30756	0.00000	0.12795	0.00008	0.00000	0.00014	0.00013	0.00000	0.00006
5	HDT Mix	28,512	6.6	188,179	28,512	14,256	156.25940	11.98164	0.00000	0.00088	0.00010	0.00000	0.02462	0.00189	0.00000

Off-Site Exhaust Emissions for Channel Widening (Phase 2)

Permanente Creek Restoration Project - EMFAC2021 GHG Emissions Calculations for *Off-Site Exhaust Emissions*

Accounts for trucks and passenger vehicles driving to and from the site

Metric Tons/Year	CO2	CH4	N2O	CO2e
HHDT	6.3075	0.0000	0.0010	6.6042
LDT1	5.4355	0.0002	0.0002	5.4956
HDT Mix	168.2410	0.0010	0.0265	176.1643
Total	179.9841	0.0012	0.0277	188.2642

EMFAC2021 Output for 2028

Region	Calendar Year	Vehicle Category	Model Year	Speed	Fuel	CO2_RUNEX	CO2_IDLEX	CO2_STREX	CH4_RUNEX	CH4_IDLEX	CH4_STREX	N2O_RUNEX	N2O_IDLEX	N2O_STREX
Santa Clara	2028	HHDT	Aggregate	Aggregate	Diesel	1527.99982	11109.89941	0.00000	0.00068	0.23470	0.00000	0.24074	1.75037	0.00000
Santa Clara	2028	LDT1	Aggregate	Aggregate	Gasoline	304.98057	0.00000	79.07292	0.00411	0.00000	0.08117	0.00693	0.00000	0.03448
Santa Clara	2028	LHDT1	Aggregate	Aggregate	Diesel	620.69309	125.50144	0.00000	0.00623	0.00510	0.00000	0.09779	0.01977	0.00000
Santa Clara	2028	LHDT2	Aggregate	Aggregate	Diesel	735.49806	201.50966	0.00000	0.00621	0.00510	0.00000	0.11588	0.03175	0.00000
Santa Clara	2028	MHDT	Aggregate	Aggregate	Diesel	1122.13522	2173.47316	0.00000	0.00086	0.00964	0.00000	0.17679	0.34243	0.00000
		HDT Mix				826.10879	833.49475	0.00000	0.00444	0.00661	0.00000	0.13015	0.13132	0.00000

Emissions Calcs for Material Removal Area (Phase 1)

							Metric Tons per Year			Metric Tons per Year			Metric Tons per Year		
Metric Tons/Year	g/MT	1,000,000					CO2	CO2	CO2	CH4	CH4	CH4	N2O	N2O	N2O
				g/mi	g/trip	g/vehicle/day	g/mi	g/vehicle/day	g/trip	g/mi	g/vehicle/day	g/trip	g/mi	g/vehicle/day	g/trip
Row Index No.		Trips	mi/trip	tot mi	tot trip	tot veh	CO2_RUNEX	CO2_IDLEX	CO2_STREX	CH4_RUNEX	CH4_IDLEX	CH4_STREX	N2O_RUNEX	N2O_IDLEX	N2O_STREX
3	HHDT	638	20.0	12,760	638	319	19.49728	3.54406	0.00000	0.00001	0.00007	0.00000	0.00307	0.00056	0.00000
4	LDT1	2,080	10.8	22,464	2,080	1,040	6.85108	0.00000	0.16447	0.00009	0.00000	0.00017	0.00016	0.00000	0.00007
5	HDT Mix	28,080	6.6	185,328	28,080	14,040	153.10109	11.70227	0.00000	0.00082	0.00009	0.00000	0.02412	0.00184	0.00000

Off-Site Exhaust Emissions Material Removal Area (Phase 1)

Metric Tons/Year	CO2	CH4	N2O	CO2e
HHDT	23.0413	0.0001	0.0036	24.1252
LDT1	7.0156	0.0003	0.0002	7.0898
HDT Mix	164.8034	0.0009	0.0260	172.5638
Total	194.8602	0.0013	0.0298	203.7788

Emissions Calcs for Old Crusher

							Metric Tons per Year			Metric Tons per Year			Metric Tons per Year		
Metric Tons/Year	g/MT	1,000,000					CO2	CO2	CO2	CH4	CH4	CH4	N2O	N2O	N2O
				g/mi	g/trip	g/vehicle/day	g/mi	g/vehicle/day	g/trip	g/mi	g/vehicle/day	g/trip	g/mi	g/vehicle/day	g/trip
Row Index No.		Trips	mi/trip	tot mi	tot trip	tot veh	CO2_RUNEX	CO2_IDLEX	CO2_STREX	CH4_RUNEX	CH4_IDLEX	CH4_STREX	N2O_RUNEX	N2O_IDLEX	N2O_STREX
3	HHDT	2	20	40	2	1	0.06112	0.01111	0.00000	0.00000	0.00000	0.00000	0.00001	0.00000	0.00000
4	LDT1	1,040	10.8	11,232	1,040	520	3.42554	0.00000	0.08224	0.00005	0.00000	0.00008	0.00008	0.00000	0.00004
5	HDT Mix	3,250	6.6	21,450	3,250	1,625	17.72003	1.35443	0.00000	0.00010	0.00001	0.00000	0.00279	0.00021	0.00000

Off-Site Exhaust Emissions for Old Crusher

Metric Tons/Year	CO2	CH4	N2O	CO2e
HHDT	0.0722	0.0000	0.0000	0.0756
LDT1	3.5078	0.0001	0.0001	3.5449
HDT Mix	19.0745	0.0001	0.0030	19.9727
Total	22.6545	0.0002	0.0031	23.5932

Permanente Creek Restoration Project - EMFAC2021 GHG Emissions Calculations for *Off-Site Exhaust Emissions*

Accounts for trucks and passenger vehicles driving to and from the site

EMFAC2021 Output for 2029

Region	Calendar Year	Vehicle Category	Model Year	Speed	Fuel	CO2_RUNEX	CO2_IDLEX	CO2_STREX	CH4_RUNEX	CH4_IDLEX	CH4_STREX	N2O_RUNEX	N2O_IDLEX	N2O_STREX
Santa Clara	2029	HHDT	Aggregate	Aggregate	Diesel	1500.67840	10929.24419	0.00000	0.00066	0.23479	0.00000	0.23643	1.72191	0.00000
Santa Clara	2029	LDT1	Aggregate	Aggregate	Gasoline	299.95366	0.00000	77.43555	0.00370	0.00000	0.07622	0.00644	0.00000	0.03362
Santa Clara	2029	LHDT1	Aggregate	Aggregate	Diesel	618.85111	124.39819	0.00000	0.00593	0.00510	0.00000	0.09750	0.01960	0.00000
Santa Clara	2029	LHDT2	Aggregate	Aggregate	Diesel	731.73671	200.00244	0.00000	0.00601	0.00510	0.00000	0.11529	0.03151	0.00000
Santa Clara	2029	MHDT	Aggregate	Aggregate	Diesel	1115.70279	2156.34660	0.00000	0.00077	0.00936	0.00000	0.17578	0.33973	0.00000
		HDT Mix				822.09687	826.91574	0.00000	0.00424	0.00652	0.00000	0.12952	0.13028	0.00000

Emissions Calcs for Material Removal Area (Phase 2)

							Metric Tons per Year			Metric Tons per Year			Metric Tons per Year		
Metric Tons/Year	g/MT	1,000,000					CO2	CO2	CO2	CH4	CH4	CH4	N2O	N2O	N2O
				g/mi	g/trip	g/vehicle/day	g/mi	g/vehicle/day	g/trip	g/mi	g/vehicle/day	g/trip	g/mi	g/vehicle/day	g/trip
Row Index No.		Trips	mi/trip	tot mi	tot trip	tot veh	CO2_RUNEX	CO2_IDLEX	CO2_STREX	CH4_RUNEX	CH4_IDLEX	CH4_STREX	N2O_RUNEX	N2O_IDLEX	N2O_STREX
3	HHDT	638	20	12,760	638	319	19.14866	3.48643	0.00000	0.00001	0.00007	0.00000	0.00302	0.00055	0.00000
4	LDT1	2,096	10.8	22,637	2,096	1,048	6.78999	0.00000	0.16230	0.00008	0.00000	0.00016	0.00015	0.00000	0.00007
5	HDT Mix	28,296	6.6	186,754	28,296	14,148	153.52955	11.69920	0.00000	0.00079	0.00009	0.00000	0.02419	0.00184	0.00000

Off-Site Exhaust Emissions Material Removal Area (Phase 2)

Metric Tons/Year	CO2	CH4	N2O	CO2e
HHDT	22.6351	0.0001	0.0036	23.6999
LDT1	6.9523	0.0002	0.0002	7.0228
HDT Mix	165.2288	0.0009	0.0260	173.0083
Total	194.8161	0.0012	0.0298	203.7310

A-2 CalEEMod Output Files

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Permanente Creek Restoration Project

Santa Clara County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
User Defined Recreational	1.00	User Defined Unit	0.00	0.00	0

1.2 Other Project Characteristics

Urbanization	Rural	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	58
Climate Zone	4			**Operational Year**	2027
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - Project information

Land Use - Placeholder land use. There will be no operational phase of the project, and construction data is custom to the Project.

Construction Phase - Obtained revised schedule from Lehigh on 1/24/23 - Construction Assumptions Attachment. Using the Applicant-provided schedule, some of the modeled workdays are 1 to 2 days more per phase than workdays provided by Applicant.

Off-road Equipment - Applicant-provided equipment list.

Off-road Equipment - Based on 1/24/23 Applicant provided data.

Off-road Equipment - Based on 1/24/23 Applicant provided data.

Off-road Equipment - Equipment list, number of equipment operation days, and hours/day used provided by Applicant. Average hours/day per phase estimated based on phase days.

Off-road Equipment - Based on 1/24/23 Applicant-proposed data.

Off-road Equipment - Based on 1/24/23 Applicant-proposed data.

Off-road Equipment - Based on Applicant-provided equipment list.

Permanente Creek Restoration Project - Santa Clara County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Off-road Equipment - Based on 1/24/23 Applicant data.

Off-road Equipment - Per 1/24/23 Applicant provided data

Trips and VMT - On-road vehicle emissions are estimated outside of CalEEMod using EMFAC 2020.4.0 and AP-42 emission factors.

Construction Off-road Equipment Mitigation - All trucks and equipment would be Tier 4 Final per Lehigh (6/8/21).

Table Name	Column Name	Default Value	New Value
tblAreaCoating	Area_EF_Parking	150	0
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	12.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	24.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	6.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	12.00
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstructionPhase	NumDays	0.00	132.00
tblConstructionPhase	NumDays	0.00	132.00
tblConstructionPhase	NumDays	0.00	132.00
tblConstructionPhase	NumDays	0.00	132.00
tblConstructionPhase	NumDays	0.00	132.00
tblConstructionPhase	NumDays	0.00	130.00
tblConstructionPhase	NumDays	0.00	130.00
tblConstructionPhase	NumDays	0.00	131.00

Permanente Creek Restoration Project - Santa Clara County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblOffRoadEquipment	HorsePower	158.00	286.00
tblOffRoadEquipment	HorsePower	158.00	108.00
tblOffRoadEquipment	HorsePower	158.00	286.00
tblOffRoadEquipment	HorsePower	158.00	108.00
tblOffRoadEquipment	HorsePower	158.00	286.00
tblOffRoadEquipment	HorsePower	158.00	108.00
tblOffRoadEquipment	HorsePower	158.00	286.00
tblOffRoadEquipment	HorsePower	158.00	108.00
tblOffRoadEquipment	HorsePower	158.00	286.00
tblOffRoadEquipment	HorsePower	158.00	108.00
tblOffRoadEquipment	HorsePower	158.00	286.00
tblOffRoadEquipment	HorsePower	158.00	108.00
tblOffRoadEquipment	HorsePower	402.00	452.00
tblOffRoadEquipment	HorsePower	402.00	452.00
tblOffRoadEquipment	HorsePower	402.00	452.00
tblOffRoadEquipment	HorsePower	402.00	452.00
tblOffRoadEquipment	HorsePower	402.00	452.00
tblOffRoadEquipment	HorsePower	402.00	452.00
tblOffRoadEquipment	HorsePower	80.00	156.00
tblOffRoadEquipment	HorsePower	80.00	156.00
tblOffRoadEquipment	HorsePower	247.00	347.00
tblOffRoadEquipment	HorsePower	247.00	347.00
tblOffRoadEquipment	HorsePower	247.00	347.00
tblOffRoadEquipment	HorsePower	247.00	347.00
tblOffRoadEquipment	HorsePower	247.00	347.00
tblOffRoadEquipment	HorsePower	247.00	347.00
tblOffRoadEquipment	HorsePower	203.00	393.00
tblOffRoadEquipment	HorsePower	203.00	110.00
tblOffRoadEquipment	HorsePower	203.00	393.00

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblOffRoadEquipment	HorsePower	203.00	110.00
tblOffRoadEquipment	HorsePower	203.00	393.00
tblOffRoadEquipment	HorsePower	203.00	110.00
tblOffRoadEquipment	HorsePower	203.00	393.00
tblOffRoadEquipment	HorsePower	203.00	110.00
tblOffRoadEquipment	HorsePower	203.00	393.00
tblOffRoadEquipment	HorsePower	203.00	110.00
tblOffRoadEquipment	HorsePower	203.00	393.00
tblOffRoadEquipment	HorsePower	203.00	110.00
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural
tblTripsAndVMT	WorkerTripNumber	3.00	0.00
tblTripsAndVMT	WorkerTripNumber	23.00	0.00
tblTripsAndVMT	WorkerTripNumber	25.00	0.00
tblTripsAndVMT	WorkerTripNumber	25.00	0.00
tblTripsAndVMT	WorkerTripNumber	3.00	0.00
tblTripsAndVMT	WorkerTripNumber	23.00	0.00

2.0 Emissions Summary

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2024	0.0544	0.3996	0.4165	1.3400e-003	0.0499	0.0167	0.0666	0.0186	0.0154	0.0339	0.0000	117.3322	117.3322	0.0377	0.0000	118.2748
2025	0.1435	0.9201	1.0778	4.0500e-003	0.0447	0.0343	0.0790	0.0246	0.0316	0.0561	0.0000	355.5745	355.5745	0.1150	0.0000	358.4495
2026	0.1435	0.9201	1.0778	4.0500e-003	0.0447	0.0343	0.0790	0.0246	0.0316	0.0561	0.0000	355.5745	355.5745	0.1150	0.0000	358.4495
2027	0.0519	0.3432	0.4058	1.3300e-003	0.0298	0.0139	0.0437	0.0164	0.0128	0.0292	0.0000	116.6513	116.6513	0.0378	7.0000e-005	117.6165
2028	0.1259	0.8089	0.9408	3.5300e-003	0.0440	0.0302	0.0742	0.0242	0.0278	0.0520	0.0000	310.2259	310.2259	0.0999	0.0000	312.7244
2029	0.1263	0.8045	0.9397	3.5200e-003	0.0444	0.0300	0.0744	0.0244	0.0276	0.0520	0.0000	309.3015	309.3015	0.1001	6.0000e-005	311.8227
Maximum	**0.1435**	**0.9201**	**1.0778**	**4.0500e-003**	**0.0499**	**0.0343**	**0.0790**	**0.0246**	**0.0316**	**0.0561**	**0.0000**	**355.5745**	**355.5745**	**0.1150**	**7.0000e-005**	**358.4495**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

2.1 Overall Construction

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2024	0.0164	0.0709	0.6402	1.3400e-003	0.0499	2.1800e-003	0.0521	0.0186	2.1800e-003	0.0207	0.0000	117.3321	117.3321	0.0377	0.0000	118.2747
2025	0.0496	0.2151	1.8755	4.0500e-003	0.0447	6.6200e-003	0.0513	0.0246	6.6200e-003	0.0312	0.0000	355.5741	355.5741	0.1150	0.0000	358.4491
2026	0.0496	0.2151	1.8755	4.0500e-003	0.0447	6.6200e-003	0.0513	0.0246	6.6200e-003	0.0312	0.0000	355.5741	355.5741	0.1150	0.0000	358.4491
2027	0.0175	0.0710	0.6409	1.3300e-003	0.0298	2.1700e-003	0.0320	0.0164	2.1700e-003	0.0186	0.0000	116.6512	116.6512	0.0378	7.0000e-005	117.6164
2028	0.0433	0.1875	1.6323	3.5300e-003	0.0440	5.7700e-003	0.0498	0.0242	5.7700e-003	0.0300	0.0000	310.2256	310.2256	0.0999	0.0000	312.7240
2029	0.0442	0.1874	1.6305	3.5200e-003	0.0444	5.7600e-003	0.0502	0.0244	5.7600e-003	0.0302	0.0000	309.3012	309.3012	0.1001	6.0000e-005	311.8223
Maximum	**0.0496**	**0.2151**	**1.8755**	**4.0500e-003**	**0.0499**	**6.6200e-003**	**0.0521**	**0.0246**	**6.6200e-003**	**0.0312**	**0.0000**	**355.5741**	**355.5741**	**0.1150**	**7.0000e-005**	**358.4491**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**65.83**	**77.44**	**-70.73**	**0.00**	**0.00**	**81.72**	**31.23**	**0.00**	**80.14**	**42.07**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
5	**4-15-2024**	**7-14-2024**	0.2236	0.0430
6	**7-15-2024**	**10-14-2024**	0.2260	0.0434
7	**10-15-2024**	**1-14-2025**	0.0025	0.0005
9	**4-15-2025**	**7-14-2025**	0.5237	0.1303
10	**7-15-2025**	**10-14-2025**	0.5295	0.1318

Permanente Creek Restoration Project - Santa Clara County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

11	**10-15-2025**	**1-14-2026**	0.0058	0.0014
13	**4-15-2026**	**7-14-2026**	0.5237	0.1303
14	**7-15-2026**	**10-14-2026**	0.5295	0.1318
15	**10-15-2026**	**1-14-2027**	0.0058	0.0014
17	**4-15-2027**	**7-14-2027**	0.1946	0.0437
18	**7-15-2027**	**10-14-2027**	0.1968	0.0441
19	**10-15-2027**	**1-14-2028**	0.0021	0.0005
21	**4-15-2028**	**7-14-2028**	0.4674	0.1154
22	**7-15-2028**	**10-14-2028**	0.4725	0.1166
23	**10-15-2028**	**1-14-2029**	0.0051	0.0013
25	**4-15-2029**	**7-14-2029**	0.4619	0.1150
26	**7-15-2029**	**9-30-2029**	0.3959	0.0986
		Highest	0.5295	0.1318

Permanente Creek Restoration Project - Santa Clara County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.0000	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	2.0000e-005
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**1.0000e-005**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.0000**	**2.0000e-005**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.0000	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	2.0000e-005
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**1.0000e-005**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.0000**	**2.0000e-005**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Concrete Channel	Grading	4/15/2024	10/15/2024	5	132	
2	Channel Widening (Phase 1)	Grading	4/15/2024	10/15/2024	5	132	
3	Rock Pile Area (Phase 1)	Grading	4/15/2025	10/15/2025	5	132	

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

4	Rock Pile Area (Phase 2)	Grading	4/15/2026	10/15/2026	5	132	
5	Channel Widening (Phase 2)	Grading	4/15/2027	10/15/2027	5	132	
6	Old Crusher Foundation	Grading	4/15/2028	10/15/2028	5	130	
7	Material Removal Area (Phase 1)	Grading	4/15/2028	10/15/2028	5	130	
8	Material Removal Area (Phase 2)	Grading	4/15/2029	10/15/2029	5	131	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 37.95

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Concrete Channel	Concrete/Industrial Saws	1	0.20	81	0.73
Channel Widening (Phase 1)	Excavators	1	2.90	286	0.38
Channel Widening (Phase 1)	Excavators	1	1.40	108	0.38
Channel Widening (Phase 1)	Off-Highway Trucks	1	0.30	402	0.38
Channel Widening (Phase 1)	Off-Highway Trucks	1	5.40	452	0.38
Channel Widening (Phase 1)	Off-Highway Trucks	1	0.10	402	0.38
Channel Widening (Phase 1)	Off-Highway Trucks	1	1.80	402	0.38
Channel Widening (Phase 1)	Rubber Tired Dozers	1	0.60	347	0.40
Channel Widening (Phase 1)	Rubber Tired Loaders	1	0.20	393	0.36
Channel Widening (Phase 1)	Rubber Tired Loaders	1	2.90	110	0.36
Rock Pile Area (Phase 1)	Excavators	1	8.70	286	0.38
Rock Pile Area (Phase 1)	Excavators	1	4.30	108	0.38
Rock Pile Area (Phase 1)	Off-Highway Trucks	1	0.40	402	0.38
Rock Pile Area (Phase 1)	Off-Highway Trucks	1	23.00	452	0.38
Rock Pile Area (Phase 1)	Off-Highway Trucks	1	0.10	402	0.38

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Rock Pile Area (Phase 1)	Off-Highway Trucks	1	1.80	402	0.38
Rock Pile Area (Phase 1)	Rollers	1	0.40	156	0.38
Rock Pile Area (Phase 1)	Rubber Tired Dozers	1	0.90	347	0.40
Rock Pile Area (Phase 1)	Rubber Tired Loaders	1	0.40	393	0.36
Rock Pile Area (Phase 1)	Rubber Tired Loaders	1	1.40	110	0.36
Rock Pile Area (Phase 2)	Excavators	1	8.70	286	0.38
Rock Pile Area (Phase 2)	Excavators	1	4.30	108	0.38
Rock Pile Area (Phase 2)	Off-Highway Trucks	1	0.40	402	0.38
Rock Pile Area (Phase 2)	Off-Highway Trucks	1	23.00	452	0.38
Rock Pile Area (Phase 2)	Off-Highway Trucks	1	0.10	402	0.38
Rock Pile Area (Phase 2)	Off-Highway Trucks	1	1.80	402	0.38
Rock Pile Area (Phase 2)	Rollers	1	0.40	156	0.38
Rock Pile Area (Phase 2)	Rubber Tired Dozers	1	0.90	347	0.40
Rock Pile Area (Phase 2)	Rubber Tired Loaders	1	0.40	393	0.36
Rock Pile Area (Phase 2)	Rubber Tired Loaders	1	1.40	110	0.36
Channel Widening (Phase 2)	Excavators	1	2.90	286	0.38
Channel Widening (Phase 2)	Excavators	1	1.40	108	0.38
Channel Widening (Phase 2)	Off-Highway Trucks	1	0.30	402	0.38
Channel Widening (Phase 2)	Off-Highway Trucks	1	5.40	452	0.38
Channel Widening (Phase 2)	Off-Highway Trucks	1	0.10	402	0.38
Channel Widening (Phase 2)	Off-Highway Trucks	1	1.80	402	0.38
Channel Widening (Phase 2)	Rubber Tired Dozers	1	0.60	347	0.40
Channel Widening (Phase 2)	Rubber Tired Loaders	1	0.20	393	0.36
Channel Widening (Phase 2)	Rubber Tired Loaders	1	2.90	110	0.36
Old Crusher Foundation	Generator Sets	1	0.30	84	0.74
Material Removal Area (Phase 1)	Excavators	1	7.50	286	0.38
Material Removal Area (Phase 1)	Excavators	1	3.70	108	0.38
Material Removal Area (Phase 1)	Off-Highway Trucks	1	0.30	402	0.38
Material Removal Area (Phase 1)	Off-Highway Trucks	1	20.20	452	0.38

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Material Removal Area (Phase 1)	Off-Highway Trucks	1	0.20	402	0.38
Material Removal Area (Phase 1)	Off-Highway Trucks	1	1.80	402	0.38
Material Removal Area (Phase 1)	Rubber Tired Dozers	1	0.90	347	0.40
Material Removal Area (Phase 1)	Rubber Tired Loaders	1	0.40	393	0.36
Material Removal Area (Phase 1)	Rubber Tired Loaders	1	1.10	110	0.36
Material Removal Area (Phase 2)	Excavators	1	7.50	286	0.38
Material Removal Area (Phase 2)	Excavators	1	3.70	108	0.38
Material Removal Area (Phase 2)	Off-Highway Trucks	1	0.30	402	0.38
Material Removal Area (Phase 2)	Off-Highway Trucks	1	20.00	452	0.38
Material Removal Area (Phase 2)	Off-Highway Trucks	1	0.20	402	0.38
Material Removal Area (Phase 2)	Off-Highway Trucks	1	1.80	402	0.38
Material Removal Area (Phase 2)	Rubber Tired Dozers	1	0.90	347	0.40
Material Removal Area (Phase 2)	Rubber Tired Loaders	1	0.40	393	0.36
Material Removal Area (Phase 2)	Rubber Tired Loaders	1	1.10	110	0.36

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Concrete Channel	1	0.00	0.00	0.00	10.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Channel Widening (Phase 1)	9	0.00	0.00	0.00	10.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Rock Pile Area (Phase 1)	10	0.00	0.00	0.00	10.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Rock Pile Area (Phase 2)	10	0.00	0.00	0.00	10.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Channel Widening (Phase 2)	9	23.00		0.00				LD_Mix	HDT_Mix	HHDT
Old Crusher Foundation	1	0.00	0.00	0.00	10.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Material Removal Area (Phase 1)	9	0.00	0.00	0.00	10.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Material Removal Area (Phase 2)	9	23.00		0.00				LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Permanente Creek Restoration Project - Santa Clara County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Use Cleaner Engines for Construction Equipment

3.2 Concrete Channel - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	5.2000e-004	3.9800e-003	6.0200e-003	1.0000e-005		1.8000e-004	1.8000e-004		1.8000e-004	1.8000e-004	0.0000	0.8871	0.8871	4.0000e-005	0.0000	0.8882
Total	**5.2000e-004**	**3.9800e-003**	**6.0200e-003**	**1.0000e-005**		**1.8000e-004**	**1.8000e-004**		**1.8000e-004**	**1.8000e-004**	**0.0000**	**0.8871**	**0.8871**	**4.0000e-005**	**0.0000**	**0.8882**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.2 Concrete Channel - 2024

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	1.0000e-004	4.5000e-004	6.3700e-003	1.0000e-005		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	0.8871	0.8871	4.0000e-005	0.0000	0.8882
Total	**1.0000e-004**	**4.5000e-004**	**6.3700e-003**	**1.0000e-005**		**1.0000e-005**	**1.0000e-005**		**1.0000e-005**	**1.0000e-005**	**0.0000**	**0.8871**	**0.8871**	**4.0000e-005**	**0.0000**	**0.8882**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Permanente Creek Restoration Project - Santa Clara County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.3 Channel Widening (Phase 1) - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0499	0.0000	0.0499	0.0186	0.0000	0.0186	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0538	0.3957	0.4105	1.3300e-003		0.0165	0.0165		0.0152	0.0152	0.0000	116.4451	116.4451	0.0377	0.0000	117.3866
Total	**0.0538**	**0.3957**	**0.4105**	**1.3300e-003**	**0.0499**	**0.0165**	**0.0664**	**0.0186**	**0.0152**	**0.0337**	**0.0000**	**116.4451**	**116.4451**	**0.0377**	**0.0000**	**117.3866**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Permanente Creek Restoration Project - Santa Clara County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.3 Channel Widening (Phase 1) - 2024

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0499	0.0000	0.0499	0.0186	0.0000	0.0186	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0163	0.0705	0.6339	1.3300e-003		2.1700e-003	2.1700e-003		2.1700e-003	2.1700e-003	0.0000	116.4450	116.4450	0.0377	0.0000	117.3865
Total	**0.0163**	**0.0705**	**0.6339**	**1.3300e-003**	**0.0499**	**2.1700e-003**	**0.0521**	**0.0186**	**2.1700e-003**	**0.0207**	**0.0000**	**116.4450**	**116.4450**	**0.0377**	**0.0000**	**117.3865**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Permanente Creek Restoration Project - Santa Clara County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.4 Rock Pile Area (Phase 1) - 2025

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0447	0.0000	0.0447	0.0246	0.0000	0.0246	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1435	0.9201	1.0778	4.0500e-003		0.0343	0.0343		0.0316	0.0316	0.0000	355.5745	355.5745	0.1150	0.0000	358.4495
Total	**0.1435**	**0.9201**	**1.0778**	**4.0500e-003**	**0.0447**	**0.0343**	**0.0790**	**0.0246**	**0.0316**	**0.0561**	**0.0000**	**355.5745**	**355.5745**	**0.1150**	**0.0000**	**358.4495**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Permanente Creek Restoration Project - Santa Clara County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.4 Rock Pile Area (Phase 1) - 2025

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0447	0.0000	0.0447	0.0246	0.0000	0.0246	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0496	0.2151	1.8755	4.0500e-003		6.6200e-003	6.6200e-003		6.6200e-003	6.6200e-003	0.0000	355.5741	355.5741	0.1150	0.0000	358.4491
Total	**0.0496**	**0.2151**	**1.8755**	**4.0500e-003**	**0.0447**	**6.6200e-003**	**0.0513**	**0.0246**	**6.6200e-003**	**0.0312**	**0.0000**	**355.5741**	**355.5741**	**0.1150**	**0.0000**	**358.4491**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Permanente Creek Restoration Project - Santa Clara County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.5 Rock Pile Area (Phase 2) - 2026

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0447	0.0000	0.0447	0.0246	0.0000	0.0246	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1435	0.9201	1.0778	4.0500e-003		0.0343	0.0343		0.0316	0.0316	0.0000	355.5745	355.5745	0.1150	0.0000	358.4495
Total	**0.1435**	**0.9201**	**1.0778**	**4.0500e-003**	**0.0447**	**0.0343**	**0.0790**	**0.0246**	**0.0316**	**0.0561**	**0.0000**	**355.5745**	**355.5745**	**0.1150**	**0.0000**	**358.4495**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Permanente Creek Restoration Project - Santa Clara County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.5 Rock Pile Area (Phase 2) - 2026

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0447	0.0000	0.0447	0.0246	0.0000	0.0246	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0496	0.2151	1.8755	4.0500e-003		6.6200e-003	6.6200e-003		6.6200e-003	6.6200e-003	0.0000	355.5741	355.5741	0.1150	0.0000	358.4491
Total	**0.0496**	**0.2151**	**1.8755**	**4.0500e-003**	**0.0447**	**6.6200e-003**	**0.0513**	**0.0246**	**6.6200e-003**	**0.0312**	**0.0000**	**355.5741**	**355.5741**	**0.1150**	**0.0000**	**358.4491**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.6 Channel Widening (Phase 2) - 2027

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0298	0.0000	0.0298	0.0164	0.0000	0.0164	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0507	0.3427	0.3988	1.3300e-003		0.0139	0.0139		0.0128	0.0128	0.0000	116.4230	116.4230	0.0377	0.0000	117.3643
Total	**0.0507**	**0.3427**	**0.3988**	**1.3300e-003**	**0.0298**	**0.0139**	**0.0437**	**0.0164**	**0.0128**	**0.0292**	**0.0000**	**116.4230**	**116.4230**	**0.0377**	**0.0000**	**117.3643**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.2000e-003	5.6000e-004	7.0100e-003	0.0000	1.0000e-005	1.0000e-005	2.0000e-005	1.0000e-005	1.0000e-005	1.0000e-005	0.0000	0.2283	0.2283	1.3000e-004	7.0000e-005	0.2522
Total	**1.2000e-003**	**5.6000e-004**	**7.0100e-003**	**0.0000**	**1.0000e-005**	**1.0000e-005**	**2.0000e-005**	**1.0000e-005**	**1.0000e-005**	**1.0000e-005**	**0.0000**	**0.2283**	**0.2283**	**1.3000e-004**	**7.0000e-005**	**0.2522**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.6 Channel Widening (Phase 2) - 2027

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0298	0.0000	0.0298	0.0164	0.0000	0.0164	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0163	0.0705	0.6339	1.3300e-003		2.1700e-003	2.1700e-003		2.1700e-003	2.1700e-003	0.0000	116.4228	116.4228	0.0377	0.0000	117.3642
Total	**0.0163**	**0.0705**	**0.6339**	**1.3300e-003**	**0.0298**	**2.1700e-003**	**0.0320**	**0.0164**	**2.1700e-003**	**0.0186**	**0.0000**	**116.4228**	**116.4228**	**0.0377**	**0.0000**	**117.3642**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.2000e-003	5.6000e-004	7.0100e-003	0.0000	1.0000e-005	1.0000e-005	2.0000e-005	1.0000e-005	1.0000e-005	1.0000e-005	0.0000	0.2283	0.2283	1.3000e-004	7.0000e-005	0.2522
Total	**1.2000e-003**	**5.6000e-004**	**7.0100e-003**	**0.0000**	**1.0000e-005**	**1.0000e-005**	**2.0000e-005**	**1.0000e-005**	**1.0000e-005**	**1.0000e-005**	**0.0000**	**0.2283**	**0.2283**	**1.3000e-004**	**7.0000e-005**	**0.2522**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.7 Old Crusher Foundation - 2028

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	6.5000e-004	5.8400e-003	8.9200e-003	2.0000e-005		2.3000e-004	2.3000e-004		2.3000e-004	2.3000e-004	0.0000	1.3777	1.3777	5.0000e-005	0.0000	1.3790
Total	**6.5000e-004**	**5.8400e-003**	**8.9200e-003**	**2.0000e-005**		**2.3000e-004**	**2.3000e-004**		**2.3000e-004**	**2.3000e-004**	**0.0000**	**1.3777**	**1.3777**	**5.0000e-005**	**0.0000**	**1.3790**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.7 Old Crusher Foundation - 2028

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	1.6000e-004	6.9000e-004	9.8900e-003	2.0000e-005		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	1.3777	1.3777	5.0000e-005	0.0000	1.3790
Total	**1.6000e-004**	**6.9000e-004**	**9.8900e-003**	**2.0000e-005**		**2.0000e-005**	**2.0000e-005**		**2.0000e-005**	**2.0000e-005**	**0.0000**	**1.3777**	**1.3777**	**5.0000e-005**	**0.0000**	**1.3790**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Permanente Creek Restoration Project - Santa Clara County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.8 Material Removal Area (Phase 1) - 2028

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0440	0.0000	0.0440	0.0242	0.0000	0.0242	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1252	0.8031	0.9319	3.5200e-003		0.0299	0.0299		0.0275	0.0275	0.0000	308.8482	308.8482	0.0999	0.0000	311.3454
Total	**0.1252**	**0.8031**	**0.9319**	**3.5200e-003**	**0.0440**	**0.0299**	**0.0740**	**0.0242**	**0.0275**	**0.0517**	**0.0000**	**308.8482**	**308.8482**	**0.0999**	**0.0000**	**311.3454**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.8 Material Removal Area (Phase 1) - 2028

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0440	0.0000	0.0440	0.0242	0.0000	0.0242	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0431	0.1868	1.6224	3.5200e-003		5.7500e-003	5.7500e-003		5.7500e-003	5.7500e-003	0.0000	308.8479	308.8479	0.0999	0.0000	311.3451
Total	**0.0431**	**0.1868**	**1.6224**	**3.5200e-003**	**0.0440**	**5.7500e-003**	**0.0498**	**0.0242**	**5.7500e-003**	**0.0300**	**0.0000**	**308.8479**	**308.8479**	**0.0999**	**0.0000**	**311.3451**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.9 Material Removal Area (Phase 2) - 2029

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0444	0.0000	0.0444	0.0244	0.0000	0.0244	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1253	0.8040	0.9332	3.5200e-003		0.0300	0.0300		0.0276	0.0276	0.0000	309.0866	309.0866	0.1000	0.0000	311.5857
Total	**0.1253**	**0.8040**	**0.9332**	**3.5200e-003**	**0.0444**	**0.0300**	**0.0743**	**0.0244**	**0.0276**	**0.0520**	**0.0000**	**309.0866**	**309.0866**	**0.1000**	**0.0000**	**311.5857**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.0400e-003	5.0000e-004	6.5300e-003	0.0000	1.0000e-005	1.0000e-005	2.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.2150	0.2150	1.1000e-004	6.0000e-005	0.2370
Total	**1.0400e-003**	**5.0000e-004**	**6.5300e-003**	**0.0000**	**1.0000e-005**	**1.0000e-005**	**2.0000e-005**	**1.0000e-005**	**0.0000**	**1.0000e-005**	**0.0000**	**0.2150**	**0.2150**	**1.1000e-004**	**6.0000e-005**	**0.2370**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.9 Material Removal Area (Phase 2) - 2029

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0444	0.0000	0.0444	0.0244	0.0000	0.0244	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0431	0.1869	1.6240	3.5200e-003		5.7500e-003	5.7500e-003		5.7500e-003	5.7500e-003	0.0000	309.0862	309.0862	0.1000	0.0000	311.5853
Total	**0.0431**	**0.1869**	**1.6240**	**3.5200e-003**	**0.0444**	**5.7500e-003**	**0.0501**	**0.0244**	**5.7500e-003**	**0.0301**	**0.0000**	**309.0862**	**309.0862**	**0.1000**	**0.0000**	**311.5853**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.0400e-003	5.0000e-004	6.5300e-003	0.0000	1.0000e-005	1.0000e-005	2.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.2150	0.2150	1.1000e-004	6.0000e-005	0.2370
Total	**1.0400e-003**	**5.0000e-004**	**6.5300e-003**	**0.0000**	**1.0000e-005**	**1.0000e-005**	**2.0000e-005**	**1.0000e-005**	**0.0000**	**1.0000e-005**	**0.0000**	**0.2150**	**0.2150**	**1.1000e-004**	**6.0000e-005**	**0.2370**

Permanente Creek Restoration Project - Santa Clara County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
User Defined Recreational	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
User Defined Recreational	14.70	6.60	6.60	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
User Defined Recreational	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
User Defined Recreational	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
User Defined Recreational	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
User Defined Recreational	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
User Defined Recreational	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

Permanente Creek Restoration Project - Santa Clara County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0000	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	2.0000e-005
Unmitigated	0.0000	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	2.0000e-005

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0000	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	2.0000e-005
Total	**0.0000**	**0.0000**	**1.0000e-005**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.0000**	**2.0000e-005**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0000	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	2.0000e-005
Total	**0.0000**	**0.0000**	**1.0000e-005**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.0000**	**2.0000e-005**

7.0 Water Detail

7.1 Mitigation Measures Water

Permanente Creek Restoration Project - Santa Clara County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
User Defined Recreational	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
User Defined Recreational	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
User Defined Recreational	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
User Defined Recreational	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Permanente Creek Restoration Project - Santa Clara County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Permanente Creek Restoration Project

Santa Clara County, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
User Defined Recreational	1.00	User Defined Unit	0.00	0.00	0

1.2 Other Project Characteristics

Urbanization	Rural	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	58
Climate Zone	4			**Operational Year**	2027
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - Project information

Land Use - Placeholder land use. There will be no operational phase of the project, and construction data is custom to the Project.

Construction Phase - Obtained revised schedule from Lehigh on 1/24/23 - Construction Assumptions Attachment. Using the Applicant-provided schedule, some of the modeled workdays are 1 to 2 days more per phase than workdays provided by Applicant.

Off-road Equipment - Applicant-provided equipment list.

Off-road Equipment - Based on 1/24/23 Applicant provided data.

Off-road Equipment - Based on 1/24/23 Applicant provided data.

Off-road Equipment - Equipment list, number of equipment operation days, and hours/day used provided by Applicant. Average hours/day per phase estimated based on phase days.

Off-road Equipment - Based on 1/24/23 Applicant-proposed data.

Off-road Equipment - Based on 1/24/23 Applicant-proposed data.

Off-road Equipment - Based on Applicant-provided equipment list.

Permanente Creek Restoration Project - Santa Clara County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Off-road Equipment - Based on 1/24/23 Applicant data.

Off-road Equipment - Per 1/24/23 Applicant provided data

Trips and VMT - On-road vehicle emissions are estimated outside of CalEEMod using EMFAC 2020.4.0 and AP-42 emission factors.

Construction Off-road Equipment Mitigation - All trucks and equipment would be Tier 4 Final per Lehigh (6/8/21).

Table Name	Column Name	Default Value	New Value
tblAreaCoating	Area_EF_Parking	150	0
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	12.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	24.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	6.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	12.00
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstructionPhase	NumDays	0.00	132.00
tblConstructionPhase	NumDays	0.00	132.00
tblConstructionPhase	NumDays	0.00	132.00
tblConstructionPhase	NumDays	0.00	132.00
tblConstructionPhase	NumDays	0.00	132.00
tblConstructionPhase	NumDays	0.00	130.00
tblConstructionPhase	NumDays	0.00	130.00
tblConstructionPhase	NumDays	0.00	131.00

Permanente Creek Restoration Project - Santa Clara County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblOffRoadEquipment	HorsePower	158.00	286.00
tblOffRoadEquipment	HorsePower	158.00	108.00
tblOffRoadEquipment	HorsePower	158.00	286.00
tblOffRoadEquipment	HorsePower	158.00	108.00
tblOffRoadEquipment	HorsePower	158.00	286.00
tblOffRoadEquipment	HorsePower	158.00	108.00
tblOffRoadEquipment	HorsePower	158.00	286.00
tblOffRoadEquipment	HorsePower	158.00	108.00
tblOffRoadEquipment	HorsePower	158.00	286.00
tblOffRoadEquipment	HorsePower	158.00	108.00
tblOffRoadEquipment	HorsePower	158.00	286.00
tblOffRoadEquipment	HorsePower	158.00	108.00
tblOffRoadEquipment	HorsePower	402.00	452.00
tblOffRoadEquipment	HorsePower	402.00	452.00
tblOffRoadEquipment	HorsePower	402.00	452.00
tblOffRoadEquipment	HorsePower	402.00	452.00
tblOffRoadEquipment	HorsePower	402.00	452.00
tblOffRoadEquipment	HorsePower	402.00	452.00
tblOffRoadEquipment	HorsePower	80.00	156.00
tblOffRoadEquipment	HorsePower	80.00	156.00
tblOffRoadEquipment	HorsePower	247.00	347.00
tblOffRoadEquipment	HorsePower	247.00	347.00
tblOffRoadEquipment	HorsePower	247.00	347.00
tblOffRoadEquipment	HorsePower	247.00	347.00
tblOffRoadEquipment	HorsePower	247.00	347.00
tblOffRoadEquipment	HorsePower	247.00	347.00
tblOffRoadEquipment	HorsePower	203.00	393.00
tblOffRoadEquipment	HorsePower	203.00	110.00
tblOffRoadEquipment	HorsePower	203.00	393.00

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblOffRoadEquipment	HorsePower	203.00	110.00
tblOffRoadEquipment	HorsePower	203.00	393.00
tblOffRoadEquipment	HorsePower	203.00	110.00
tblOffRoadEquipment	HorsePower	203.00	393.00
tblOffRoadEquipment	HorsePower	203.00	110.00
tblOffRoadEquipment	HorsePower	203.00	393.00
tblOffRoadEquipment	HorsePower	203.00	110.00
tblOffRoadEquipment	HorsePower	203.00	393.00
tblOffRoadEquipment	HorsePower	203.00	110.00
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural
tblTripsAndVMT	WorkerTripNumber	3.00	0.00
tblTripsAndVMT	WorkerTripNumber	23.00	0.00
tblTripsAndVMT	WorkerTripNumber	25.00	0.00
tblTripsAndVMT	WorkerTripNumber	25.00	0.00
tblTripsAndVMT	WorkerTripNumber	3.00	0.00
tblTripsAndVMT	WorkerTripNumber	23.00	0.00

2.0 Emissions Summary

Permanente Creek Restoration Project - Santa Clara County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2024	0.8235	6.0551	6.3107	0.0203	0.7566	0.2528	1.0093	0.2812	0.2328	0.5140	0.0000	1,959.6463	1,959.6463	0.6297	0.0000	1,975.3888
2025	2.1740	13.9405	16.3308	0.0614	0.6775	0.5198	1.1973	0.3724	0.4782	0.8506	0.0000	5,938.6942	5,938.6942	1.9207	0.0000	5,986.7115
2026	2.1740	13.9405	16.3308	0.0614	0.6775	0.5198	1.1973	0.3724	0.4782	0.8506	0.0000	5,938.6942	5,938.6942	1.9207	0.0000	5,986.7115
2027	0.7852	5.2011	6.1657	0.0201	0.4519	0.2109	0.6628	0.2484	0.1940	0.4424	0.0000	1,948.2919	1,948.2919	0.6312	1.2300e-003	1,964.4381
2028	1.9362	12.4452	14.4743	0.0544	0.6775	0.4638	1.1413	0.3724	0.4270	0.7994	0.0000	5,261.0082	5,261.0082	1.6948	0.0000	5,303.3788
2029	1.9280	12.2831	14.3636	0.0538	0.6777	0.4574	1.1351	0.3725	0.4208	0.7933	0.0000	5,205.3079	5,205.3079	1.6844	1.1500e-003	5,247.7600
Maximum	**2.1740**	**13.9405**	**16.3308**	**0.0614**	**0.7566**	**0.5198**	**1.1973**	**0.3725**	**0.4782**	**0.8506**	**0.0000**	**5,938.6942**	**5,938.6942**	**1.9207**	**1.2300e-003**	**5,986.7115**

Permanente Creek Restoration Project - Santa Clara County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

2.1 Overall Construction (Maximum Daily Emission)

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2024	0.2479	1.0744	9.7003	0.0203	0.7566	0.0331	0.7896	0.2812	0.0331	0.3143	0.0000	1,959.6463	1,959.6463	0.6297	0.0000	1,975.3888
2025	0.7519	3.2584	28.4160	0.0614	0.6775	0.1003	0.7777	0.3724	0.1003	0.4727	0.0000	5,938.6942	5,938.6942	1.9207	0.0000	5,986.7115
2026	0.7519	3.2584	28.4160	0.0614	0.6775	0.1003	0.7777	0.3724	0.1003	0.4727	0.0000	5,938.6942	5,938.6942	1.9207	0.0000	5,986.7115
2027	0.2639	1.0768	9.7275	0.0201	0.4519	0.0329	0.4848	0.2484	0.0329	0.2813	0.0000	1,948.2919	1,948.2919	0.6312	1.2300e-003	1,964.4381
2028	0.6656	2.8841	25.1118	0.0544	0.6775	0.0887	0.7662	0.3724	0.0887	0.4611	0.0000	5,261.0082	5,261.0082	1.6948	0.0000	5,303.3788
2029	0.6738	2.8620	24.9092	0.0538	0.6777	0.0879	0.7656	0.3725	0.0879	0.4604	0.0000	5,205.3079	5,205.3079	1.6844	1.1500e-003	5,247.7600
Maximum	**0.7519**	**3.2584**	**28.4160**	**0.0614**	**0.7566**	**0.1003**	**0.7896**	**0.3725**	**0.1003**	**0.4727**	**0.0000**	**5,938.6942**	**5,938.6942**	**1.9207**	**1.2300e-003**	**5,986.7115**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**65.84**	**77.43**	**-70.71**	**0.00**	**0.00**	**81.72**	**31.24**	**0.00**	**80.14**	**42.07**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Permanente Creek Restoration Project - Santa Clara County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	1.0000e-005	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.2000e-004	2.2000e-004	0.0000		2.3000e-004
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total	**1.0000e-005**	**0.0000**	**1.0000e-004**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**2.2000e-004**	**2.2000e-004**	**0.0000**	**0.0000**	**2.3000e-004**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	1.0000e-005	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.2000e-004	2.2000e-004	0.0000		2.3000e-004
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total	**1.0000e-005**	**0.0000**	**1.0000e-004**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**2.2000e-004**	**2.2000e-004**	**0.0000**	**0.0000**	**2.3000e-004**

Permanente Creek Restoration Project - Santa Clara County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Concrete Channel	Grading	4/15/2024	10/15/2024	5	132	
2	Channel Widening (Phase 1)	Grading	4/15/2024	10/15/2024	5	132	
3	Rock Pile Area (Phase 1)	Grading	4/15/2025	10/15/2025	5	132	
4	Rock Pile Area (Phase 2)	Grading	4/15/2026	10/15/2026	5	132	
5	Channel Widening (Phase 2)	Grading	4/15/2027	10/15/2027	5	132	
6	Old Crusher Foundation	Grading	4/15/2028	10/15/2028	5	130	
7	Material Removal Area (Phase 1)	Grading	4/15/2028	10/15/2028	5	130	
8	Material Removal Area (Phase 2)	Grading	4/15/2029	10/15/2029	5	131	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 37.95

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Concrete Channel	Concrete/Industrial Saws	1	0.20	81	0.73
Channel Widening (Phase 1)	Excavators	1	2.90	286	0.38
Channel Widening (Phase 1)	Excavators	1	1.40	108	0.38

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Channel Widening (Phase 1)	Off-Highway Trucks	1	0.30	402	0.38
Channel Widening (Phase 1)	Off-Highway Trucks	1	5.40	452	0.38
Channel Widening (Phase 1)	Off-Highway Trucks	1	0.10	402	0.38
Channel Widening (Phase 1)	Off-Highway Trucks	1	1.80	402	0.38
Channel Widening (Phase 1)	Rubber Tired Dozers	1	0.60	347	0.40
Channel Widening (Phase 1)	Rubber Tired Loaders	1	0.20	393	0.36
Channel Widening (Phase 1)	Rubber Tired Loaders	1	2.90	110	0.36
Rock Pile Area (Phase 1)	Excavators	1	8.70	286	0.38
Rock Pile Area (Phase 1)	Excavators	1	4.30	108	0.38
Rock Pile Area (Phase 1)	Off-Highway Trucks	1	0.40	402	0.38
Rock Pile Area (Phase 1)	Off-Highway Trucks	1	23.00	452	0.38
Rock Pile Area (Phase 1)	Off-Highway Trucks	1	0.10	402	0.38
Rock Pile Area (Phase 1)	Off-Highway Trucks	1	1.80	402	0.38
Rock Pile Area (Phase 1)	Rollers	1	0.40	156	0.38
Rock Pile Area (Phase 1)	Rubber Tired Dozers	1	0.90	347	0.40
Rock Pile Area (Phase 1)	Rubber Tired Loaders	1	0.40	393	0.36
Rock Pile Area (Phase 1)	Rubber Tired Loaders	1	1.40	110	0.36
Rock Pile Area (Phase 2)	Excavators	1	8.70	286	0.38
Rock Pile Area (Phase 2)	Excavators	1	4.30	108	0.38
Rock Pile Area (Phase 2)	Off-Highway Trucks	1	0.40	402	0.38
Rock Pile Area (Phase 2)	Off-Highway Trucks	1	23.00	452	0.38
Rock Pile Area (Phase 2)	Off-Highway Trucks	1	0.10	402	0.38
Rock Pile Area (Phase 2)	Off-Highway Trucks	1	1.80	402	0.38
Rock Pile Area (Phase 2)	Rollers	1	0.40	156	0.38
Rock Pile Area (Phase 2)	Rubber Tired Dozers	1	0.90	347	0.40
Rock Pile Area (Phase 2)	Rubber Tired Loaders	1	0.40	393	0.36
Rock Pile Area (Phase 2)	Rubber Tired Loaders	1	1.40	110	0.36
Channel Widening (Phase 2)	Excavators	1	2.90	286	0.38
Channel Widening (Phase 2)	Excavators	1	1.40	108	0.38

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Channel Widening (Phase 2)	Off-Highway Trucks	1	0.30	402	0.38
Channel Widening (Phase 2)	Off-Highway Trucks	1	5.40	452	0.38
Channel Widening (Phase 2)	Off-Highway Trucks	1	0.10	402	0.38
Channel Widening (Phase 2)	Off-Highway Trucks	1	1.80	402	0.38
Channel Widening (Phase 2)	Rubber Tired Dozers	1	0.60	347	0.40
Channel Widening (Phase 2)	Rubber Tired Loaders	1	0.20	393	0.36
Channel Widening (Phase 2)	Rubber Tired Loaders	1	2.90	110	0.36
Old Crusher Foundation	Generator Sets	1	0.30	84	0.74
Material Removal Area (Phase 1)	Excavators	1	7.50	286	0.38
Material Removal Area (Phase 1)	Excavators	1	3.70	108	0.38
Material Removal Area (Phase 1)	Off-Highway Trucks	1	0.30	402	0.38
Material Removal Area (Phase 1)	Off-Highway Trucks	1	20.20	452	0.38
Material Removal Area (Phase 1)	Off-Highway Trucks	1	0.20	402	0.38
Material Removal Area (Phase 1)	Off-Highway Trucks	1	1.80	402	0.38
Material Removal Area (Phase 1)	Rubber Tired Dozers	1	0.90	347	0.40
Material Removal Area (Phase 1)	Rubber Tired Loaders	1	0.40	393	0.36
Material Removal Area (Phase 1)	Rubber Tired Loaders	1	1.10	110	0.36
Material Removal Area (Phase 2)	Excavators	1	7.50	286	0.38
Material Removal Area (Phase 2)	Excavators	1	3.70	108	0.38
Material Removal Area (Phase 2)	Off-Highway Trucks	1	0.30	402	0.38
Material Removal Area (Phase 2)	Off-Highway Trucks	1	20.00	452	0.38
Material Removal Area (Phase 2)	Off-Highway Trucks	1	0.20	402	0.38
Material Removal Area (Phase 2)	Off-Highway Trucks	1	1.80	402	0.38
Material Removal Area (Phase 2)	Rubber Tired Dozers	1	0.90	347	0.40
Material Removal Area (Phase 2)	Rubber Tired Loaders	1	0.40	393	0.36
Material Removal Area (Phase 2)	Rubber Tired Loaders	1	1.10	110	0.36

Trips and VMT

Permanente Creek Restoration Project - Santa Clara County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Concrete Channel	1	0.00	0.00	0.00	10.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Channel Widening (Phase 1)	9	0.00	0.00	0.00	10.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Rock Pile Area (Phase 1)	10	0.00	0.00	0.00	10.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Rock Pile Area (Phase 2)	10	0.00	0.00	0.00	10.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Channel Widening (Phase 2)	9	23.00		0.00				LD_Mix	HDT_Mix	HHDT
Old Crusher Foundation	1	0.00	0.00	0.00	10.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Material Removal Area (Phase 1)	9	0.00	0.00	0.00	10.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Material Removal Area (Phase 2)	9	23.00		0.00				LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

3.2 Concrete Channel - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	7.8200e-003	0.0604	0.0913	1.6000e-004		2.7600e-003	2.7600e-003		2.7600e-003	2.7600e-003		14.8166	14.8166	7.0000e-004		14.8342
Total	**7.8200e-003**	**0.0604**	**0.0913**	**1.6000e-004**		**2.7600e-003**	**2.7600e-003**		**2.7600e-003**	**2.7600e-003**		**14.8166**	**14.8166**	**7.0000e-004**		**14.8342**

Permanente Creek Restoration Project - Santa Clara County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.2 Concrete Channel - 2024

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.5600e-003	6.7800e-003	0.0965	1.6000e-004		2.1000e-004	2.1000e-004		2.1000e-004	2.1000e-004	0.0000	14.8166	14.8166	7.0000e-004		14.8342
Total	**1.5600e-003**	**6.7800e-003**	**0.0965**	**1.6000e-004**		**2.1000e-004**	**2.1000e-004**		**2.1000e-004**	**2.1000e-004**	**0.0000**	**14.8166**	**14.8166**	**7.0000e-004**		**14.8342**

Permanente Creek Restoration Project - Santa Clara County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.2 Concrete Channel - 2024

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

3.3 Channel Widening (Phase 1) - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.7566	0.0000	0.7566	0.2812	0.0000	0.2812			0.0000			0.0000
Off-Road	0.8157	5.9947	6.2195	0.0201		0.2500	0.2500		0.2300	0.2300		1,944.8297	1,944.8297	0.6290		1,960.5546
Total	**0.8157**	**5.9947**	**6.2195**	**0.0201**	**0.7566**	**0.2500**	**1.0066**	**0.2812**	**0.2300**	**0.5112**		**1,944.8297**	**1,944.8297**	**0.6290**		**1,960.5546**

Permanente Creek Restoration Project - Santa Clara County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.3 Channel Widening (Phase 1) - 2024

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.7566	0.0000	0.7566	0.2812	0.0000	0.2812			0.0000			0.0000
Off-Road	0.2464	1.0677	9.6038	0.0201		0.0329	0.0329		0.0329	0.0329	0.0000	1,944.8297	1,944.8297	0.6290		1,960.5546
Total	**0.2464**	**1.0677**	**9.6038**	**0.0201**	**0.7566**	**0.0329**	**0.7894**	**0.2812**	**0.0329**	**0.3140**	**0.0000**	**1,944.8297**	**1,944.8297**	**0.6290**		**1,960.5546**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.3 Channel Widening (Phase 1) - 2024

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

3.4 Rock Pile Area (Phase 1) - 2025

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.6775	0.0000	0.6775	0.3724	0.0000	0.3724			0.0000			0.0000
Off-Road	2.1740	13.9405	16.3308	0.0614		0.5198	0.5198		0.4782	0.4782		5,938.6942	5,938.6942	1.9207		5,986.7115
Total	**2.1740**	**13.9405**	**16.3308**	**0.0614**	**0.6775**	**0.5198**	**1.1973**	**0.3724**	**0.4782**	**0.8506**		**5,938.6942**	**5,938.6942**	**1.9207**		**5,986.7115**

Permanente Creek Restoration Project - Santa Clara County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.4 Rock Pile Area (Phase 1) - 2025

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.6775	0.0000	0.6775	0.3724	0.0000	0.3724			0.0000			0.0000
Off-Road	0.7519	3.2584	28.4160	0.0614		0.1003	0.1003		0.1003	0.1003	0.0000	5,938.6942	5,938.6942	1.9207		5,986.7115
Total	**0.7519**	**3.2584**	**28.4160**	**0.0614**	**0.6775**	**0.1003**	**0.7777**	**0.3724**	**0.1003**	**0.4727**	**0.0000**	**5,938.6942**	**5,938.6942**	**1.9207**		**5,986.7115**

Permanente Creek Restoration Project - Santa Clara County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.4 Rock Pile Area (Phase 1) - 2025

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

3.5 Rock Pile Area (Phase 2) - 2026

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.6775	0.0000	0.6775	0.3724	0.0000	0.3724			0.0000			0.0000
Off-Road	2.1740	13.9405	16.3308	0.0614		0.5198	0.5198		0.4782	0.4782		5,938.6942	5,938.6942	1.9207		5,986.7115
Total	**2.1740**	**13.9405**	**16.3308**	**0.0614**	**0.6775**	**0.5198**	**1.1973**	**0.3724**	**0.4782**	**0.8506**		**5,938.6942**	**5,938.6942**	**1.9207**		**5,986.7115**

Permanente Creek Restoration Project - Santa Clara County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.5 Rock Pile Area (Phase 2) - 2026

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.6775	0.0000	0.6775	0.3724	0.0000	0.3724			0.0000			0.0000
Off-Road	0.7519	3.2584	28.4160	0.0614		0.1003	0.1003		0.1003	0.1003	0.0000	5,938.6942	5,938.6942	1.9207		5,986.7115
Total	**0.7519**	**3.2584**	**28.4160**	**0.0614**	**0.6775**	**0.1003**	**0.7777**	**0.3724**	**0.1003**	**0.4727**	**0.0000**	**5,938.6942**	**5,938.6942**	**1.9207**		**5,986.7115**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.5 Rock Pile Area (Phase 2) - 2026

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

3.6 Channel Widening (Phase 2) - 2027

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.4517	0.0000	0.4517	0.2483	0.0000	0.2483			0.0000			0.0000
Off-Road	0.7677	5.1920	6.0419	0.0201		0.2108	0.2108		0.1939	0.1939		1,944.4598	1,944.4598	0.6289		1,960.1818
Total	**0.7677**	**5.1920**	**6.0419**	**0.0201**	**0.4517**	**0.2108**	**0.6625**	**0.2483**	**0.1939**	**0.4422**		**1,944.4598**	**1,944.4598**	**0.6289**		**1,960.1818**

Permanente Creek Restoration Project - Santa Clara County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.6 Channel Widening (Phase 2) - 2027

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0175	9.1700e-003	0.1238	4.0000e-005	2.3000e-004	9.0000e-005	3.1000e-004	9.0000e-005	8.0000e-005	1.7000e-004		3.8321	3.8321	2.3400e-003	1.2300e-003	4.2563
Total	**0.0175**	**9.1700e-003**	**0.1238**	**4.0000e-005**	**2.3000e-004**	**9.0000e-005**	**3.1000e-004**	**9.0000e-005**	**8.0000e-005**	**1.7000e-004**		**3.8321**	**3.8321**	**2.3400e-003**	**1.2300e-003**	**4.2563**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.4517	0.0000	0.4517	0.2483	0.0000	0.2483			0.0000			0.0000
Off-Road	0.2464	1.0677	9.6038	0.0201		0.0329	0.0329		0.0329	0.0329	0.0000	1,944.4598	1,944.4598	0.6289		1,960.1818
Total	**0.2464**	**1.0677**	**9.6038**	**0.0201**	**0.4517**	**0.0329**	**0.4845**	**0.2483**	**0.0329**	**0.2811**	**0.0000**	**1,944.4598**	**1,944.4598**	**0.6289**		**1,960.1818**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.6 Channel Widening (Phase 2) - 2027

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0175	9.1700e-003	0.1238	4.0000e-005	2.3000e-004	9.0000e-005	3.1000e-004	9.0000e-005	8.0000e-005	1.7000e-004		3.8321	3.8321	2.3400e-003	1.2300e-003	4.2563
Total	**0.0175**	**9.1700e-003**	**0.1238**	**4.0000e-005**	**2.3000e-004**	**9.0000e-005**	**3.1000e-004**	**9.0000e-005**	**8.0000e-005**	**1.7000e-004**		**3.8321**	**3.8321**	**2.3400e-003**	**1.2300e-003**	**4.2563**

3.7 Old Crusher Foundation - 2028

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	9.9900e-003	0.0898	0.1372	2.5000e-004		3.5800e-003	3.5800e-003		3.5800e-003	3.5800e-003		23.3638	23.3638	8.6000e-004		23.3854
Total	**9.9900e-003**	**0.0898**	**0.1372**	**2.5000e-004**		**3.5800e-003**	**3.5800e-003**		**3.5800e-003**	**3.5800e-003**		**23.3638**	**23.3638**	**8.6000e-004**		**23.3854**

Permanente Creek Restoration Project - Santa Clara County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.7 Old Crusher Foundation - 2028

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.4700e-003	0.0107	0.1521	2.5000e-004		3.3000e-004	3.3000e-004		3.3000e-004	3.3000e-004	0.0000	23.3638	23.3638	8.6000e-004		23.3854
Total	**2.4700e-003**	**0.0107**	**0.1521**	**2.5000e-004**		**3.3000e-004**	**3.3000e-004**		**3.3000e-004**	**3.3000e-004**	**0.0000**	**23.3638**	**23.3638**	**8.6000e-004**		**23.3854**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.7 Old Crusher Foundation - 2028

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

3.8 Material Removal Area (Phase 1) - 2028

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.6775	0.0000	0.6775	0.3724	0.0000	0.3724			0.0000			0.0000
Off-Road	1.9262	12.3554	14.3371	0.0541		0.4602	0.4602		0.4234	0.4234		5,237.6444	5,237.6444	1.6940		5,279.9934
Total	**1.9262**	**12.3554**	**14.3371**	**0.0541**	**0.6775**	**0.4602**	**1.1377**	**0.3724**	**0.4234**	**0.7958**		**5,237.6444**	**5,237.6444**	**1.6940**		**5,279.9934**

Permanente Creek Restoration Project - Santa Clara County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.8 Material Removal Area (Phase 1) - 2028

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.6775	0.0000	0.6775	0.3724	0.0000	0.3724			0.0000			0.0000
Off-Road	0.6631	2.8734	24.9597	0.0541		0.0884	0.0884		0.0884	0.0884	0.0000	5,237.6444	5,237.6444	1.6940		5,279.9934
Total	**0.6631**	**2.8734**	**24.9597**	**0.0541**	**0.6775**	**0.0884**	**0.7659**	**0.3724**	**0.0884**	**0.4608**	**0.0000**	**5,237.6444**	**5,237.6444**	**1.6940**		**5,279.9934**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.8 Material Removal Area (Phase 1) - 2028

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

3.9 Material Removal Area (Phase 2) - 2029

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.6775	0.0000	0.6775	0.3724	0.0000	0.3724			0.0000			0.0000
Off-Road	1.9128	12.2748	14.2475	0.0538		0.4573	0.4573		0.4207	0.4207		5,201.6735	5,201.6735	1.6823		5,243.7316
Total	**1.9128**	**12.2748**	**14.2475**	**0.0538**	**0.6775**	**0.4573**	**1.1348**	**0.3724**	**0.4207**	**0.7931**		**5,201.6735**	**5,201.6735**	**1.6823**		**5,243.7316**

Permanente Creek Restoration Project - Santa Clara County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.9 Material Removal Area (Phase 2) - 2029

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0152	8.2900e-003	0.1161	4.0000e-005	2.3000e-004	8.0000e-005	3.0000e-004	9.0000e-005	7.0000e-005	1.6000e-004		3.6345	3.6345	2.0400e-003	1.1500e-003	4.0284
Total	**0.0152**	**8.2900e-003**	**0.1161**	**4.0000e-005**	**2.3000e-004**	**8.0000e-005**	**3.0000e-004**	**9.0000e-005**	**7.0000e-005**	**1.6000e-004**		**3.6345**	**3.6345**	**2.0400e-003**	**1.1500e-003**	**4.0284**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.6775	0.0000	0.6775	0.3724	0.0000	0.3724			0.0000			0.0000
Off-Road	0.6586	2.8537	24.7931	0.0538		0.0878	0.0878		0.0878	0.0878	0.0000	5,201.6735	5,201.6735	1.6823		5,243.7316
Total	**0.6586**	**2.8537**	**24.7931**	**0.0538**	**0.6775**	**0.0878**	**0.7653**	**0.3724**	**0.0878**	**0.4602**	**0.0000**	**5,201.6735**	**5,201.6735**	**1.6823**		**5,243.7316**

Permanente Creek Restoration Project - Santa Clara County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.9 Material Removal Area (Phase 2) - 2029

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0152	8.2900e-003	0.1161	4.0000e-005	2.3000e-004	8.0000e-005	3.0000e-004	9.0000e-005	7.0000e-005	1.6000e-004		3.6345	3.6345	2.0400e-003	1.1500e-003	4.0284
Total	**0.0152**	**8.2900e-003**	**0.1161**	**4.0000e-005**	**2.3000e-004**	**8.0000e-005**	**3.0000e-004**	**9.0000e-005**	**7.0000e-005**	**1.6000e-004**		**3.6345**	**3.6345**	**2.0400e-003**	**1.1500e-003**	**4.0284**

Permanente Creek Restoration Project - Santa Clara County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
User Defined Recreational	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
User Defined Recreational	14.70	6.60	6.60	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
User Defined Recreational	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
User Defined Recreational	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
User Defined Recreational	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	1.0000e-005	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.2000e-004	2.2000e-004	0.0000		2.3000e-004
Unmitigated	1.0000e-005	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.2000e-004	2.2000e-004	0.0000		2.3000e-004

Permanente Creek Restoration Project - Santa Clara County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	1.0000e-005	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.2000e-004	2.2000e-004	0.0000		2.3000e-004
Total	**1.0000e-005**	**0.0000**	**1.0000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**2.2000e-004**	**2.2000e-004**	**0.0000**		**2.3000e-004**

Permanente Creek Restoration Project - Santa Clara County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	1.0000e-005	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.2000e-004	2.2000e-004	0.0000		2.3000e-004
Total	**1.0000e-005**	**0.0000**	**1.0000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**2.2000e-004**	**2.2000e-004**	**0.0000**		**2.3000e-004**

7.0 Water Detail

7.1 Mitigation Measures Water

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

A-3 EMFAC2021 Output File

Permanente Creek Restoration Project - EMFAC2021 Output

Source: EMFAC2021 (v1.0.2) Emission Rates
Region Type: County
Region: Santa Clara
Calendar Year: 2024, 2025, 2026, 2027, 2028, 2029
Season: Annual
Vehicle Classification: EMFAC2007 Categories
Units: miles/day for CVMT and EVMT, trips/day for Trips, g/mile for RUNEX, PMBW and PMTW, g/trip for STREX, HOTSOAK and RUNLOSS, g/vehicle/day for IDLEX and DIURN. PHEV calculated based on total VMT.

Region	Calendar Year	Vehicle Category	Model Year	Speed	Fuel	Population	Total VMT	CVMT	EVMT	Trips	NOx_RUNEX	NOx_IDLEX	NOx_STREX	PM2.5_RUNEX	PM2.5_IDLEX	PM2.5_STREX	PM2.5_PMTW	PM2.5_PMBW	PM10_RUNEX	PM10_IDLEX	PM10_STREX	PM10_PMTW	PM10_PMBW	CO2_RUNEX	CO2_IDLEX	CO2_STREX	CH4_RUNEX	CH4_IDLEX	CH4_STREX
Santa Clara	2024	HHDT	Aggregate	Aggregate	Diesel	8486.693443	1001095.457	1001095.457	0	124748.3826	1.894566926	62.32042216	2.898867292	0.02567407	0.030169722	0	0.008770415	0.027453935	0.026834937	0.031533863	0	0.035081661	0.078439815	1634.100473	11997.01133	0	0.000777165	0.236630245	0
Santa Clara	2024	LDT1	Aggregate	Aggregate	Gasoline	52693.36611	1706864.169	1706864.169	0	234793.4065	0.128356647	0	0.381293891	0.001737031	0	0.002678086	0.002000001	0.003240211	0.001889145	0	0.002912598	0.008000002	0.009257745	327.2570918	0	86.38433675	0.006260741	0	0.105365286
Santa Clara	2024	LHDT1	Aggregate	Aggregate	Diesel	10107.73681	398004.1011	398004.1011	0	127142.6136	1.563015044	1.92167994	0	0.035057802	0.026804436	0	0.003000001	0.027300008	0.03664296	0.028016414	0	0.012000003	0.078000022	631.4007789	131.150333	0	0.008005976	0.005098128	0
Santa Clara	2024	LHDT2	Aggregate	Aggregate	Diesel	4663.455482	183558.3761	183558.3761	0	58660.40334	1.266101505	1.895402893	0	0.032054602	0.027000214	0	0.003000001	0.031850009	0.033503969	0.028221043	0	0.012000003	0.091000026	756.8682466	209.5618158	0	0.007405628	0.005098128	0
Santa Clara	2024	MHDT	Aggregate	Aggregate	Diesel	10390.528	434043.5933	434043.5933	0	123938.9566	1.232824299	13.11951542	1.642732197	0.014397251	0.02990206	0	0.003000001	0.015940936	0.015048231	0.031254099	0	0.012000003	0.045545531	1147.309186	2248.547162	0	0.00150743	0.01158024	0
Santa Clara	2025	HHDT	Aggregate	Aggregate	Diesel	8692.574961	1008963.948	1008963.948	0	127877.0897	1.825194406	60.9144925	2.931994928	0.025334562	0.028938075	0	0.008771993	0.027420798	0.026480079	0.030246526	0	0.035087973	0.078345136	1608.776391	11755.33723	0	0.000749625	0.235891247	0
Santa Clara	2025	LDT1	Aggregate	Aggregate	Gasoline	51680.85517	1664705.874	1664705.874	0	230185.983	0.115355426	0	0.359720012	0.00163888	0	0.002543391	0.002000001	0.00324103	0.001782432	0	0.002766169	0.008000002	0.009260087	321.4889695	0	84.45546982	0.005621132	0	0.098552424
Santa Clara	2025	LHDT1	Aggregate	Aggregate	Diesel	10387.10281	408019.3319	408019.3319	0	130656.6864	1.379237433	1.823413625	0	0.032346958	0.026692484	0	0.003000001	0.027300008	0.033809544	0.0278994	0	0.012000003	0.078000022	628.0700002	129.5472379	0	0.007467887	0.005098128	0
Santa Clara	2025	LHDT2	Aggregate	Aggregate	Diesel	4837.2356	188645.0475	188645.0475	0	60846.33861	1.13928853	1.802657825	0	0.030296284	0.027004879	0	0.003000001	0.031850009	0.031666148	0.02822592	0	0.012000003	0.091000026	750.3571027	207.2396473	0	0.007042571	0.005098128	0
Santa Clara	2025	MHDT	Aggregate	Aggregate	Diesel	10548.05912	435100.6189	435100.6189	0	125915.2277	1.128154524	12.48972596	1.646558812	0.012460624	0.02479153	0	0.003000001	0.015940886	0.013024038	0.025912493	0	0.012000003	0.045545388	1141.328021	2229.373761	0	0.001309599	0.010956747	0
Santa Clara	2026	HHDT	Aggregate	Aggregate	Diesel	8867.794797	1016011.772	1016011.772	0	130548.9889	1.761105227	59.43677827	2.955473393	0.025195217	0.027767082	0	0.008773873	0.02751348	0.026334433	0.029022586	0	0.035095492	0.078609942	1583.151138	11526.41341	0	0.000724695	0.235280043	0
Santa Clara	2026	LDT1	Aggregate	Aggregate	Gasoline	50750.46627	1625960.476	1625960.476	0	225981.5443	0.104002405	0	0.340041536	0.00154812	0	0.002420563	0.002000001	0.003241466	0.001683722	0	0.002632583	0.008000002	0.00926133	315.7925465	0	82.57768697	0.005058439	0	0.092241428
Santa Clara	2026	LHDT1	Aggregate	Aggregate	Diesel	10635.30661	416619.2958	416619.2958	0	133778.7779	1.21928089	1.732484181	0	0.030021689	0.026602873	0	0.003000001	0.027300008	0.031379137	0.027805736	0	0.012000003	0.078000022	625.2279894	128.0663971	0	0.006994052	0.005098128	0
Santa Clara	2026	LHDT2	Aggregate	Aggregate	Diesel	4995.257652	193100.7206	193100.7206	0	62834.05723	1.030069118	1.717943561	0	0.028772746	0.027013649	0	0.003000001	0.031850009	0.030073722	0.028235087	0	0.012000003	0.091000026	744.6842158	205.1132679	0	0.006720178	0.005098128	0
Santa Clara	2026	MHDT	Aggregate	Aggregate	Diesel	10675.11434	435455.3677	435455.3677	0	127504.1973	1.028859701	11.86252673	1.644140559	0.010795948	0.02038247	0	0.003000001	0.015940874	0.011284093	0.021304075	0	0.012000003	0.045545353	1134.952009	2210.329037	0	0.00113435	0.01041873	0
Santa Clara	2027	HHDT	Aggregate	Aggregate	Diesel	9011.070537	1021241.459	1021241.459	0	132754.8218	1.704042548	58.05742484	2.958034339	0.025062276	0.0267847	0	0.00877634	0.027672005	0.026195481	0.027995786	0	0.035105361	0.07906287	1556.122851	11312.43773	0	0.000701453	0.234878082	0
Santa Clara	2027	LDT1	Aggregate	Aggregate	Gasoline	49888.15483	1593479.412	1593479.412	0	222126.8834	0.093626232	0	0.322280877	0.001454777	0	0.002294769	0.002000001	0.003240788	0.001582203	0	0.002495771	0.008000002	0.009259396	310.252928	0	80.77512164	0.004546824	0	0.086445041
Santa Clara	2027	LHDT1	Aggregate	Aggregate	Diesel	10848.43998	422662.2799	422662.2799	0	136459.7276	1.084389946	1.649679663	0	0.028062473	0.026509216	0	0.003000001	0.027300008	0.029331333	0.027707846	0	0.012000003	0.078000022	622.795222	126.7206258	0	0.006587033	0.005098128	0
Santa Clara	2027	LHDT2	Aggregate	Aggregate	Diesel	5135.733672	196396.2345	196396.2345	0	64601.06884	0.939744901	1.64220307	0	0.027495523	0.027012499	0	0.003000001	0.031850009	0.028738749	0.028233885	0	0.012000003	0.091000026	739.7686125	203.206596	0	0.006443743	0.005098128	0
Santa Clara	2027	MHDT	Aggregate	Aggregate	Diesel	10767.25749	434295.527	434295.527	0	128657.1776	0.93944559	11.29117481	1.635782434	0.009400852	0.016811771	0	0.003000001	0.015940912	0.009825917	0.017571925	0	0.012000003	0.045545463	1128.562651	2191.462417	0	0.000986723	0.009986931	0
Santa Clara	2028	HHDT	Aggregate	Aggregate	Diesel	9119.078917	1024317.446	1024317.446	0	134474.3376	1.649728035	56.82183584	2.940108604	0.024929742	0.025824919	0	0.008779571	0.027829118	0.026056954	0.026992607	0	0.035118285	0.079511767	1527.999821	11109.89941	0	0.000679064	0.234702709	0
Santa Clara	2028	LDT1	Aggregate	Aggregate	Gasoline	49081.00994	1563538.266	1563538.266	0	218519.1405	0.084307943	0	0.305828271	0.00136046	0	0.002171319	0.002000001	0.003239636	0.001479624	0	0.002361508	0.008000002	0.009256103	304.9805749	0	79.07291589	0.004110549	0	0.081168562
Santa Clara	2028	LHDT1	Aggregate	Aggregate	Diesel	11024.69048	426298.0601	426298.0601	0	138676.7372	0.969402619	1.574570322	0	0.026417879	0.026447375	0	0.003000001	0.027300008	0.027612378	0.027643208	0	0.012000003	0.078000022	620.6930902	125.5014406	0	0.006234269	0.005098128	0
Santa Clara	2028	LHDT2	Aggregate	Aggregate	Diesel	5257.649939	198606.7634	198606.7634	0	66134.62211	0.865041124	1.574904929	0	0.026453546	0.026999542	0	0.003000001	0.031850009	0.027649658	0.028220342	0	0.012000003	0.091000026	735.4980568	201.5096585	0	0.006210438	0.005098128	0
Santa Clara	2028	MHDT	Aggregate	Aggregate	Diesel	10803.07831	430729.4798	430729.4798	0	129114.2453	0.860612692	10.76300356	1.608029039	0.008247655	0.013920738	0	0.003000001	0.015941011	0.008620578	0.014550172	0	0.012000003	0.045545745	1122.135219	2173.473161	0	0.000864795	0.009638929	0
Santa Clara	2029	HHDT	Aggregate	Aggregate	Diesel	9189.951296	1025176.229	1025176.229	0	135692.8403	1.603158469	55.79259022	2.911980809	0.024838891	0.025083431	0	0.008783641	0.027987037	0.025961995	0.026217592	0	0.035134564	0.079962964	1500.678395	10929.24419	0	0.000661476	0.234793126	0
Santa Clara	2029	LDT1	Aggregate	Aggregate	Gasoline	48318.69428	1536414.268	1536414.268	0	215179.526	0.075535195	0	0.290636212	0.001268957	0	0.002050251	0.002000001	0.003237853	0.001380107	0	0.002229835	0.008000002	0.009251008	299.9536579	0	77.43554551	0.003703947	0	0.076223756
Santa Clara	2029	LHDT1	Aggregate	Aggregate	Diesel	11166.16036	427809.9107	427809.9107	0	140456.2503	0.873132816	1.506548613	0	0.025010224	0.026359497	0	0.003000001	0.027300008	0.026141075	0.027551357	0	0.012000003	0.078000022	618.8511137	124.3981938	0	0.00592954	0.005098128	0
Santa Clara	2029	LHDT2	Aggregate	Aggregate	Diesel	5355.483243	199692.9236	199692.9236	0	67365.242	0.8026363	1.514320499	0	0.025577596	0.026920374	0	0.003000001	0.031850009	0.026734101	0.028137594	0	0.012000003	0.091000026	731.7367144	200.02436	0	0.006013785	0.005098128	0
Santa Clara	2029	MHDT	Aggregate	Aggregate	Diesel	10773.70764	424561.2947	424561.2947	0	128772.1002	0.791583378	10.29665014	1.574117129	0.007300054	0.011569913	0	0.003000001	0.015941141	0.00763013	0.012093053	0	0.012000003	0.045546118	1115.702794	2156.346596	0	0.000765027	0.009357026	0

Permanente Creek Restoration Project - EMFAC2021 Output

Source: EMFAC2021 (v1.0.2) Emission Rates
Region Type: County
Region: Santa Clara
Calendar Year: 2024, 2025, 2026, 2027, 2028, 2029
Season: Annual
Vehicle Classification: EMFAC2007 Categories
Units: miles/day for CVMT and EVMT, trips/day for Trips, g/mile for RUNEX, PMBW anc

Region	Calendar Year	Vehicle Category	Model Year	Speed	Fuel	N2O_RUNEX	N2O_IDLEX	N2O_STREX	ROG_RUNEX	ROG_IDLEX	ROG_STREX	ROG_HOTSOAK	ROG_RUNLOSS	ROG_DIURN	TOG_RUNEX	TOG_IDLEX	TOG_STREX	TOG_HOTSOAK	TOG_RUNLOSS	TOG_DIURN	NH3_RUNEX	CO_RUNEX	CO_IDLEX	CO_STREX	SOx_RUNEX	SOx_IDLEX	SOx_STREX
Santa Clara	2024	HHDT	Aggregate	Aggregate	Diesel	0.257453195	1.89013402	0	0.016732148	5.094584291	0	0	0	0	0.019048277	5.799796409	0	0	0	0	0.215084464	0.082524175	74.10575716	0	0.015473954	0.113604523	0
Santa Clara	2024	LDT1	Aggregate	Aggregate	Gasoline	0.009423658	0	0.038689754	0.027741271	0	0.539320629	0.165331716	0.472477354	2.667157548	0.040475389	0	0.590487693	0.165331716	0.472477354	2.667157548	0.036078996	1.427620935	0	5.253053402	0.00323527	0	0.000853997
Santa Clara	2024	LHDT1	Aggregate	Aggregate	Diesel	0.09947745	0.020662788	0	0.172363946	0.109759705	0	0	0	0	0.196224893	0.124954127	0	0	0	0	0.172780847	0.473593645	0.909745076	0	0.005982843	0.001242716	0
Santa Clara	2024	LHDT2	Aggregate	Aggregate	Diesel	0.1192449	0.033016549	0	0.159438817	0.109759705	0	0	0	0	0.181510493	0.124954127	0	0	0	0	0.184131895	0.411861281	0.909745076	0	0.007171711	0.001985705	0
Santa Clara	2024	MHDT	Aggregate	Aggregate	Diesel	0.18075903	0.354259521	0	0.032454559	0.249319387	0	0	0	0	0.036947045	0.283831143	0	0	0	0	0.210531717	0.120870515	7.556027258	0	0.010864332	0.021292397	0
Santa Clara	2025	HHDT	Aggregate	Aggregate	Diesel	0.253463376	1.852058168	0	0.016139221	5.078673859	0	0	0	0	0.018373274	5.781683593	0	0	0	0	0.215507348	0.078083371	74.00903847	0	0.01523415	0.111316014	0
Santa Clara	2025	LDT1	Aggregate	Aggregate	Gasoline	0.00868741	0	0.037511317	0.024709715	0	0.498817786	0.156962689	0.442298672	2.522359711	0.036056358	0	0.546142689	0.156962689	0.442298672	2.522359711	0.036452995	1.317415745	0	4.886115041	0.003178246	0	0.000834928
Santa Clara	2025	LHDT1	Aggregate	Aggregate	Diesel	0.098952684	0.02041022	0	0.16077922	0.109759705	0	0	0	0	0.183036452	0.124954127	0	0	0	0	0.178979738	0.43508667	0.909745076	0	0.005951282	0.001227526	0
Santa Clara	2025	LHDT2	Aggregate	Aggregate	Diesel	0.118219067	0.032650691	0	0.151622408	0.109759705	0	0	0	0	0.172612031	0.124954127	0	0	0	0	0.188496169	0.387904259	0.909745076	0	0.007110015	0.001963701	0
Santa Clara	2025	MHDT	Aggregate	Aggregate	Diesel	0.179816695	0.351238744	0	0.028195298	0.235895752	0	0	0	0	0.032098201	0.268549357	0	0	0	0	0.211891256	0.109646491	7.535392538	0	0.010807694	0.021110836	0
Santa Clara	2026	HHDT	Aggregate	Aggregate	Diesel	0.249426106	1.815991127	0	0.015602474	5.065514804	0	0	0	0	0.017762229	5.766703011	0	0	0	0	0.215913666	0.074070339	73.94193824	0	0.014991495	0.109148242	0
Santa Clara	2026	LDT1	Aggregate	Aggregate	Gasoline	0.008041011	0	0.03641187	0.02205146	0	0.461638025	0.148727252	0.417239536	2.377298253	0.032177439	0	0.50543553	0.148727252	0.417239536	2.377298253	0.036832712	1.219346167	0	4.549174395	0.003121931	0	0.000816365
Santa Clara	2026	LHDT1	Aggregate	Aggregate	Diesel	0.098504924	0.020176913	0	0.150577832	0.109759705	0	0	0	0	0.171422851	0.124954127	0	0	0	0	0.184377336	0.40171955	0.909745076	0	0.005924353	0.001213494	0
Santa Clara	2026	LHDT2	Aggregate	Aggregate	Diesel	0.117325301	0.032315679	0	0.144681466	0.109759705	0	0	0	0	0.16471023	0.124954127	0	0	0	0	0.192319501	0.367308649	0.909745076	0	0.007056261	0.001943552	0
Santa Clara	2026	MHDT	Aggregate	Aggregate	Diesel	0.178812151	0.34823824	0	0.024422247	0.224312398	0	0	0	0	0.027802869	0.25536259	0	0	0	0	0.213113233	0.099563391	7.520816284	0	0.010747317	0.020930494	0
Santa Clara	2027	HHDT	Aggregate	Aggregate	Diesel	0.245167789	1.782279171	0	0.015102101	5.056860706	0	0	0	0	0.017192592	5.75685098	0	0	0	0	0.216279576	0.070456077	73.92423642	0	0.014735553	0.107122021	0
Santa Clara	2027	LDT1	Aggregate	Aggregate	Gasoline	0.007451405	0	0.035413004	0.019635123	0	0.427722873	0.140959034	0.397237361	2.28612425	0.028651525	0	0.468302708	0.140959034	0.397237361	2.28612425	0.037251041	1.12868955	0	4.239779613	0.003067166	0	0.000798544
Santa Clara	2027	LHDT1	Aggregate	Aggregate	Diesel	0.098121641	0.019964886	0	0.141814947	0.109759705	0	0	0	0	0.161446888	0.124954127	0	0	0	0	0.188997721	0.373722264	0.909745076	0	0.005901301	0.001200742	0
Santa Clara	2027	LHDT2	Aggregate	Aggregate	Diesel	0.116550846	0.032015282	0	0.138729986	0.109759705	0	0	0	0	0.157934866	0.124954127	0	0	0	0	0.19556073	0.350532101	0.909745076	0	0.007009684	0.001925486	0
Santa Clara	2027	MHDT	Aggregate	Aggregate	Diesel	0.177805505	0.345265796	0	0.021243866	0.215015876	0	0	0	0	0.024184524	0.244779208	0	0	0	0	0.214145614	0.090922465	7.512068444	0	0.010686813	0.020751839	0
Santa Clara	2028	HHDT	Aggregate	Aggregate	Diesel	0.240736994	1.750369176	0	0.014620069	5.053084964	0	0	0	0	0.016643836	5.752552584	0	0	0	0	0.216623025	0.067122188	73.97200661	0	0.014469245	0.105204104	0
Santa Clara	2028	LDT1	Aggregate	Aggregate	Gasoline	0.00692695	0	0.034482073	0.017586415	0	0.397179186	0.135564821	0.390418252	2.261734877	0.025662056	0	0.434861215	0.135564821	0.390418252	2.261734877	0.037654401	1.051410755	0	3.96401297	0.003015043	0	0.000781716
Santa Clara	2028	LHDT1	Aggregate	Aggregate	Diesel	0.097790449	0.019772803	0	0.134220132	0.109759705	0	0	0	0	0.152800697	0.124954127	0	0	0	0	0.192970221	0.350151046	0.909745076	0	0.005881382	0.00118919	0
Santa Clara	2028	LHDT2	Aggregate	Aggregate	Diesel	0.115878018	0.031747929	0	0.133707083	0.109759705	0	0	0	0	0.152216624	0.124954127	0	0	0	0	0.198313767	0.337165852	0.909745076	0	0.006969218	0.001909406	0
Santa Clara	2028	MHDT	Aggregate	Aggregate	Diesel	0.176792861	0.342431582	0	0.018618805	0.207523499	0	0	0	0	0.021196093	0.236249707	0	0	0	0	0.215005219	0.08370472	7.507182664	0	0.010625949	0.020581491	0
Santa Clara	2029	HHDT	Aggregate	Aggregate	Diesel	0.236432492	1.721906873	0	0.014241396	5.055031616	0	0	0	0	0.016212745	5.754768699	0	0	0	0	0.216928931	0.064322083	74.08532071	0	0.014210527	0.103493407	0
Santa Clara	2029	LDT1	Aggregate	Aggregate	Gasoline	0.006438624	0	0.033624233	0.015670381	0	0.368641942	0.128603222	0.375010124	2.192925083	0.022866183	0	0.403616524	0.128603222	0.375010124	2.192925083	0.038057874	0.978505452	0	3.70419774	0.002965347	0	0.000765529
Santa Clara	2029	LHDT1	Aggregate	Aggregate	Diesel	0.097500245	0.019598986	0	0.127659495	0.109759705	0	0	0	0	0.145331848	0.124954127	0	0	0	0	0.196381599	0.330525697	0.909745076	0	0.005863929	0.001178736	0
Santa Clara	2029	LHDT2	Aggregate	Aggregate	Diesel	0.115285417	0.031510465	0	0.129473251	0.109759705	0	0	0	0	0.147396689	0.124954127	0	0	0	0	0.200682393	0.326473591	0.909745076	0	0.006933577	0.001895125	0
Santa Clara	2029	MHDT	Aggregate	Aggregate	Diesel	0.17577943	0.339733284	0	0.016470811	0.201454208	0	0	0	0	0.018750764	0.229340281	0	0	0	0	0.215725467	0.077746423	7.505570598	0	0.010565038	0.020419313	0

Exhibit B
Health Risk Assessment

ESA

B-1 Cancer Risk Calculations – 2003 OEHHA Guidance

HRA Permanente Creek Restoration Project

Construction Year 2024

Emissions Inputs

Construction Activity	Construction Year & Source	DPM Exhaust (tons/year)	PM10 Dust for speciation (tons/year)	Arsenic (tons/year)	Beryllium (tons/year)	Cadmium (tons/year)	Cobalt (tons/year)	Copper (tons/year)	Lead (tons/year)	Mercury (tons/year)	Nickel (tons/year)	Selenium (tons/year)	Chromium VI (tons/year)	Crystalline Silica (tons/year)
Concrete Channel 2024	2024_CONCRTE	0.000	0.00	2.91E-12	1.74E-12	2.91E-12	1.49E-11	3.26E-11	2.91E-12	4.65E-13	5.35E-11	5.81E-12	2.33E-13	8.63E-09
Paved road	2024_PAVED	2.07E-04	0.08	1.04E-07	6.26E-08	1.04E-07	6.68E-08	2.09E-06	1.92E-07	1.17E-08	4.51E-06	2.09E-07	1.59E-07	5.93E-04
Unpaved road	2024_CCP_UNPV	6.27E-05	0.20	2.56E-07	1.54E-07	2.56E-07	1.64E-07	5.12E-06	4.71E-07	2.87E-08	1.11E-05	5.12E-07	3.89E-07	1.46E-03
Channel Widening 2024	2024_CHAN_RCK	0.002	0.16	2.05E-07	1.23E-07	2.05E-07	1.05E-06	2.29E-06	2.05E-07	3.28E-08	3.77E-06	4.09E-07	1.64E-08	6.08E-04
Paved road	2024_PAVED	1.80E-03	2.39	2.99E-06	1.79E-06	2.99E-06	1.91E-06	5.98E-05	5.50E-06	3.35E-07	1.29E-04	5.98E-06	4.54E-06	1.70E-02
Rock Pile Area 2025	2025_CHAN_RCK	0.006	0.25	3.16E-07	1.89E-07	3.16E-07	1.62E-06	3.54E-06	3.16E-07	5.05E-08	5.81E-06	6.31E-07	2.53E-08	9.37E-04
Paved road	2025_PAVED	5.95E-03	2.44	3.05E-06	1.83E-06	3.05E-06	1.95E-06	6.10E-05	5.61E-06	3.41E-07	1.32E-04	6.10E-06	4.63E-06	1.73E-02
Rock Pile Area 2026	2026_CHAN_RCK	0.006	0.25	3.16E-07	1.89E-07	3.16E-07	1.62E-06	3.54E-06	3.16E-07	5.05E-08	5.81E-06	6.31E-07	2.53E-08	9.37E-04
Paved road	2026_PAVED	5.84E-03	2.44	3.05E-06	1.83E-06	3.05E-06	1.95E-06	6.10E-05	5.61E-06	3.41E-07	1.32E-04	6.10E-06	4.63E-06	1.73E-02
Channel Widening 2027	2027_CHAN_RCK	0.002	0.98	1.23E-06	7.36E-07	1.23E-06	6.28E-06	1.37E-05	1.23E-06	1.96E-07	2.26E-05	2.45E-06	9.82E-08	3.64E-03
Paved road	2027_PAVED	5.61E-03	2.39	2.99E-06	1.79E-06	2.99E-06	1.91E-06	5.98E-05	5.50E-06	3.35E-07	1.29E-04	5.98E-06	4.54E-06	1.70E-02
Material Removal 2028	2028_MATRMVL	0.001	0.25	3.15E-07	1.89E-07	3.15E-07	1.62E-06	3.53E-06	3.15E-07	5.05E-08	5.80E-06	6.31E-07	2.52E-08	9.37E-04
Paved road	2028_PAVED	5.57E-03	2.39	2.99E-06	1.80E-06	2.99E-06	1.92E-06	5.98E-05	5.51E-06	3.35E-07	1.29E-04	5.98E-06	4.55E-06	1.70E-02
Unpaved road	2028_UNPAVED	3.40E-03	11.84	1.48E-05	8.88E-06	1.48E-05	9.47E-06	2.96E-04	2.72E-05	1.66E-06	6.40E-04	2.96E-05	2.25E-05	8.41E-02
Material Removal 2029	2029_MATRMVL	0.001	0.25	3.15E-07	1.89E-07	3.15E-07	1.62E-06	3.53E-06	3.15E-07	5.05E-08	5.80E-06	6.31E-07	2.52E-08	9.37E-04
Paved road	2029_PAVED	5.56E-03	2.41	3.01E-06	1.81E-06	3.01E-06	1.93E-06	6.03E-05	5.55E-06	3.38E-07	1.30E-04	6.03E-06	4.58E-06	1.71E-02
Unpaved road	2029_UNPAVED	3.39E-03	11.93	1.49E-05	8.95E-06	1.49E-05	9.55E-06	2.98E-04	2.74E-05	1.67E-06	6.44E-04	2.98E-05	2.27E-05	8.47E-02

Construction Activity	Construction Year	DPM (g/s)	Arsenic (g/s)	Beryllium (g/s)	Cadmium (g/s)	Cobalt (g/s)	Copper (g/s)	Lead (g/s)	Mercury (g/s)	Nickel (g/s)	Selenium (g/s)	Chromium VI (g/s)	Crystalline Silica (g/s)
Concrete Channel 2024	2024_CONCRTE	2.877E-07	8.36E-14	5.02E-14	8.36E-14	4.28E-13	9.37E-13	8.36E-14	1.34E-14	1.54E-12	1.67E-13	6.69E-15	2.48E-10
Paved road	2024_PAVED	5.948E-06	3.00E-09	1.80E-09	3.00E-09	1.92E-09	6.01E-08	5.53E-09	3.36E-10	1.30E-07	6.01E-09	4.56E-09	1.71E-05
Unpaved road	2024_CCP_UNPV	1.802E-06	7.37E-09	4.42E-09	7.37E-09	4.72E-09	1.47E-07	1.36E-08	8.26E-10	3.18E-07	1.47E-08	1.12E-08	4.19E-05
Channel Widening 2024	2024_CHAN_RCK	5.566E-05	5.889E-09	3.533E-09	5.889E-09	3.015E-08	6.595E-08	5.889E-09	9.422E-10	1.084E-07	1.178E-08	4.711E-10	1.749E-05
Paved road	2024_PAVED	5.173E-05	8.597E-08	5.158E-08	8.597E-08	5.502E-08	1.719E-06	1.582E-07	9.629E-09	3.714E-06	1.719E-07	1.307E-07	4.883E-04
Rock Pile Area 2025	2025_CHAN_RCK	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Paved road	2025_PAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Rock Pile Area 2026	2026_CHAN_RCK	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Paved road	2026_PAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Channel Widening 2027	2027_CHAN_RCK	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Paved road	2027_PAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Material Removal 2028	2028_MATRMVL	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Paved road	2028_PAVED	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Unpaved road	2028_UNPAVED	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Material Removal 2029	2029_MATRMVL	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Paved road	2029_PAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Unpaved road	2029_UNPAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

N/A = not including PM10 on-site dust in HRA calculation; it is only for speciating metals.

Exposure Duration, ED

	Exposure Start	3rd Trimester	0<2	2<16	16<30
Years	1/1/2024	0.25	0.75	0	0

Risk Factors

	Abbreviation	UOM	3rd Trimester	0<2	2<16	16<30
Daily Breathing Rate (95th %'ile)	DBR	L/kg-day	361	581	581	302
Fraction Of Time At Home [a]	FAH	unitless	0.85	0.85	0.72	0.73
Exposure Frequency	EF	days/year	0.96	0.96	0.96	0.96
Age Sensitivity Factor	ASF	unitless	10	10	3	1.7
Inhalation Absorption Factor	A	unitless	1	1	1	1
Conversion Factor	CF_1	m^3/L	0.001	0.001	0.001	0.001
Conversion Factor	CF_2	$\mu g/m^3$	0.001	0.001	0.001	0.001
Averaging Time (for residential exposure)	AT	years	70.00	70.00	70.00	70.00

[a] assume school or daycare will have cancer risk of >1 per million

Cancer Potency Factor, CPF

TAC	UOM	
DPM	$mg/kg\text{-}day^{-1}$	1.1
Arsenic	$mg/kg\text{-}day^{-1}$	12
Beryllium	$mg/kg\text{-}day^{-1}$	8.4
Cadmium	$mg/kg\text{-}day^{-1}$	15
Cobalt	$mg/kg\text{-}day^{-1}$	27
Lead	$mg/kg\text{-}day^{-1}$	0.04
Nickel	$mg/kg\text{-}day^{-1}$	0.91
Chromium VI	$mg/kg\text{-}day^{-1}$	510

Intake Factor for Inhalation, IF (m^3/kg-day)

Equation	3rd Trimester	0<2	2<16	16<30
DBR*FAH*EF*ED*ASF*A*CF/AT	0.011	0.051	0.000	0.000

Risk Calculation Part 1, R1

	TAC	3rd Trimester	0<2	2<16	16<30
IF*CPF*CF	DPM	1.16E-05	5.58E-05	0.00E+00	0.00E+00
	Arsenic	1.26E-04	6.09E-04	0.00E+00	0.00E+00
	Beryllium	8.83E-05	4.26E-04	0.00E+00	0.00E+00
	Cadmium	1.58E-04	7.61E-04	0.00E+00	0.00E+00
	Cobalt	2.84E-04	1.37E-03	0.00E+00	0.00E+00
	Lead	4.20E-07	2.03E-06	0.00E+00	0.00E+00
	Nickel	9.56E-06	4.62E-05	0.00E+00	0.00E+00
	Chromium VI	5.36E-03	2.59E-02	0.00E+00	0.00E+00

	Max		UTM X	UTM Y
CT House	0.036498396	per million	581336.22	4131207.48
Res	0.50981567	per million	581848.86	4130984.94

Risk Calculation Part 2, $\sum R1*C_{TAC}$

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)								3rd Trimester	0<2	2<16	16<30	Cancer Risk - 2024	Receptor Type	Cancer Risk Total
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Cobalt	Lead	Nickel	Chromium VI					(per million)		(per million)
581336.22_4131207.48	581336.22	4131207.48	6.80E-05	1.05E-07	6.28E-08	1.05E-07	6.75E-08	1.92E-07	4.51E-06	1.59E-07	7.85631E-10	3.79323E-09	0	0	0.0046	CT House	0.0365
581554.22_4130688.06	581554.22	4130688.06	4.73E-05	7.23E-08	4.34E-08	7.23E-08	4.74E-08	1.33E-07	3.12E-06	1.09E-07	5.47066E-10	2.64138E-09	0	0	0.0032	Res	0.0249
579793.36_4131503.29	579793.36	4131503.29	4.22E-06	3.82E-09	2.29E-09	3.82E-09	3.36E-09	6.86E-09	1.60E-07	5.51E-09	4.8765E-11	2.3545E-10	0	0	0.0003	Acute	0.0022
580488.37_4131517.71	580488.37	4131517.71	5.66E-06	7.89E-09	4.73E-09	7.89E-09	5.58E-09	1.44E-08	3.38E-07	1.18E-08	6.53906E-11	3.15722E-10	0	0	0.0004	Acute	0.0029
581678.43_4131040.03	581678.43	4131040.03	2.14E-04	3.30E-07	1.98E-07	3.30E-07	2.12E-07	6.07E-07	1.43E-05	5.01E-07	2.47759E-09	1.19625E-08	0	0	0.0144	Res	0.1158
581635.43_4130978.54	581635.43	4130978.54	4.33E-04	6.68E-07	4.01E-07	6.68E-07	4.28E-07	1.23E-06	2.88E-05	1.01E-06	5.00589E-09	2.41697E-08	0	0	0.0292	Res	0.2341
581830.06_4131027.55	581830.06	4131027.55	1.97E-04	3.03E-07	1.82E-07	3.03E-07	1.95E-07	5.58E-07	1.31E-05	4.61E-07	2.27999E-09	1.10083E-08	0	0	0.0133	Res	0.1066
581727.48_4130976.54	581727.48	4130976.54	5.24E-04	8.07E-07	4.84E-07	8.07E-07	5.17E-07	1.49E-06	3.49E-05	1.23E-06	6.05239E-09	2.92225E-08	0	0	0.0353	Res	0.2833
581789.11_4130419.65	581789.11	4130419.65	3.68E-05	5.44E-08	3.27E-08	5.44E-08	3.63E-08	9.99E-08	2.34E-06	8.23E-08	4.25349E-10	2.0537E-09	0	0	0.0025	Res	0.0192
581700.32_4130781.89	581700.32	4130781.89	1.05E-04	1.62E-07	9.74E-08	1.62E-07	1.05E-07	2.99E-07	7.01E-06	2.47E-07	1.21711E-09	5.87653E-09	0	0	0.0071	Res	0.0565
581426.07_4131299.01	581426.07	4131299.01	2.49E-05	3.77E-08	2.26E-08	3.77E-08	2.46E-08	6.93E-08	1.63E-06	5.72E-08	2.87629E-10	1.38874E-09	0	0	0.0017	Acute	0.0133
582301.42_4129474.56	582301.42	4129474.56	1.32E-05	1.75E-08	1.05E-08	1.75E-08	1.26E-08	3.20E-08	7.50E-07	2.62E-08	1.53105E-10	7.39232E-10	0	0	0.0009	Res	0.0067
582357.99_4129474.56	582357.99	4129474.56	1.24E-05	1.63E-08	9.79E-09	1.63E-08	1.17E-08	2.98E-08	6.98E-07	2.44E-08	1.43125E-10	6.91044E-10	0	0	0.0008	Res	0.0062
582414.56_4129474.56	582414.56	4129474.56	1.16E-05	1.52E-08	9.11E-09	1.52E-08	1.09E-08	2.77E-08	6.49E-07	2.27E-08	1.34068E-10	6.47315E-10	0	0	0.0008	Res	0.0058
582471.13_4129474.56	582471.13	4129474.56	1.09E-05	1.42E-08	8.49E-09	1.42E-08	1.02E-08	2.58E-08	6.05E-07	2.11E-08	1.25812E-10	6.07453E-10	0	0	0.0007	Res	0.0055
582527.7_4129474.56	582527.7	4129474.56	1.03E-05	1.33E-08	7.97E-09	1.33E-08	9.59E-09	2.42E-08	5.68E-07	1.98E-08	1.18724E-10	5.73229E-10	0	0	0.0007	Res	0.0052
582584.27_4129474.56	582584.27	4129474.56	9.65E-06	1.24E-08	7.44E-09	1.24E-08	8.97E-09	2.26E-08	5.30E-07	1.85E-08	1.1154E-10	5.38544E-10	0	0	0.0007	Res	0.0049
582640.84_4129474.56	582640.84	4129474.56	9.01E-06	1.15E-08	6.90E-09	1.15E-08	8.34E-09	2.10E-08	4.91E-07	1.71E-08	1.04164E-10	5.02929E-10	0	0	0.0006	Res	0.0046
582244.85_4129558.47	582244.85	4129558.47	1.37E-05	1.76E-08	1.06E-08	1.76E-08	1.28E-08	3.22E-08	7.53E-07	2.63E-08	1.58592E-10	7.65722E-10	0	0	0.0009	Res	0.0069
582301.42_4129558.47	582301.42	4129558.47	1.34E-05	1.77E-08	1.06E-08	1.77E-08	1.27E-08	3.22E-08	7.55E-07	2.64E-08	1.55086E-10	7.48795E-10	0	0	0.0009	Res	0.0067
582357.99_4129558.47	582357.99	4129558.47	1.26E-05	1.66E-08	9.97E-09	1.66E-08	1.19E-08	3.03E-08	7.11E-07	2.48E-08	1.46018E-10	7.0501E-10	0	0	0.0009	Res	0.0064
582414.56_4129558.47	582414.56	4129558.47	1.18E-05	1.55E-08	9.28E-09	1.55E-08	1.11E-08	2.82E-08	6.61E-07	2.31E-08	1.36781E-10	6.60416E-10	0	0	0.0008	Res	0.0060
582471.13_4129558.47	582471.13	4129558.47	1.10E-05	1.43E-08	8.59E-09	1.43E-08	1.03E-08	2.61E-08	6.12E-07	2.14E-08	1.27469E-10	6.15452E-10	0	0	0.0007	Res	0.0056
582527.7_4129558.47	582527.7	4129558.47	1.03E-05	1.33E-08	7.99E-09	1.33E-08	9.61E-09	2.43E-08	5.69E-07	1.99E-08	1.19325E-10	5.76133E-10	0	0	0.0007	Res	0.0052
582584.27_4129558.47	582584.27	4129558.47	9.66E-06	1.24E-08	7.43E-09	1.24E-08	8.96E-09	2.26E-08	5.29E-07	1.85E-08	1.11707E-10	5.39348E-10	0	0	0.0007	Res	0.0049
582640.84_4129558.47	582640.84	4129558.47	9.11E-06	1.16E-08	6.96E-09	1.16E-08	8.42E-09	2.12E-08	4.96E-07	1.73E-08	1.05291E-10	5.08373E-10	0	0	0.0006	Res	0.0046
582697.41_4129558.47	582697.41	4129558.47	8.58E-06	1.09E-08	6.52E-09	1.09E-08	7.91E-09	1.98E-08	4.64E-07	1.62E-08	9.91796E-11	4.78864E-10	0	0	0.0006	Res	0.0044
582244.85_4129642.38	582244.85	4129642.38	1.24E-05	1.50E-08	9.00E-09	1.50E-08	1.12E-08	2.73E-08	6.39E-07	2.23E-08	1.43765E-10	6.94133E-10	0	0	0.0008	Res	0.0062
582301.42_4129642.38	582301.42	4129642.38	1.32E-05	1.70E-08	1.02E-08	1.70E-08	1.23E-08	3.10E-08	7.25E-07	2.53E-08	1.52342E-10	7.35545E-10	0	0	0.0009	Res	0.0066
582357.99_4129642.38	582357.99	4129642.38	1.28E-05	1.68E-08	1.01E-08	1.68E-08	1.21E-08	3.07E-08	7.20E-07	2.52E-08	1.48116E-10	7.15142E-10	0	0	0.0009	Res	0.0065
582414.56_4129642.38	582414.56	4129642.38	1.20E-05	1.57E-08	9.43E-09	1.57E-08	1.13E-08	2.87E-08	6.72E-07	2.35E-08	1.38968E-10	6.70972E-10	0	0	0.0008	Res	0.0061
582471.13_4129642.38	582471.13	4129642.38	1.13E-05	1.46E-08	8.78E-09	1.46E-08	1.05E-08	2.67E-08	6.26E-07	2.19E-08	1.30072E-10	6.28018E-10	0	0	0.0008	Res	0.0057
582527.7_4129642.38	582527.7	4129642.38	1.06E-05	1.37E-08	8.20E-09	1.37E-08	9.83E-09	2.49E-08	5.84E-07	2.04E-08	1.22122E-10	5.89637E-10	0	0	0.0007	Res	0.0054
582584.27_4129642.38	582584.27	4129642.38	9.84E-06	1.26E-08	7.58E-09	1.26E-08	9.13E-09	2.31E-08	5.40E-07	1.89E-08	1.13783E-10	5.49373E-10	0	0	0.0007	Res	0.0050
582640.84_4129642.38	582640.84	4129642.38	9.22E-06	1.18E-08	7.06E-09	1.18E-08	8.52E-09	2.15E-08	5.03E-07	1.76E-08	1.06587E-10	5.14631E-10	0	0	0.0006	Res	0.0047
582697.41_4129642.38	582697.41	4129642.38	8.66E-06	1.10E-08	6.59E-09	1.10E-08	7.97E-09	2.00E-08	4.69E-07	1.64E-08	1.00051E-10	4.83071E-10	0	0	0.0006	Res	0.0044
582753.98_4129642.38	582753.98	4129642.38	8.11E-06	1.02E-08	6.14E-09	1.02E-08	7.45E-09	1.86E-08	4.37E-07	1.53E-08	9.37953E-11	4.52868E-10	0	0	0.0005	Res	0.0041
582810.55_4129642.38	582810.55	4129642.38	7.63E-06	9.55E-09	5.73E-09	9.55E-09	6.99E-09	1.74E-08	4.08E-07	1.42E-08	8.8211E-11	4.25905E-10	0	0	0.0005	Res	0.0039
582867.12_4129642.38	582867.12	4129642.38	7.11E-06	8.83E-09	5.30E-09	8.83E-09	6.49E-09	1.61E-08	3.77E-07	1.32E-08	8.22265E-11	3.9701E-10	0	0	0.0005	Res	0.0036
582244.85_4129726.29	582244.85	4129726.29	1.33E-05	1.66E-08	9.94E-09	1.66E-08	1.22E-08	3.02E-08	7.07E-07	2.47E-08	1.53798E-10	7.42578E-10	0	0	0.0009	Res	0.0067
582301.42_4129726.29	582301.42	4129726.29	1.29E-05	1.63E-08	9.77E-09	1.63E-08	1.19E-08	2.97E-08	6.96E-07	2.43E-08	1.4861E-10	7.17529E-10	0	0	0.0009	Res	0.0065
582357.99_4129726.29	582357.99	4129726.29	1.29E-05	1.69E-08	1.01E-08	1.69E-08	1.21E-08	3.08E-08	7.22E-07	2.52E-08	1.48686E-10	7.17894E-10	0	0	0.0009	Res	0.0065
582414.56_4129726.29	582414.56	4129726.29	1.22E-05	1.60E-08	9.59E-09	1.60E-08	1.14E-08	2.92E-08	6.84E-07	2.39E-08	1.40941E-10	6.80498E-10	0	0	0.0008	Res	0.0062
582471.13_4129726.29	582471.13	4129726.29	1.15E-05	1.50E-08	8.98E-09	1.50E-08	1.07E-08	2.73E-08	6.40E-07	2.24E-08	1.32559E-10	6.4003E-10	0	0	0.0008	Res	0.0058
582527.7_4129726.29	582527.7	4129726.29	1.08E-05	1.40E-08	8.38E-09	1.40E-08	1.00E-08	2.55E-08	5.98E-07	2.09E-08	1.24363E-10	6.00455E-10	0	0	0.0007	Res	0.0055
582584.27_4129726.29	582584.27	4129726.29	1.01E-05	1.30E-08	7.81E-09	1.30E-08	9.36E-09	2.38E-08	5.57E-07	1.95E-08	1.16518E-10	5.62579E-10	0	0	0.0007	Res	0.0051

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)								Risk Calculation Part 2, $\sum R1*C_{TAC}$						Cancer Risk Total
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Cobalt	Lead	Nickel	Chromium VI	3rd Trimester	0<2	2<16	16<30	Cancer Risk - 2024 (per million)	Receptor Type	(per million)
582640.84_4129726.29	582640.84	4129726.29	9.43E-06	1.21E-08	7.26E-09	1.21E-08	8.73E-09	2.21E-08	5.18E-07	1.81E-08	1.08989E-10	5.26227E-10	0	0	0.0006	Res	0.0048
582697.41_4129726.29	582697.41	4129726.29	8.76E-06	1.12E-08	6.70E-09	1.12E-08	8.08E-09	2.04E-08	4.77E-07	1.67E-08	1.0126E-10	4.88909E-10	0	0	0.0006	Res	0.0045
582753.98_4129726.29	582753.98	4129726.29	8.11E-06	1.02E-08	6.14E-09	1.02E-08	7.45E-09	1.87E-08	4.37E-07	1.53E-08	9.37101E-11	4.52456E-10	0	0	0.0005	Res	0.0041
582810.55_4129726.29	582810.55	4129726.29	7.44E-06	9.29E-09	5.58E-09	9.29E-09	6.80E-09	1.69E-08	3.97E-07	1.38E-08	8.59667E-11	4.15069E-10	0	0	0.0005	Res	0.0038
582244.85_4129810.2	582244.85	4129810.2	1.30E-05	1.59E-08	9.57E-09	1.59E-08	1.18E-08	2.91E-08	6.80E-07	2.37E-08	1.49738E-10	7.22975E-10	0	0	0.0009	Res	0.0065
582301.42_4129810.2	582301.42	4129810.2	1.29E-05	1.65E-08	9.88E-09	1.65E-08	1.20E-08	3.00E-08	7.03E-07	2.46E-08	1.49301E-10	7.20866E-10	0	0	0.0009	Res	0.0065
582357.99_4129810.2	582357.99	4129810.2	1.27E-05	1.65E-08	9.93E-09	1.65E-08	1.19E-08	3.02E-08	7.08E-07	2.47E-08	1.46564E-10	7.07651E-10	0	0	0.0009	Res	0.0064
582414.56_4129810.2	582414.56	4129810.2	1.22E-05	1.61E-08	9.63E-09	1.61E-08	1.15E-08	2.93E-08	6.87E-07	2.40E-08	1.4122E-10	6.81844E-10	0	0	0.0008	Res	0.0062
582471.13_4129810.2	582471.13	4129810.2	1.16E-05	1.52E-08	9.11E-09	1.52E-08	1.08E-08	2.77E-08	6.50E-07	2.27E-08	1.33826E-10	6.46148E-10	0	0	0.0008	Res	0.0059
582527.7_4129810.2	582527.7	4129810.2	1.09E-05	1.42E-08	8.50E-09	1.42E-08	1.01E-08	2.59E-08	6.06E-07	2.12E-08	1.25469E-10	6.05798E-10	0	0	0.0007	Res	0.0055
582584.27_4129810.2	582584.27	4129810.2	1.01E-05	1.31E-08	7.87E-09	1.31E-08	9.41E-09	2.40E-08	5.61E-07	1.96E-08	1.16965E-10	5.64739E-10	0	0	0.0007	Res	0.0052
582640.84_4129810.2	582640.84	4129810.2	9.30E-06	1.19E-08	7.17E-09	1.19E-08	8.61E-09	2.18E-08	5.11E-07	1.79E-08	1.07482E-10	5.18949E-10	0	0	0.0006	Res	0.0048
582697.41_4129810.2	582697.41	4129810.2	8.56E-06	1.09E-08	6.54E-09	1.09E-08	7.90E-09	1.99E-08	4.66E-07	1.63E-08	9.89974E-11	4.77985E-10	0	0	0.0006	Res	0.0044
581905.43_4129894.11	581905.43	4129894.11	1.57E-05	2.11E-08	1.26E-08	2.11E-08	1.48E-08	3.85E-08	9.03E-07	3.16E-08	1.81315E-10	8.75434E-10	0	0	0.0011	Res	0.0081
581962_4129894.11	581962	4129894.11	1.67E-05	2.11E-08	1.27E-08	2.11E-08	1.53E-08	3.85E-08	9.03E-07	3.15E-08	1.92503E-10	9.29453E-10	0	0	0.0011	Res	0.0085
582131.71_4129894.11	582131.71	4129894.11	1.48E-05	1.83E-08	1.10E-08	1.83E-08	1.34E-08	3.33E-08	7.81E-07	2.72E-08	1.70663E-10	8.24006E-10	0	0	0.0010	Res	0.0075
582188.28_4129894.11	582188.28	4129894.11	1.41E-05	1.76E-08	1.06E-08	1.76E-08	1.29E-08	3.22E-08	7.53E-07	2.63E-08	1.63009E-10	7.87047E-10	0	0	0.0010	Res	0.0072
582244.85_4129894.11	582244.85	4129894.11	1.37E-05	1.75E-08	1.05E-08	1.75E-08	1.26E-08	3.18E-08	7.46E-07	2.61E-08	1.58049E-10	7.63101E-10	0	0	0.0009	Res	0.0069
582301.42_4129894.11	582301.42	4129894.11	1.31E-05	1.70E-08	1.02E-08	1.70E-08	1.23E-08	3.11E-08	7.28E-07	2.54E-08	1.51843E-10	7.33139E-10	0	0	0.0009	Res	0.0067
582357.99_4129894.11	582357.99	4129894.11	1.25E-05	1.63E-08	9.79E-09	1.63E-08	1.17E-08	2.98E-08	6.98E-07	2.44E-08	1.4442E-10	6.97298E-10	0	0	0.0008	Res	0.0063
582414.56_4129894.11	582414.56	4129894.11	1.24E-05	1.64E-08	9.87E-09	1.64E-08	1.17E-08	3.00E-08	7.04E-07	2.46E-08	1.43474E-10	6.92731E-10	0	0	0.0008	Res	0.0063
582471.13_4129894.11	582471.13	4129894.11	1.16E-05	1.53E-08	9.17E-09	1.53E-08	1.09E-08	2.79E-08	6.54E-07	2.29E-08	1.33972E-10	6.46852E-10	0	0	0.0008	Res	0.0059
582527.7_4129894.11	582527.7	4129894.11	1.07E-05	1.40E-08	8.41E-09	1.40E-08	9.99E-09	2.56E-08	6.00E-07	2.10E-08	1.23782E-10	5.97653E-10	0	0	0.0007	Res	0.0055
582584.27_4129894.11	582584.27	4129894.11	9.85E-06	1.28E-08	7.67E-09	1.28E-08	9.16E-09	2.33E-08	5.47E-07	1.91E-08	1.13892E-10	5.49901E-10	0	0	0.0007	Res	0.0050
582640.84_4129894.11	582640.84	4129894.11	9.04E-06	1.16E-08	6.98E-09	1.16E-08	8.37E-09	2.12E-08	4.97E-07	1.74E-08	1.04536E-10	5.04726E-10	0	0	0.0006	Res	0.0046
582697.41_4129894.11	582697.41	4129894.11	8.29E-06	1.06E-08	6.33E-09	1.06E-08	7.64E-09	1.93E-08	4.51E-07	1.58E-08	9.58529E-11	4.62802E-10	0	0	0.0006	Res	0.0042
581962_4129978.02	581962	4129978.02	1.72E-05	2.19E-08	1.32E-08	2.19E-08	1.58E-08	4.00E-08	9.37E-07	3.28E-08	1.98449E-10	9.5816E-10	0	0	0.0012	Res	0.0088
582018.57_4129978.02	582018.57	4129978.02	1.64E-05	2.05E-08	1.23E-08	2.05E-08	1.50E-08	3.74E-08	8.77E-07	3.06E-08	1.89439E-10	9.14661E-10	0	0	0.0011	Res	0.0083
582075.14_4129978.02	582075.14	4129978.02	1.67E-05	2.14E-08	1.28E-08	2.14E-08	1.54E-08	3.90E-08	9.14E-07	3.19E-08	1.92816E-10	9.30966E-10	0	0	0.0011	Res	0.0085
582131.71_4129978.02	582131.71	4129978.02	1.64E-05	2.16E-08	1.29E-08	2.16E-08	1.54E-08	3.94E-08	9.22E-07	3.23E-08	1.89776E-10	9.16287E-10	0	0	0.0011	Res	0.0084
582188.28_4129978.02	582188.28	4129978.02	1.62E-05	2.19E-08	1.31E-08	2.19E-08	1.54E-08	4.00E-08	9.38E-07	3.28E-08	1.87579E-10	9.05682E-10	0	0	0.0011	Res	0.0083
582244.85_4129978.02	582244.85	4129978.02	1.47E-05	1.97E-08	1.18E-08	1.97E-08	1.40E-08	3.60E-08	8.44E-07	2.95E-08	1.70403E-10	8.2275E-10	0	0	0.0010	Res	0.0075
582301.42_4129978.02	582301.42	4129978.02	1.44E-05	1.94E-08	1.16E-08	1.94E-08	1.36E-08	3.55E-08	8.32E-07	2.91E-08	1.66049E-10	8.01729E-10	0	0	0.0010	Res	0.0074
582357.99_4129978.02	582357.99	4129978.02	1.35E-05	1.82E-08	1.09E-08	1.82E-08	1.28E-08	3.32E-08	7.79E-07	2.73E-08	1.5612E-10	7.53787E-10	0	0	0.0009	Res	0.0069
582414.56_4129978.02	582414.56	4129978.02	1.25E-05	1.67E-08	1.00E-08	1.67E-08	1.18E-08	3.06E-08	7.16E-07	2.51E-08	1.44494E-10	6.97653E-10	0	0	0.0008	Res	0.0064
582471.13_4129978.02	582471.13	4129978.02	1.15E-05	1.52E-08	9.15E-09	1.52E-08	1.08E-08	2.79E-08	6.53E-07	2.28E-08	1.32769E-10	6.41044E-10	0	0	0.0008	Res	0.0059
582527.7_4129978.02	582527.7	4129978.02	1.05E-05	1.38E-08	8.30E-09	1.38E-08	9.82E-09	2.53E-08	5.92E-07	2.07E-08	1.21479E-10	5.86531E-10	0	0	0.0007	Res	0.0054
582584.27_4129978.02	582584.27	4129978.02	9.61E-06	1.25E-08	7.51E-09	1.25E-08	8.94E-09	2.29E-08	5.36E-07	1.87E-08	1.11041E-10	5.36136E-10	0	0	0.0006	Res	0.0049
582640.84_4129978.02	582640.84	4129978.02	8.79E-06	1.13E-08	6.81E-09	1.13E-08	8.15E-09	2.07E-08	4.85E-07	1.70E-08	1.01664E-10	4.90862E-10	0	0	0.0006	Res	0.0045
582697.41_4129978.02	582697.41	4129978.02	8.05E-06	1.03E-08	6.16E-09	1.03E-08	7.42E-09	1.87E-08	4.39E-07	1.53E-08	9.30334E-11	4.49189E-10	0	0	0.0005	Res	0.0041
582753.98_4129978.02	582753.98	4129978.02	7.32E-06	9.21E-09	5.53E-09	9.21E-09	6.71E-09	1.68E-08	3.93E-07	1.37E-08	8.45787E-11	4.08367E-10	0	0	0.0005	Res	0.0037
582810.55_4129978.02	582810.55	4129978.02	6.53E-06	8.08E-09	4.85E-09	8.08E-09	5.94E-09	1.47E-08	3.45E-07	1.20E-08	7.54586E-11	3.64333E-10	0	0	0.0004	Res	0.0033
581905.43_4130061.93	581905.43	4130061.93	2.37E-05	3.27E-08	1.96E-08	3.27E-08	2.28E-08	5.98E-08	1.40E-06	4.91E-08	2.73995E-10	1.32292E-09	0	0	0.0016	Res	0.0121
581962_4130061.93	581962	4130061.93	2.23E-05	3.07E-08	1.84E-08	3.07E-08	2.14E-08	5.62E-08	1.32E-06	4.61E-08	2.57424E-10	1.24291E-09	0	0	0.0015	Res	0.0114
582018.57_4130061.93	582018.57	4130061.93	1.92E-05	2.56E-08	1.54E-08	2.56E-08	1.80E-08	4.68E-08	1.10E-06	3.84E-08	2.21535E-10	1.06963E-09	0	0	0.0013	Res	0.0098
582075.14_4130061.93	582075.14	4130061.93	1.72E-05	2.27E-08	1.36E-08	2.27E-08	1.61E-08	4.14E-08	9.70E-07	3.39E-08	1.9885E-10	9.60099E-10	0	0	0.0012	Res	0.0088
582131.71_4130061.93	582131.71	4130061.93	1.67E-05	2.25E-08	1.35E-08	2.25E-08	1.58E-08	4.11E-08	9.63E-07	3.37E-08	1.93521E-10	9.34369E-10	0	0	0.0011	Res	0.0086
582188.28_4130061.93	582188.28	4130061.93	1.63E-05	2.22E-08	1.33E-08	2.22E-08	1.55E-08	4.07E-08	9.53E-07	3.34E-08	1.87997E-10	9.07697E-10	0	0	0.0011	Res	0.0083
582244.85_4130061.93	582244.85	4130061.93	1.58E-05	2.17E-08	1.30E-08	2.17E-08	1.51E-08	3.98E-08	9.32E-07	3.26E-08	1.82247E-10	8.79935E-10	0	0	0.0011	Res	0.0081
582301.42_4130061.93	582301.42	4130061.93	1.46E-05	2.00E-08	1.20E-08	2.00E-08	1.39E-08	3.66E-08	8.59E-07	3.01E-08	1.68982E-10	8.15886E-10	0	0	0.0010	Res	0.0075
582357.99_4130061.93	582357.99	4130061.93	1.36E-05	1.85E-08	1.11E-08	1.85E-08	1.29E-08	3.38E-08	7.91E-07	2.77E-08	1.5664E-10	7.56297E-10	0	0	0.0009	Res	0.0070
582414.56_4130061.93	582414.56	4130061.93	1.25E-05	1.68E-08	1.01E-08	1.68E-08	1.18E-08	3.08E-08	7.22E-07	2.53E-08	1.43918E-10	6.94871E-10	0	0	0.0008	Res	0.0064
582471.13_4130061.93	582471.13	4130061.93	1.13E-05	1.52E-08	9.12E-09	1.52E-08	1.07E-08	2.78E-08	6.52E-07	2.28E-08	1.31127E-10	6.33116E-10	0	0	0.0008	Res	0.0059
582527.7_4130061.93	582527.7	4130061.93	1.03E-05	1.37E-08	8.20E-09	1.37E-08	9.66E-09	2.50E-08	5.85E-07	2.05E-08	1.19042E-10	5.74763E-10	0	0	0.0007	Res	0.0053
582584.27_4130061.93	582584.27	4130061.93	9.36E-06	1.23E-08	7.38E-09	1.23E-08	8.74E-09	2.25E-08	5.26E-07	1.84E-08	1.08245E-10	5.22636E-10	0	0	0.0006	Res	0.0048
582640.84_4130061.93	582640.84	4130061.93	8.50E-06	1.10E-08	6.62E-09	1.10E-08	7.89E-09	2.01E-08	4.72E-07	1.65E-08	9.82424E-11	4.74339E-10	0	0	0.0006	Res	0.0044
582697.41_4130061.93	582697.41	4130061.93	7.74E-06	9.92E-09	5.95E-09	9.92E-09	7.15E-09	1.81E-08	4.24E-07	1.48E-08	8.95131E-11	4.32192E-10	0	0	0.0005	Res	0.0040
582753.98_4130061.93	582753.98	4130061.93	7.08E-06	8.96E-09	5.38E-09	8.96E-09	6.50E-09	1.63E-08	3.83E-07	1.34E-08	8.18414E-11	3.95151E-10	0	0	0.0005	Res	0.0036
582810.55_4130061.93	582810.55	4130061.93	6.47E-06	8.08E-09	4.85E-09	8.08E-09	5.91E-09	1.47E-08	3.45E-07	1.20E-08	7.48342E-11	3.61319E-10	0	0	0.0004	Res	0.0033
581962_4130145.84	581962	4130145.84	2.52E-05	3.64E-08	2.18E-08	3.64E-08	2.48E-08	6.67E-08	1.56E-06	5.49E-08	2.9122E-10	1.40609E-09	0	0	0.0017	Res	0.0130

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)								Risk Calculation Part 2, $\sum R1*C_{TAC}$						Cancer Risk Total
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Cobalt	Lead	Nickel	Chromium VI	3rd Trimester	0<2	2<16	16<30	Cancer Risk - 2024 (per million)	Receptor Type	(per million)
582018.57_4130145.84	582018.57	4130145.84	2.33E-05	3.35E-08	2.01E-08	3.35E-08	2.28E-08	6.14E-08	1.44E-06	5.05E-08	2.69324E-10	1.30036E-09	0	0	0.0016	Res	0.0120
582075.14_4130145.84	582075.14	4130145.84	2.00E-05	2.81E-08	1.69E-08	2.81E-08	1.93E-08	5.15E-08	1.21E-06	4.23E-08	2.31123E-10	1.11592E-09	0	0	0.0013	Res	0.0103
582131.71_4130145.84	582131.71	4130145.84	1.85E-05	2.61E-08	1.56E-08	2.61E-08	1.79E-08	4.77E-08	1.12E-06	3.92E-08	2.14207E-10	1.03425E-09	0	0	0.0012	Res	0.0096
582188.28_4130145.84	582188.28	4130145.84	1.77E-05	2.50E-08	1.50E-08	2.50E-08	1.71E-08	4.58E-08	1.07E-06	3.76E-08	2.05146E-10	9.90496E-10	0	0	0.0012	Res	0.0092
582244.85_4130145.84	582244.85	4130145.84	1.62E-05	2.27E-08	1.36E-08	2.27E-08	1.56E-08	4.15E-08	9.73E-07	3.41E-08	1.87282E-10	9.04245E-10	0	0	0.0011	Res	0.0084
582301.42_4130145.84	582301.42	4130145.84	1.47E-05	2.05E-08	1.23E-08	2.05E-08	1.41E-08	3.75E-08	8.78E-07	3.08E-08	1.70374E-10	8.22608E-10	0	0	0.0010	Res	0.0076
582357.99_4130145.84	582357.99	4130145.84	1.35E-05	1.85E-08	1.11E-08	1.85E-08	1.28E-08	3.39E-08	7.96E-07	2.79E-08	1.55584E-10	7.51201E-10	0	0	0.0009	Res	0.0070
582414.56_4130145.84	582414.56	4130145.84	1.23E-05	1.68E-08	1.01E-08	1.68E-08	1.16E-08	3.07E-08	7.19E-07	2.52E-08	1.41723E-10	6.84273E-10	0	0	0.0008	Res	0.0064
582471.13_4130145.84	582471.13	4130145.84	1.11E-05	1.50E-08	9.01E-09	1.50E-08	1.05E-08	2.75E-08	6.44E-07	2.25E-08	1.2824E-10	6.19174E-10	0	0	0.0007	Res	0.0057
582527.7_4130145.84	582527.7	4130145.84	9.97E-06	1.33E-08	8.01E-09	1.33E-08	9.38E-09	2.44E-08	5.72E-07	2.00E-08	1.15268E-10	5.56542E-10	0	0	0.0007	Res	0.0052
582584.27_4130145.84	582584.27	4130145.84	8.96E-06	1.18E-08	7.10E-09	1.18E-08	8.38E-09	2.16E-08	5.07E-07	1.77E-08	1.03515E-10	4.99796E-10	0	0	0.0006	Res	0.0046
582640.84_4130145.84	582640.84	4130145.84	8.08E-06	1.05E-08	6.32E-09	1.05E-08	7.51E-09	1.92E-08	4.51E-07	1.58E-08	9.33443E-11	4.5069E-10	0	0	0.0005	Res	0.0042
582697.41_4130145.84	582697.41	4130145.84	7.33E-06	9.43E-09	5.66E-09	9.43E-09	6.78E-09	1.72E-08	4.03E-07	1.41E-08	8.46838E-11	4.08875E-10	0	0	0.0005	Res	0.0038
582753.98_4130145.84	582753.98	4130145.84	6.70E-06	8.52E-09	5.11E-09	8.52E-09	6.16E-09	1.55E-08	3.64E-07	1.27E-08	7.74356E-11	3.73879E-10	0	0	0.0005	Res	0.0034
582810.55_4130145.84	582810.55	4130145.84	6.17E-06	7.75E-09	4.65E-09	7.75E-09	5.64E-09	1.41E-08	3.31E-07	1.16E-08	7.12874E-11	3.44194E-10	0	0	0.0004	Res	0.0032
582867.12_4130145.84	582867.12	4130145.84	5.49E-06	6.77E-09	4.06E-09	6.77E-09	4.99E-09	1.23E-08	2.89E-07	1.01E-08	6.35131E-11	3.06657E-10	0	0	0.0004	Res	0.0028
581962_4130229.75	581962	4130229.75	2.54E-05	3.67E-08	2.20E-08	3.67E-08	2.49E-08	6.72E-08	1.58E-06	5.53E-08	2.93726E-10	1.41818E-09	0	0	0.0017	Res	0.0132
582018.57_4130229.75	582018.57	4130229.75	2.42E-05	3.50E-08	2.10E-08	3.50E-08	2.37E-08	6.42E-08	1.51E-06	5.28E-08	2.79217E-10	1.34813E-09	0	0	0.0016	Res	0.0125
582075.14_4130229.75	582075.14	4130229.75	2.24E-05	3.23E-08	1.94E-08	3.23E-08	2.18E-08	5.92E-08	1.39E-06	4.87E-08	2.58677E-10	1.24896E-09	0	0	0.0015	Res	0.0116
582131.71_4130229.75	582131.71	4130229.75	2.02E-05	2.89E-08	1.73E-08	2.89E-08	1.96E-08	5.29E-08	1.24E-06	4.36E-08	2.33065E-10	1.1253E-09	0	0	0.0014	Res	0.0105
582188.28_4130229.75	582188.28	4130229.75	1.80E-05	2.56E-08	1.54E-08	2.56E-08	1.75E-08	4.70E-08	1.10E-06	3.86E-08	2.08453E-10	1.00647E-09	0	0	0.0012	Res	0.0094
582244.85_4130229.75	582244.85	4130229.75	1.62E-05	2.28E-08	1.37E-08	2.28E-08	1.56E-08	4.18E-08	9.80E-07	3.44E-08	1.87049E-10	9.03118E-10	0	0	0.0011	Res	0.0084
582301.42_4130229.75	582301.42	4130229.75	1.46E-05	2.04E-08	1.23E-08	2.04E-08	1.40E-08	3.74E-08	8.78E-07	3.08E-08	1.68863E-10	8.15314E-10	0	0	0.0010	Res	0.0076
582357.99_4130229.75	582357.99	4130229.75	1.32E-05	1.84E-08	1.10E-08	1.84E-08	1.26E-08	3.36E-08	7.88E-07	2.76E-08	1.52874E-10	7.38112E-10	0	0	0.0009	Res	0.0069
582414.56_4130229.75	582414.56	4130229.75	1.19E-05	1.63E-08	9.79E-09	1.63E-08	1.13E-08	2.99E-08	7.00E-07	2.45E-08	1.37186E-10	6.6237E-10	0	0	0.0008	Res	0.0062
582471.13_4130229.75	582471.13	4130229.75	1.06E-05	1.43E-08	8.61E-09	1.43E-08	9.99E-09	2.62E-08	6.15E-07	2.15E-08	1.2203E-10	5.89192E-10	0	0	0.0007	Res	0.0055
582527.7_4130229.75	582527.7	4130229.75	9.40E-06	1.26E-08	7.57E-09	1.26E-08	8.85E-09	2.31E-08	5.41E-07	1.89E-08	1.08642E-10	5.24551E-10	0	0	0.0006	Res	0.0049
582584.27_4130229.75	582584.27	4130229.75	8.41E-06	1.11E-08	6.68E-09	1.11E-08	7.87E-09	2.04E-08	4.77E-07	1.67E-08	9.72114E-11	4.69362E-10	0	0	0.0006	Res	0.0043
582640.84_4130229.75	582640.84	4130229.75	7.58E-06	9.91E-09	5.95E-09	9.91E-09	7.05E-09	1.81E-08	4.24E-07	1.48E-08	8.75946E-11	4.22929E-10	0	0	0.0005	Res	0.0039
582697.41_4130229.75	582697.41	4130229.75	6.91E-06	8.92E-09	5.35E-09	8.92E-09	6.40E-09	1.63E-08	3.82E-07	1.33E-08	7.98519E-11	3.85545E-10	0	0	0.0005	Res	0.0036
582753.98_4130229.75	582753.98	4130229.75	6.33E-06	8.08E-09	4.85E-09	8.08E-09	5.83E-09	1.48E-08	3.46E-07	1.21E-08	7.31784E-11	3.53324E-10	0	0	0.0004	Res	0.0033
582810.55_4130229.75	582810.55	4130229.75	5.86E-06	7.40E-09	4.44E-09	7.40E-09	5.37E-09	1.35E-08	3.16E-07	1.10E-08	6.76814E-11	3.26783E-10	0	0	0.0004	Res	0.0030
582867.12_4130229.75	582867.12	4130229.75	5.45E-06	6.83E-09	4.10E-09	6.83E-09	4.98E-09	1.24E-08	2.92E-07	1.02E-08	6.30432E-11	3.04388E-10	0	0	0.0004	Res	0.0028
582018.57_4130313.66	582018.57	4130313.66	2.57E-05	3.74E-08	2.25E-08	3.74E-08	2.52E-08	6.87E-08	1.61E-06	5.65E-08	2.96981E-10	1.4339E-09	0	0	0.0017	Res	0.0134
582075.14_4130313.66	582075.14	4130313.66	2.37E-05	3.44E-08	2.06E-08	3.44E-08	2.31E-08	6.30E-08	1.48E-06	5.19E-08	2.74009E-10	1.32299E-09	0	0	0.0016	Res	0.0124
582131.71_4130313.66	582131.71	4130313.66	2.08E-05	3.00E-08	1.80E-08	3.00E-08	2.02E-08	5.49E-08	1.29E-06	4.52E-08	2.40791E-10	1.1626E-09	0	0	0.0014	Res	0.0109
582188.28_4130313.66	582188.28	4130313.66	1.83E-05	2.61E-08	1.57E-08	2.61E-08	1.77E-08	4.78E-08	1.12E-06	3.93E-08	2.11536E-10	1.02135E-09	0	0	0.0012	Res	0.0096
582244.85_4130313.66	582244.85	4130313.66	1.62E-05	2.29E-08	1.38E-08	2.29E-08	1.56E-08	4.20E-08	9.86E-07	3.46E-08	1.8755E-10	9.05542E-10	0	0	0.0011	Res	0.0085
582301.42_4130313.66	582301.42	4130313.66	1.45E-05	2.03E-08	1.22E-08	2.03E-08	1.39E-08	3.72E-08	8.71E-07	3.05E-08	1.67277E-10	8.07657E-10	0	0	0.0010	Res	0.0075
582357.99_4130313.66	582357.99	4130313.66	1.28E-05	1.78E-08	1.07E-08	1.78E-08	1.22E-08	3.25E-08	7.62E-07	2.67E-08	1.47934E-10	7.14264E-10	0	0	0.0009	Res	0.0067
582414.56_4130313.66	582414.56	4130313.66	1.12E-05	1.54E-08	9.25E-09	1.54E-08	1.07E-08	2.82E-08	6.61E-07	2.32E-08	1.29958E-10	6.27472E-10	0	0	0.0008	Res	0.0058
582471.13_4130313.66	582471.13	4130313.66	9.90E-06	1.34E-08	8.05E-09	1.34E-08	9.35E-09	2.45E-08	5.75E-07	2.01E-08	1.14489E-10	5.52784E-10	0	0	0.0007	Res	0.0051
582527.7_4130313.66	582527.7	4130313.66	8.80E-06	1.18E-08	7.06E-09	1.18E-08	8.27E-09	2.15E-08	5.04E-07	1.77E-08	1.01752E-10	4.91286E-10	0	0	0.0006	Res	0.0046
582584.27_4130313.66	582584.27	4130313.66	7.89E-06	1.04E-08	6.25E-09	1.04E-08	7.37E-09	1.90E-08	4.46E-07	1.56E-08	9.11766E-11	4.40224E-10	0	0	0.0005	Res	0.0041
582640.84_4130313.66	582640.84	4130313.66	7.15E-06	9.33E-09	5.60E-09	9.33E-09	6.65E-09	1.70E-08	3.99E-07	1.40E-08	8.26262E-11	3.98941E-10	0	0	0.0005	Res	0.0037
582697.41_4130313.66	582697.41	4130313.66	6.53E-06	8.43E-09	5.06E-09	8.43E-09	6.04E-09	1.54E-08	3.61E-07	1.26E-08	7.54522E-11	3.64302E-10	0	0	0.0004	Res	0.0034
582753.98_4130313.66	582753.98	4130313.66	6.00E-06	7.67E-09	4.60E-09	7.67E-09	5.53E-09	1.40E-08	3.28E-07	1.15E-08	6.93463E-11	3.34822E-10	0	0	0.0004	Res	0.0031
582810.55_4130313.66	582810.55	4130313.66	5.53E-06	7.00E-09	4.20E-09	7.00E-09	5.08E-09	1.28E-08	2.99E-07	1.04E-08	6.39359E-11	3.08699E-10	0	0	0.0004	Res	0.0028
582867.12_4130313.66	582867.12	4130313.66	5.12E-06	6.42E-09	3.85E-09	6.42E-09	4.68E-09	1.17E-08	2.74E-07	9.57E-09	5.92003E-11	2.85834E-10	0	0	0.0003	Res	0.0026
581848.86_4130397.57	581848.86	4130397.57	3.49E-05	5.15E-08	3.09E-08	5.15E-08	3.44E-08	9.45E-08	2.22E-06	7.78E-08	4.02979E-10	1.94568E-09	0	0	0.0023	Res	0.0182
581905.43_4130397.57	581905.43	4130397.57	3.37E-05	4.99E-08	2.99E-08	4.99E-08	3.32E-08	9.16E-08	2.15E-06	7.54E-08	3.89462E-10	1.88042E-09	0	0	0.0023	Res	0.0176
581962_4130397.57	581962	4130397.57	3.17E-05	4.68E-08	2.81E-08	4.68E-08	3.12E-08	8.59E-08	2.02E-06	7.08E-08	3.66734E-10	1.77069E-09	0	0	0.0021	Res	0.0166
582018.57_4130397.57	582018.57	4130397.57	2.85E-05	4.17E-08	2.50E-08	4.17E-08	2.78E-08	7.65E-08	1.79E-06	6.30E-08	3.28894E-10	1.58798E-09	0	0	0.0019	Res	0.0149
582075.14_4130397.57	582075.14	4130397.57	2.50E-05	3.63E-08	2.18E-08	3.63E-08	2.43E-08	6.66E-08	1.56E-06	5.49E-08	2.88826E-10	1.39453E-09	0	0	0.0017	Res	0.0131
582131.71_4130397.57	582131.71	4130397.57	2.15E-05	3.10E-08	1.86E-08	3.10E-08	2.08E-08	5.68E-08	1.33E-06	4.67E-08	2.48444E-10	1.19955E-09	0	0	0.0014	Res	0.0113
582188.28_4130397.57	582188.28	4130397.57	1.87E-05	2.68E-08	1.61E-08	2.68E-08	1.81E-08	4.91E-08	1.15E-06	4.04E-08	2.16732E-10	1.04644E-09	0	0	0.0013	Res	0.0098
582244.85_4130397.57	582244.85	4130397.57	1.63E-05	2.30E-08	1.38E-08	2.30E-08	1.56E-08	4.21E-08	9.88E-07	3.46E-08	1.88041E-10	9.0791E-10	0	0	0.0011	Res	0.0085
582301.42_4130397.57	582301.42	4130397.57	1.41E-05	1.97E-08	1.18E-08	1.97E-08	1.35E-08	3.61E-08	8.46E-07	2.97E-08	1.63042E-10	7.87207E-10	0	0	0.0010	Res	0.0074
582357.99_4130397.57	582357.99	4130397.57	1.22E-05	1.68E-08	1.01E-08	1.68E-08	1.16E-08	3.07E-08	7.20E-07	2.52E-08	1.40658E-10	6.79133E-10	0	0	0.0008	Res	0.0063
582414.56_4130397.57	582414.56	4130397.57	1.06E-05	1.44E-08	8.66E-09	1.44E-08	1.00E-08	2.64E-08	6.19E-07	2.17E-08	1.2262E-10	5.92041E-10	0	0	0.0007	Res	0.0055
582471.13_4130397.57	582471.13	4130397.57	9.36E-06	1.26E-08	7.55E-09	1.26E-08	8.81E-09	2.30E-08	5.39E-07	1.89E-08	1.08209E-10	5.22463E-10	0	0	0.0006	Res	0.0049
582527.7_4130397.57	582527.7	4130397.57	8.34E-06	1.11E-08	6.64E-09	1.11E-08	7.81E-09	2.02E-08	4.74E-07	1.66E-08	9.64297E-11	4.65587E-10	0	0	0.0006	Res	0.0043

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)								Risk Calculation Part 2, $\sum R1*C_{TAC}$						Cancer Risk Total
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Cobalt	Lead	Nickel	Chromium VI	3rd Trimester	0<2	2<16	16<30	Cancer Risk - 2024 (per million)	Receptor Type	(per million)
582584.27_4130397.57	582584.27	4130397.57	7.50E-06	9.84E-09	5.91E-09	9.84E-09	6.99E-09	1.80E-08	4.21E-07	1.47E-08	8.66957E-11	4.18589E-10	0	0	0.0005	Res	0.0039
582640.84_4130397.57	582640.84	4130397.57	6.80E-06	8.82E-09	5.29E-09	8.82E-09	6.31E-09	1.61E-08	3.78E-07	1.32E-08	7.85757E-11	3.79383E-10	0	0	0.0005	Res	0.0035
582697.41_4130397.57	582697.41	4130397.57	6.17E-06	7.92E-09	4.75E-09	7.92E-09	5.70E-09	1.45E-08	3.39E-07	1.18E-08	7.13426E-11	3.4446E-10	0	0	0.0004	Res	0.0032
582753.98_4130397.57	582753.98	4130397.57	5.65E-06	7.17E-09	4.30E-09	7.17E-09	5.19E-09	1.31E-08	3.06E-07	1.07E-08	6.52697E-11	3.15139E-10	0	0	0.0004	Res	0.0029
582810.55_4130397.57	582810.55	4130397.57	5.19E-06	6.53E-09	3.92E-09	6.53E-09	4.76E-09	1.19E-08	2.79E-07	9.73E-09	6.00352E-11	2.89865E-10	0	0	0.0003	Res	0.0027
582867.12_4130397.57	582867.12	4130397.57	4.80E-06	5.97E-09	3.58E-09	5.97E-09	4.38E-09	1.09E-08	2.55E-07	8.89E-09	5.54431E-11	2.67694E-10	0	0	0.0003	Res	0.0025
581848.86_4130481.48	581848.86	4130481.48	4.39E-05	6.62E-08	3.97E-08	6.62E-08	4.35E-08	1.22E-07	2.85E-06	1.00E-07	5.07259E-10	2.44918E-09	0	0	0.0030	Res	0.0232
581905.43_4130481.48	581905.43	4130481.48	4.06E-05	6.08E-08	3.65E-08	6.08E-08	4.01E-08	1.12E-07	2.62E-06	9.21E-08	4.69506E-10	2.2669E-09	0	0	0.0027	Res	0.0215
581962_4130481.48	581962	4130481.48	3.48E-05	5.17E-08	3.10E-08	5.17E-08	3.42E-08	9.49E-08	2.23E-06	7.82E-08	4.01924E-10	1.94059E-09	0	0	0.0023	Res	0.0184
582018.57_4130481.48	582018.57	4130481.48	3.07E-05	4.52E-08	2.71E-08	4.52E-08	3.00E-08	8.30E-08	1.95E-06	6.84E-08	3.54375E-10	1.71101E-09	0	0	0.0021	Res	0.0162
582075.14_4130481.48	582075.14	4130481.48	2.60E-05	3.80E-08	2.28E-08	3.80E-08	2.54E-08	6.98E-08	1.64E-06	5.75E-08	3.00934E-10	1.45299E-09	0	0	0.0018	Res	0.0137
582131.71_4130481.48	582131.71	4130481.48	2.22E-05	3.21E-08	1.93E-08	3.21E-08	2.15E-08	5.89E-08	1.38E-06	4.85E-08	2.5669E-10	1.23937E-09	0	0	0.0015	Res	0.0117
582188.28_4130481.48	582188.28	4130481.48	1.89E-05	2.70E-08	1.62E-08	2.70E-08	1.82E-08	4.95E-08	1.16E-06	4.08E-08	2.18273E-10	1.05388E-09	0	0	0.0013	Res	0.0099
582244.85_4130481.48	582244.85	4130481.48	1.59E-05	2.24E-08	1.34E-08	2.24E-08	1.52E-08	4.10E-08	9.62E-07	3.37E-08	1.83375E-10	8.85381E-10	0	0	0.0011	Res	0.0083
582301.42_4130481.48	582301.42	4130481.48	1.34E-05	1.87E-08	1.12E-08	1.87E-08	1.28E-08	3.42E-08	8.02E-07	2.81E-08	1.55075E-10	7.48742E-10	0	0	0.0009	Res	0.0070
582357.99_4130481.48	582357.99	4130481.48	1.15E-05	1.58E-08	9.48E-09	1.58E-08	1.09E-08	2.89E-08	6.78E-07	2.37E-08	1.33186E-10	6.43056E-10	0	0	0.0008	Res	0.0060
582414.56_4130481.48	582414.56	4130481.48	1.01E-05	1.36E-08	8.18E-09	1.36E-08	9.50E-09	2.49E-08	5.84E-07	2.05E-08	1.16444E-10	5.62222E-10	0	0	0.0007	Res	0.0052
582471.13_4130481.48	582471.13	4130481.48	8.90E-06	1.19E-08	7.13E-09	1.19E-08	8.35E-09	2.17E-08	5.09E-07	1.78E-08	1.02912E-10	4.96886E-10	0	0	0.0006	Res	0.0046
582527.7_4130481.48	582527.7	4130481.48	7.92E-06	1.04E-08	6.26E-09	1.04E-08	7.39E-09	1.91E-08	4.47E-07	1.56E-08	9.15271E-11	4.41916E-10	0	0	0.0005	Res	0.0041
582584.27_4130481.48	582584.27	4130481.48	7.11E-06	9.24E-09	5.54E-09	9.24E-09	6.60E-09	1.69E-08	3.95E-07	1.38E-08	8.21312E-11	3.9655E-10	0	0	0.0005	Res	0.0037
582640.84_4130481.48	582640.84	4130481.48	6.40E-06	8.22E-09	4.93E-09	8.22E-09	5.92E-09	1.50E-08	3.52E-07	1.23E-08	7.4006E-11	3.5732E-10	0	0	0.0004	Res	0.0033
582697.41_4130481.48	582697.41	4130481.48	5.81E-06	7.37E-09	4.42E-09	7.37E-09	5.35E-09	1.34E-08	3.15E-07	1.10E-08	6.71642E-11	3.24286E-10	0	0	0.0004	Res	0.0030
582753.98_4130481.48	582753.98	4130481.48	5.32E-06	6.68E-09	4.01E-09	6.68E-09	4.88E-09	1.22E-08	2.85E-07	9.95E-09	6.15117E-11	2.96994E-10	0	0	0.0004	Res	0.0027
582810.55_4130481.48	582810.55	4130481.48	4.90E-06	6.09E-09	3.65E-09	6.09E-09	4.48E-09	1.11E-08	2.60E-07	9.07E-09	5.66903E-11	2.73715E-10	0	0	0.0003	Res	0.0025
582867.12_4130481.48	582867.12	4130481.48	4.54E-06	5.59E-09	3.35E-09	5.59E-09	4.13E-09	1.02E-08	2.38E-07	8.31E-09	5.25091E-11	2.53527E-10	0	0	0.0003	Res	0.0023
581735.72_4130565.39	581735.72	4130565.39	5.30E-05	8.13E-08	4.88E-08	8.13E-08	5.31E-08	1.49E-07	3.51E-06	1.23E-07	6.12184E-10	2.95578E-09	0	0	0.0036	Res	0.0280
581792.29_4130565.39	581792.29	4130565.39	5.19E-05	7.93E-08	4.76E-08	7.93E-08	5.18E-08	1.46E-07	3.42E-06	1.20E-07	6.00295E-10	2.89838E-09	0	0	0.0035	Res	0.0275
581848.86_4130565.39	581848.86	4130565.39	4.93E-05	7.49E-08	4.49E-08	7.49E-08	4.89E-08	1.38E-07	3.23E-06	1.13E-07	5.69768E-10	2.75099E-09	0	0	0.0033	Res	0.0262
581905.43_4130565.39	581905.43	4130565.39	4.70E-05	7.10E-08	4.26E-08	7.10E-08	4.64E-08	1.30E-07	3.06E-06	1.08E-07	5.42758E-10	2.62057E-09	0	0	0.0032	Res	0.0250
581962_4130565.39	581962	4130565.39	4.06E-05	6.10E-08	3.66E-08	6.10E-08	4.00E-08	1.12E-07	2.63E-06	9.24E-08	4.69281E-10	2.26581E-09	0	0	0.0027	Res	0.0216
582018.57_4130565.39	582018.57	4130565.39	3.30E-05	4.92E-08	2.95E-08	4.92E-08	3.24E-08	9.03E-08	2.12E-06	7.45E-08	3.81754E-10	1.8432E-09	0	0	0.0022	Res	0.0175
582075.14_4130565.39	582075.14	4130565.39	2.70E-05	3.98E-08	2.39E-08	3.98E-08	2.64E-08	7.31E-08	1.71E-06	6.02E-08	3.11981E-10	1.50632E-09	0	0	0.0018	Res	0.0143
582131.71_4130565.39	582131.71	4130565.39	2.23E-05	3.25E-08	1.95E-08	3.25E-08	2.17E-08	5.97E-08	1.40E-06	4.91E-08	2.57689E-10	1.24419E-09	0	0	0.0015	Res	0.0118
582188.28_4130565.39	582188.28	4130565.39	1.81E-05	2.60E-08	1.56E-08	2.60E-08	1.75E-08	4.77E-08	1.12E-06	3.93E-08	2.09184E-10	1.00999E-09	0	0	0.0012	Res	0.0095
582244.85_4130565.39	582244.85	4130565.39	1.49E-05	2.10E-08	1.26E-08	2.10E-08	1.43E-08	3.86E-08	9.05E-07	3.17E-08	1.71888E-10	8.2992E-10	0	0	0.0010	Res	0.0078
582301.42_4130565.39	582301.42	4130565.39	1.26E-05	1.76E-08	1.06E-08	1.76E-08	1.21E-08	3.23E-08	7.57E-07	2.65E-08	1.46152E-10	7.05661E-10	0	0	0.0009	Res	0.0066
582357.99_4130565.39	582357.99	4130565.39	1.08E-05	1.49E-08	8.91E-09	1.49E-08	1.03E-08	2.72E-08	6.37E-07	2.23E-08	1.25129E-10	6.04152E-10	0	0	0.0007	Res	0.0056
582414.56_4130565.39	582414.56	4130565.39	9.41E-06	1.27E-08	7.62E-09	1.27E-08	8.88E-09	2.32E-08	5.45E-07	1.91E-08	1.08736E-10	5.25003E-10	0	0	0.0006	Res	0.0049
582471.13_4130565.39	582471.13	4130565.39	8.28E-06	1.10E-08	6.60E-09	1.10E-08	7.77E-09	2.01E-08	4.71E-07	1.65E-08	9.57169E-11	4.62146E-10	0	0	0.0006	Res	0.0043
582527.7_4130565.39	582527.7	4130565.39	7.36E-06	9.64E-09	5.78E-09	9.64E-09	6.87E-09	1.76E-08	4.13E-07	1.44E-08	8.51316E-11	4.11037E-10	0	0	0.0005	Res	0.0038
582584.27_4130565.39	582584.27	4130565.39	6.63E-06	8.55E-09	5.13E-09	8.55E-09	6.15E-09	1.56E-08	3.66E-07	1.28E-08	7.66192E-11	3.69937E-10	0	0	0.0004	Res	0.0034
582640.84_4130565.39	582640.84	4130565.39	5.98E-06	7.60E-09	4.56E-09	7.60E-09	5.51E-09	1.39E-08	3.25E-07	1.13E-08	6.91294E-11	3.33774E-10	0	0	0.0004	Res	0.0031
582697.41_4130565.39	582697.41	4130565.39	5.46E-06	6.85E-09	4.11E-09	6.85E-09	5.01E-09	1.25E-08	2.93E-07	1.02E-08	6.31427E-11	3.04869E-10	0	0	0.0004	Res	0.0028
582753.98_4130565.39	582753.98	4130565.39	5.03E-06	6.23E-09	3.74E-09	6.23E-09	4.59E-09	1.14E-08	2.66E-07	9.28E-09	5.81201E-11	2.80619E-10	0	0	0.0003	Res	0.0026
582810.55_4130565.39	582810.55	4130565.39	4.67E-06	5.72E-09	3.43E-09	5.72E-09	4.24E-09	1.04E-08	2.44E-07	8.52E-09	5.39354E-11	2.60414E-10	0	0	0.0003	Res	0.0024
582867.12_4130565.39	582867.12	4130565.39	4.36E-06	5.30E-09	3.18E-09	5.30E-09	3.95E-09	9.64E-09	2.26E-07	7.87E-09	5.03578E-11	2.4314E-10	0	0	0.0003	Res	0.0022
581735.72_4130649.3	581735.72	4130649.3	5.67E-05	8.68E-08	5.21E-08	8.68E-08	5.65E-08	1.59E-07	3.74E-06	1.32E-07	6.55301E-10	3.16396E-09	0	0	0.0038	Res	0.0302
581792.29_4130649.3	581792.29	4130649.3	5.48E-05	8.36E-08	5.02E-08	8.36E-08	5.44E-08	1.54E-07	3.61E-06	1.27E-07	6.32936E-10	3.05598E-09	0	0	0.0037	Res	0.0292
581905.43_4130649.3	581905.43	4130649.3	5.45E-05	8.29E-08	4.98E-08	8.29E-08	5.39E-08	1.52E-07	3.58E-06	1.26E-07	6.29618E-10	3.03996E-09	0	0	0.0037	Res	0.0291
581962_4130649.3	581962	4130649.3	4.53E-05	6.86E-08	4.12E-08	6.86E-08	4.47E-08	1.26E-07	2.96E-06	1.04E-07	5.23807E-10	2.52907E-09	0	0	0.0031	Res	0.0242
582018.57_4130649.3	582018.57	4130649.3	3.46E-05	5.20E-08	3.12E-08	5.20E-08	3.41E-08	9.56E-08	2.24E-06	7.89E-08	4.0016E-10	1.93208E-09	0	0	0.0023	Res	0.0185
582075.14_4130649.3	582075.14	4130649.3	2.71E-05	4.03E-08	2.42E-08	4.03E-08	2.65E-08	7.40E-08	1.74E-06	6.10E-08	3.12833E-10	1.51044E-09	0	0	0.0018	Res	0.0144
582131.71_4130649.3	582131.71	4130649.3	2.12E-05	3.12E-08	1.87E-08	3.12E-08	2.07E-08	5.73E-08	1.34E-06	4.72E-08	2.45179E-10	1.18378E-09	0	0	0.0014	Res	0.0112
582188.28_4130649.3	582188.28	4130649.3	1.69E-05	2.45E-08	1.47E-08	2.45E-08	1.64E-08	4.49E-08	1.05E-06	3.70E-08	1.94901E-10	9.41032E-10	0	0	0.0011	Res	0.0089
582244.85_4130649.3	582244.85	4130649.3	1.37E-05	1.96E-08	1.18E-08	1.96E-08	1.33E-08	3.59E-08	8.42E-07	2.95E-08	1.58565E-10	7.65591E-10	0	0	0.0009	Res	0.0072
582301.42_4130649.3	582301.42	4130649.3	1.15E-05	1.61E-08	9.65E-09	1.61E-08	1.10E-08	2.95E-08	6.91E-07	2.42E-08	1.32486E-10	6.39677E-10	0	0	0.0008	Res	0.0060
582357.99_4130649.3	582357.99	4130649.3	9.81E-06	1.35E-08	8.12E-09	1.35E-08	9.36E-09	2.48E-08	5.81E-07	2.03E-08	1.13412E-10	5.47581E-10	0	0	0.0007	Res	0.0051
582414.56_4130649.3	582414.56	4130649.3	8.57E-06	1.16E-08	6.97E-09	1.16E-08	8.12E-09	2.12E-08	4.98E-07	1.74E-08	9.90679E-11	4.78325E-10	0	0	0.0006	Res	0.0044
582471.13_4130649.3	582471.13	4130649.3	7.56E-06	1.01E-08	6.04E-09	1.01E-08	7.11E-09	1.84E-08	4.31E-07	1.51E-08	8.73772E-11	4.21879E-10	0	0	0.0005	Res	0.0039
582527.7_4130649.3	582527.7	4130649.3	6.76E-06	8.85E-09	5.31E-09	8.85E-09	6.31E-09	1.62E-08	3.79E-07	1.32E-08	7.81499E-11	3.77327E-10	0	0	0.0005	Res	0.0035
582584.27_4130649.3	582584.27	4130649.3	6.13E-06	7.89E-09	4.73E-09	7.89E-09	5.69E-09	1.44E-08	3.37E-07	1.18E-08	7.08108E-11	3.41892E-10	0	0	0.0004	Res	0.0031
582640.84_4130649.3	582640.84	4130649.3	5.61E-06	7.12E-09	4.27E-09	7.12E-09	5.18E-09	1.30E-08	3.04E-07	1.06E-08	6.48884E-11	3.13298E-10	0	0	0.0004	Res	0.0029
582697.41_4130649.3	582697.41	4130649.3	5.19E-06	6.50E-09	3.90E-09	6.50E-09	4.76E-09	1.18E-08	2.77E-07	9.68E-09	5.99633E-11	2.89518E-10	0	0	0.0003	Res	0.0026

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)								Risk Calculation Part 2, $\sum R1*C_{TAC}$						Cancer Risk Total
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Cobalt	Lead	Nickel	Chromium VI	3rd Trimester	0<2	2<16	16<30	Cancer Risk - 2024 (per million)	Receptor Type	(per million)
582753.98_4130649.3	582753.98	4130649.3	4.84E-06	5.99E-09	3.60E-09	5.99E-09	4.42E-09	1.09E-08	2.56E-07	8.92E-09	5.59409E-11	2.70097E-10	0	0	0.0003	Res	0.0025
582810.55_4130649.3	582810.55	4130649.3	4.55E-06	5.58E-09	3.35E-09	5.58E-09	4.14E-09	1.02E-08	2.38E-07	8.30E-09	5.25911E-11	2.53923E-10	0	0	0.0003	Res	0.0023
582867.12_4130649.3	582867.12	4130649.3	4.29E-06	5.21E-09	3.13E-09	5.21E-09	3.89E-09	9.49E-09	2.22E-07	7.75E-09	4.9579E-11	2.3938E-10	0	0	0.0003	Res	0.0022
581848.86_4130733.21	581848.86	4130733.21	8.03E-05	1.23E-07	7.39E-08	1.23E-07	7.96E-08	2.27E-07	5.32E-06	1.87E-07	9.28429E-10	4.48269E-09	0	0	0.0054	Res	0.0431
581905.43_4130733.21	581905.43	4130733.21	6.86E-05	1.05E-07	6.30E-08	1.05E-07	6.79E-08	1.93E-07	4.53E-06	1.59E-07	7.92803E-10	3.82786E-09	0	0	0.0046	Res	0.0368
581962_4130733.21	581962	4130733.21	5.06E-05	7.71E-08	4.63E-08	7.71E-08	5.00E-08	1.42E-07	3.33E-06	1.17E-07	5.84871E-10	2.82391E-09	0	0	0.0034	Res	0.0271
582018.57_4130733.21	582018.57	4130733.21	3.57E-05	5.41E-08	3.24E-08	5.41E-08	3.52E-08	9.94E-08	2.33E-06	8.20E-08	4.12759E-10	1.9929E-09	0	0	0.0024	Res	0.0191
582075.14_4130733.21	582075.14	4130733.21	2.54E-05	3.82E-08	2.29E-08	3.82E-08	2.51E-08	7.01E-08	1.65E-06	5.78E-08	2.94127E-10	1.42012E-09	0	0	0.0017	Res	0.0135
582131.71_4130733.21	582131.71	4130733.21	1.88E-05	2.78E-08	1.67E-08	2.78E-08	1.84E-08	5.11E-08	1.20E-06	4.21E-08	2.17194E-10	1.04867E-09	0	0	0.0013	Res	0.0099
582188.28_4130733.21	582188.28	4130733.21	1.47E-05	2.15E-08	1.29E-08	2.15E-08	1.44E-08	3.94E-08	9.25E-07	3.25E-08	1.69989E-10	8.20751E-10	0	0	0.0010	Res	0.0077
582244.85_4130733.21	582244.85	4130733.21	1.19E-05	1.72E-08	1.03E-08	1.72E-08	1.16E-08	3.15E-08	7.39E-07	2.59E-08	1.38066E-10	6.66618E-10	0	0	0.0008	Res	0.0063
582301.42_4130733.21	582301.42	4130733.21	1.00E-05	1.42E-08	8.52E-09	1.42E-08	9.69E-09	2.60E-08	6.10E-07	2.14E-08	1.15972E-10	5.59942E-10	0	0	0.0007	Res	0.0052
582357.99_4130733.21	582357.99	4130733.21	8.66E-06	1.20E-08	7.23E-09	1.20E-08	8.30E-09	2.20E-08	5.17E-07	1.81E-08	1.00056E-10	4.83095E-10	0	0	0.0006	Res	0.0045
582414.56_4130733.21	582414.56	4130733.21	7.63E-06	1.04E-08	6.26E-09	1.04E-08	7.27E-09	1.91E-08	4.48E-07	1.57E-08	8.82174E-11	4.25936E-10	0	0	0.0005	Res	0.0040
582471.13_4130733.21	582471.13	4130733.21	6.86E-06	9.23E-09	5.54E-09	9.23E-09	6.49E-09	1.69E-08	3.95E-07	1.38E-08	7.93152E-11	3.82954E-10	0	0	0.0005	Res	0.0035
582527.7_4130733.21	582527.7	4130733.21	6.26E-06	8.29E-09	4.97E-09	8.29E-09	5.89E-09	1.51E-08	3.55E-07	1.24E-08	7.23864E-11	3.495E-10	0	0	0.0004	Res	0.0032
582584.27_4130733.21	582584.27	4130733.21	5.79E-06	7.55E-09	4.53E-09	7.55E-09	5.40E-09	1.38E-08	3.23E-07	1.13E-08	6.68793E-11	3.2291E-10	0	0	0.0004	Res	0.0030
582640.84_4130733.21	582640.84	4130733.21	5.39E-06	6.94E-09	4.17E-09	6.94E-09	5.01E-09	1.27E-08	2.97E-07	1.04E-08	6.2343E-11	3.01008E-10	0	0	0.0004	Res	0.0028
582697.41_4130733.21	582697.41	4130733.21	5.06E-06	6.43E-09	3.86E-09	6.43E-09	4.67E-09	1.17E-08	2.75E-07	9.60E-09	5.8504E-11	2.82472E-10	0	0	0.0003	Res	0.0026
582753.98_4130733.21	582753.98	4130733.21	4.77E-06	5.99E-09	3.60E-09	5.99E-09	4.38E-09	1.09E-08	2.56E-07	8.94E-09	5.51364E-11	2.66213E-10	0	0	0.0003	Res	0.0024
582810.55_4130733.21	582810.55	4130733.21	4.53E-06	5.63E-09	3.38E-09	5.63E-09	4.14E-09	1.03E-08	2.40E-07	8.39E-09	5.2327E-11	2.52648E-10	0	0	0.0003	Res	0.0023
582867.12_4130733.21	582867.12	4130733.21	4.30E-06	5.29E-09	3.17E-09	5.29E-09	3.91E-09	9.64E-09	2.26E-07	7.87E-09	4.96477E-11	2.39712E-10	0	0	0.0003	Res	0.0022
581735.72_4130817.12	581735.72	4130817.12	1.18E-04	1.81E-07	1.09E-07	1.81E-07	1.17E-07	3.34E-07	7.83E-06	2.76E-07	1.36141E-09	6.57323E-09	0	0	0.0079	Res	0.0633
581792.29_4130817.12	581792.29	4130817.12	1.32E-04	2.04E-07	1.22E-07	2.04E-07	1.31E-07	3.75E-07	8.80E-06	3.10E-07	1.53114E-09	7.39272E-09	0	0	0.0089	Res	0.0713
581848.86_4130817.12	581848.86	4130817.12	1.19E-04	1.83E-07	1.10E-07	1.83E-07	1.18E-07	3.36E-07	7.89E-06	2.77E-07	1.37331E-09	6.6307E-09	0	0	0.0080	Res	0.0640
581905.43_4130817.12	581905.43	4130817.12	9.00E-05	1.38E-07	8.28E-08	1.38E-07	8.90E-08	2.54E-07	5.96E-06	2.10E-07	1.0401E-09	5.02185E-09	0	0	0.0061	Res	0.0484
581962_4130817.12	581962	4130817.12	5.49E-05	8.39E-08	5.03E-08	8.39E-08	5.43E-08	1.54E-07	3.62E-06	1.27E-07	6.34283E-10	3.06248E-09	0	0	0.0037	Res	0.0295
582018.57_4130817.12	582018.57	4130817.12	3.32E-05	5.03E-08	3.02E-08	5.03E-08	3.28E-08	9.25E-08	2.17E-06	7.63E-08	3.83257E-10	1.85046E-09	0	0	0.0022	Res	0.0177
582075.14_4130817.12	582075.14	4130817.12	2.17E-05	3.26E-08	1.96E-08	3.26E-08	2.14E-08	5.99E-08	1.41E-06	4.94E-08	2.50885E-10	1.21134E-09	0	0	0.0015	Res	0.0115
582131.71_4130817.12	582131.71	4130817.12	1.58E-05	2.35E-08	1.41E-08	2.35E-08	1.56E-08	4.31E-08	1.01E-06	3.55E-08	1.82731E-10	8.82274E-10	0	0	0.0011	Res	0.0084
582188.28_4130817.12	582188.28	4130817.12	1.24E-05	1.82E-08	1.09E-08	1.82E-08	1.22E-08	3.34E-08	7.83E-07	2.75E-08	1.43369E-10	6.92222E-10	0	0	0.0008	Res	0.0065
582244.85_4130817.12	582244.85	4130817.12	1.03E-05	1.48E-08	8.90E-09	1.48E-08	1.00E-08	2.72E-08	6.38E-07	2.24E-08	1.18543E-10	5.72357E-10	0	0	0.0007	Res	0.0054
582301.42_4130817.12	582301.42	4130817.12	8.83E-06	1.26E-08	7.56E-09	1.26E-08	8.58E-09	2.31E-08	5.42E-07	1.90E-08	1.02075E-10	4.92846E-10	0	0	0.0006	Res	0.0046
582357.99_4130817.12	582357.99	4130817.12	7.82E-06	1.10E-08	6.61E-09	1.10E-08	7.55E-09	2.02E-08	4.73E-07	1.66E-08	9.04123E-11	4.36534E-10	0	0	0.0005	Res	0.0041
582414.56_4130817.12	582414.56	4130817.12	7.06E-06	9.81E-09	5.88E-09	9.81E-09	6.78E-09	1.79E-08	4.21E-07	1.47E-08	8.15813E-11	3.93895E-10	0	0	0.0005	Res	0.0037
582471.13_4130817.12	582471.13	4130817.12	6.47E-06	8.88E-09	5.33E-09	8.88E-09	6.18E-09	1.62E-08	3.81E-07	1.33E-08	7.48359E-11	3.61327E-10	0	0	0.0004	Res	0.0034
582527.7_4130817.12	582527.7	4130817.12	5.98E-06	8.09E-09	4.86E-09	8.09E-09	5.68E-09	1.48E-08	3.47E-07	1.21E-08	6.91453E-11	3.33851E-10	0	0	0.0004	Res	0.0031
582584.27_4130817.12	582584.27	4130817.12	5.58E-06	7.45E-09	4.47E-09	7.45E-09	5.26E-09	1.36E-08	3.19E-07	1.12E-08	6.4505E-11	3.11447E-10	0	0	0.0004	Res	0.0029
582640.84_4130817.12	582640.84	4130817.12	5.24E-06	6.90E-09	4.14E-09	6.90E-09	4.91E-09	1.26E-08	2.95E-07	1.03E-08	6.05348E-11	2.92278E-10	0	0	0.0004	Res	0.0027
582697.41_4130817.12	582697.41	4130817.12	4.93E-06	6.42E-09	3.85E-09	6.42E-09	4.60E-09	1.17E-08	2.75E-07	9.61E-09	5.70443E-11	2.75424E-10	0	0	0.0003	Res	0.0025
582753.98_4130817.12	582753.98	4130817.12	4.66E-06	5.98E-09	3.59E-09	5.98E-09	4.32E-09	1.09E-08	2.56E-07	8.94E-09	5.38211E-11	2.59862E-10	0	0	0.0003	Res	0.0024
582810.55_4130817.12	582810.55	4130817.12	4.41E-06	5.60E-09	3.36E-09	5.60E-09	4.07E-09	1.02E-08	2.39E-07	8.36E-09	5.10053E-11	2.46266E-10	0	0	0.0003	Res	0.0023
582867.12_4130817.12	582867.12	4130817.12	4.20E-06	5.27E-09	3.16E-09	5.27E-09	3.85E-09	9.60E-09	2.25E-07	7.85E-09	4.84931E-11	2.34137E-10	0	0	0.0003	Res	0.0021
581735.72_4130901.03	581735.72	4130901.03	2.32E-04	3.58E-07	2.15E-07	3.58E-07	2.30E-07	6.59E-07	1.55E-05	5.44E-07	2.68634E-09	1.29703E-08	0	0	0.0157	Res	0.1255
581792.29_4130901.03	581792.29	4130901.03	2.48E-04	3.82E-07	2.29E-07	3.82E-07	2.45E-07	7.02E-07	1.65E-05	5.80E-07	2.86553E-09	1.38355E-08	0	0	0.0167	Res	0.1339
581848.86_4130901.03	581848.86	4130901.03	2.21E-04	3.40E-07	2.04E-07	3.40E-07	2.18E-07	6.26E-07	1.47E-05	5.17E-07	2.55385E-09	1.23307E-08	0	0	0.0149	Res	0.1194
581905.43_4130901.03	581905.43	4130901.03	1.16E-04	1.79E-07	1.07E-07	1.79E-07	1.15E-07	3.29E-07	7.72E-06	2.72E-07	1.34542E-09	6.49604E-09	0	0	0.0078	Res	0.0628
581962_4130901.03	581962	4130901.03	4.77E-05	7.28E-08	4.37E-08	7.28E-08	4.71E-08	1.34E-07	3.14E-06	1.10E-07	5.51434E-10	2.66246E-09	0	0	0.0032	Res	0.0256
582018.57_4130901.03	582018.57	4130901.03	2.59E-05	3.91E-08	2.35E-08	3.91E-08	2.56E-08	7.19E-08	1.69E-06	5.93E-08	2.99498E-10	1.44605E-09	0	0	0.0017	Res	0.0138
582075.14_4130901.03	582075.14	4130901.03	1.76E-05	2.63E-08	1.58E-08	2.63E-08	1.73E-08	4.83E-08	1.13E-06	3.98E-08	2.03203E-10	9.81118E-10	0	0	0.0012	Res	0.0093
582131.71_4130901.03	582131.71	4130901.03	1.36E-05	2.01E-08	1.21E-08	2.01E-08	1.34E-08	3.69E-08	8.66E-07	3.04E-08	1.56886E-10	7.57485E-10	0	0	0.0009	Res	0.0072
582188.28_4130901.03	582188.28	4130901.03	1.12E-05	1.64E-08	9.86E-09	1.64E-08	1.10E-08	3.01E-08	7.07E-07	2.48E-08	1.29437E-10	6.24957E-10	0	0	0.0008	Res	0.0059
582244.85_4130901.03	582244.85	4130901.03	9.58E-06	1.39E-08	8.35E-09	1.39E-08	9.37E-09	2.55E-08	5.99E-07	2.10E-08	1.10725E-10	5.34606E-10	0	0	0.0006	Res	0.0050
582301.42_4130901.03	582301.42	4130901.03	8.38E-06	1.21E-08	7.24E-09	1.21E-08	8.16E-09	2.21E-08	5.18E-07	1.82E-08	9.68557E-11	4.67644E-10	0	0	0.0006	Res	0.0044
582357.99_4130901.03	582357.99	4130901.03	7.46E-06	1.06E-08	6.38E-09	1.06E-08	7.24E-09	1.95E-08	4.57E-07	1.60E-08	8.62783E-11	4.16574E-10	0	0	0.0005	Res	0.0039
582414.56_4130901.03	582414.56	4130901.03	6.73E-06	9.48E-09	5.69E-09	9.48E-09	6.50E-09	1.74E-08	4.07E-07	1.43E-08	7.77884E-11	3.75582E-10	0	0	0.0005	Res	0.0035
582471.13_4130901.03	582471.13	4130901.03	6.14E-06	8.56E-09	5.14E-09	8.56E-09	5.90E-09	1.57E-08	3.67E-07	1.29E-08	7.10079E-11	3.42844E-10	0	0	0.0004	Res	0.0032
582527.7_4130901.03	582527.7	4130901.03	5.65E-06	7.79E-09	4.67E-09	7.79E-09	5.41E-09	1.42E-08	3.34E-07	1.17E-08	6.5349E-11	3.15522E-10	0	0	0.0004	Res	0.0029
582584.27_4130901.03	582584.27	4130901.03	5.26E-06	7.15E-09	4.29E-09	7.15E-09	5.00E-09	1.31E-08	3.07E-07	1.07E-08	6.07622E-11	2.93375E-10	0	0	0.0004	Res	0.0027
582640.84_4130901.03	582640.84	4130901.03	4.92E-06	6.62E-09	3.97E-09	6.62E-09	4.66E-09	1.21E-08	2.84E-07	9.92E-09	5.69161E-11	2.74805E-10	0	0	0.0003	Res	0.0025
582697.41_4130901.03	582697.41	4130901.03	4.64E-06	6.16E-09	3.69E-09	6.16E-09	4.36E-09	1.12E-08	2.64E-07	9.22E-09	5.35942E-11	2.58766E-10	0	0	0.0003	Res	0.0024
582753.98_4130901.03	582753.98	4130901.03	4.38E-06	5.75E-09	3.45E-09	5.75E-09	4.10E-09	1.05E-08	2.46E-07	8.60E-09	5.06811E-11	2.44701E-10	0	0	0.0003	Res	0.0023
582810.55_4130901.03	582810.55	4130901.03	4.16E-06	5.38E-09	3.23E-09	5.38E-09	3.87E-09	9.82E-09	2.30E-07	8.04E-09	4.80341E-11	2.31921E-10	0	0	0.0003	Res	0.0021

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)								Risk Calculation Part 2, $\sum R1*C_{TAC}$						Cancer Risk Total
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Cobalt	Lead	Nickel	Chromium VI	3rd Trimester	0<2	2<16	16<30	Cancer Risk - 2024 (per million)	Receptor Type	(per million)
582867.12_4130901.03	582867.12	4130901.03	3.96E-06	5.06E-09	3.04E-09	5.06E-09	3.66E-09	9.23E-09	2.16E-07	7.56E-09	4.57516E-11	2.209E-10	0	0	0.0003	Res	0.0020
581735.72_4130984.94	581735.72	4130984.94	6.17E-04	9.51E-07	5.71E-07	9.51E-07	6.09E-07	1.75E-06	4.11E-05	1.45E-06	7.13195E-09	3.44349E-08	0	0	0.0416	Res	0.3339
581792.29_4130984.94	581792.29	4130984.94	8.09E-04	1.25E-06	7.49E-07	1.25E-06	7.99E-07	2.30E-06	5.39E-05	1.90E-06	9.35711E-09	4.51785E-08	0	0	0.0545	Res	0.4383
581848.86_4130984.94	581848.86	4130984.94	9.41E-04	1.45E-06	8.71E-07	1.45E-06	9.30E-07	2.67E-06	6.27E-05	2.21E-06	1.08825E-08	5.25435E-08	0	0	0.0634	Res	0.5098
581905.43_4130984.94	581905.43	4130984.94	7.57E-05	1.16E-07	6.96E-08	1.16E-07	7.48E-08	2.13E-07	5.01E-06	1.76E-07	8.75486E-10	4.22707E-09	0	0	0.0051	Res	0.0408
581962_4130984.94	581962	4130984.94	3.29E-05	4.99E-08	3.00E-08	4.99E-08	3.25E-08	9.18E-08	2.15E-06	7.57E-08	3.80594E-10	1.8376E-09	0	0	0.0022	Res	0.0176
582018.57_4130984.94	582018.57	4130984.94	2.14E-05	3.22E-08	1.93E-08	3.22E-08	2.11E-08	5.91E-08	1.39E-06	4.87E-08	2.47455E-10	1.19478E-09	0	0	0.0014	Res	0.0114
582075.14_4130984.94	582075.14	4130984.94	1.59E-05	2.37E-08	1.42E-08	2.37E-08	1.56E-08	4.35E-08	1.02E-06	3.58E-08	1.83827E-10	8.87562E-10	0	0	0.0011	Res	0.0084
582131.71_4130984.94	582131.71	4130984.94	1.27E-05	1.87E-08	1.12E-08	1.87E-08	1.24E-08	3.42E-08	8.03E-07	2.82E-08	1.4625E-10	7.06132E-10	0	0	0.0009	Res	0.0067
582188.28_4130984.94	582188.28	4130984.94	1.05E-05	1.53E-08	9.19E-09	1.53E-08	1.03E-08	2.81E-08	6.59E-07	2.31E-08	1.21119E-10	5.84794E-10	0	0	0.0007	Res	0.0055
582244.85_4130984.94	582244.85	4130984.94	8.93E-06	1.29E-08	7.76E-09	1.29E-08	8.71E-09	2.37E-08	5.57E-07	1.95E-08	1.03201E-10	4.98281E-10	0	0	0.0006	Res	0.0047
582301.42_4130984.94	582301.42	4130984.94	7.78E-06	1.12E-08	6.70E-09	1.12E-08	7.56E-09	2.05E-08	4.80E-07	1.69E-08	8.98774E-11	4.33951E-10	0	0	0.0005	Res	0.0041
582357.99_4130984.94	582357.99	4130984.94	6.89E-06	9.82E-09	5.89E-09	9.82E-09	6.68E-09	1.80E-08	4.22E-07	1.48E-08	7.96769E-11	3.847E-10	0	0	0.0005	Res	0.0036
582414.56_4130984.94	582414.56	4130984.94	6.19E-06	8.75E-09	5.25E-09	8.75E-09	5.98E-09	1.60E-08	3.76E-07	1.32E-08	7.16072E-11	3.45738E-10	0	0	0.0004	Res	0.0032
582471.13_4130984.94	582471.13	4130984.94	5.63E-06	7.88E-09	4.73E-09	7.88E-09	5.42E-09	1.44E-08	3.38E-07	1.19E-08	6.50924E-11	3.14283E-10	0	0	0.0004	Res	0.0029
582527.7_4130984.94	582527.7	4130984.94	5.17E-06	7.16E-09	4.30E-09	7.16E-09	4.95E-09	1.31E-08	3.07E-07	1.08E-08	5.97298E-11	2.8839E-10	0	0	0.0003	Res	0.0027
582584.27_4130984.94	582584.27	4130984.94	4.80E-06	6.58E-09	3.95E-09	6.58E-09	4.58E-09	1.20E-08	2.82E-07	9.88E-09	5.54354E-11	2.67656E-10	0	0	0.0003	Res	0.0025
582640.84_4130984.94	582640.84	4130984.94	4.50E-06	6.11E-09	3.66E-09	6.11E-09	4.27E-09	1.12E-08	2.62E-07	9.17E-09	5.19744E-11	2.50946E-10	0	0	0.0003	Res	0.0023
582697.41_4130984.94	582697.41	4130984.94	4.23E-06	5.68E-09	3.41E-09	5.68E-09	4.00E-09	1.04E-08	2.43E-07	8.52E-09	4.88629E-11	2.35923E-10	0	0	0.0003	Res	0.0022
582753.98_4130984.94	582753.98	4130984.94	4.01E-06	5.33E-09	3.20E-09	5.33E-09	3.77E-09	9.74E-09	2.28E-07	7.98E-09	4.63433E-11	2.23757E-10	0	0	0.0003	Res	0.0021
582810.55_4130984.94	582810.55	4130984.94	3.81E-06	5.01E-09	3.01E-09	5.01E-09	3.57E-09	9.15E-09	2.14E-07	7.50E-09	4.40541E-11	2.12704E-10	0	0	0.0003	Res	0.0020
582867.12_4130984.94	582867.12	4130984.94	3.63E-06	4.72E-09	2.83E-09	4.72E-09	3.39E-09	8.62E-09	2.02E-07	7.06E-09	4.2016E-11	2.02864E-10	0	0	0.0002	Res	0.0019
581735.72_4131068.85	581735.72	4131068.85	1.02E-04	1.56E-07	9.36E-08	1.56E-07	1.00E-07	2.87E-07	6.74E-06	2.37E-07	1.17517E-09	5.67403E-09	0	0	0.0068	Res	0.0548
581792.29_4131068.85	581792.29	4131068.85	8.12E-05	1.24E-07	7.47E-08	1.24E-07	8.02E-08	2.29E-07	5.37E-06	1.89E-07	9.3871E-10	4.53233E-09	0	0	0.0055	Res	0.0437
581848.86_4131068.85	581848.86	4131068.85	4.41E-05	6.71E-08	4.03E-08	6.71E-08	4.35E-08	1.23E-07	2.90E-06	1.02E-07	5.09412E-10	2.45957E-09	0	0	0.0030	Res	0.0236
581905.43_4131068.85	581905.43	4131068.85	2.83E-05	4.28E-08	2.57E-08	4.28E-08	2.79E-08	7.86E-08	1.84E-06	6.48E-08	3.27255E-10	1.58007E-09	0	0	0.0019	Res	0.0151
581962_4131068.85	581962	4131068.85	2.07E-05	3.10E-08	1.86E-08	3.10E-08	2.03E-08	5.69E-08	1.33E-06	4.69E-08	2.38832E-10	1.15314E-09	0	0	0.0014	Res	0.0110
582018.57_4131068.85	582018.57	4131068.85	1.58E-05	2.34E-08	1.41E-08	2.34E-08	1.55E-08	4.30E-08	1.01E-06	3.55E-08	1.82356E-10	8.80462E-10	0	0	0.0011	Res	0.0084
582075.14_4131068.85	582075.14	4131068.85	1.26E-05	1.85E-08	1.11E-08	1.85E-08	1.23E-08	3.40E-08	7.98E-07	2.80E-08	1.45582E-10	7.02909E-10	0	0	0.0008	Res	0.0067
582131.71_4131068.85	582131.71	4131068.85	1.04E-05	1.52E-08	9.13E-09	1.52E-08	1.02E-08	2.79E-08	6.55E-07	2.30E-08	1.20642E-10	5.82489E-10	0	0	0.0007	Res	0.0055
582188.28_4131068.85	582188.28	4131068.85	8.86E-06	1.28E-08	7.68E-09	1.28E-08	8.63E-09	2.35E-08	5.50E-07	1.93E-08	1.02386E-10	4.94345E-10	0	0	0.0006	Res	0.0047
582244.85_4131068.85	582244.85	4131068.85	7.68E-06	1.10E-08	6.60E-09	1.10E-08	7.46E-09	2.02E-08	4.73E-07	1.66E-08	8.88274E-11	4.28881E-10	0	0	0.0005	Res	0.0040
582301.42_4131068.85	582301.42	4131068.85	6.77E-06	9.62E-09	5.77E-09	9.62E-09	6.56E-09	1.76E-08	4.13E-07	1.45E-08	7.82847E-11	3.77979E-10	0	0	0.0005	Res	0.0035
582357.99_4131068.85	582357.99	4131068.85	6.05E-06	8.52E-09	5.11E-09	8.52E-09	5.84E-09	1.56E-08	3.66E-07	1.28E-08	6.98935E-11	3.37463E-10	0	0	0.0004	Res	0.0032
582414.56_4131068.85	582414.56	4131068.85	5.47E-06	7.65E-09	4.59E-09	7.65E-09	5.26E-09	1.40E-08	3.28E-07	1.15E-08	6.31926E-11	3.0511E-10	0	0	0.0004	Res	0.0029
582471.13_4131068.85	582471.13	4131068.85	4.99E-06	6.93E-09	4.16E-09	6.93E-09	4.79E-09	1.27E-08	2.97E-07	1.04E-08	5.76708E-11	2.78449E-10	0	0	0.0003	Res	0.0026
582527.7_4131068.85	582527.7	4131068.85	4.59E-06	6.33E-09	3.80E-09	6.33E-09	4.39E-09	1.16E-08	2.71E-07	9.51E-09	5.30586E-11	2.5618E-10	0	0	0.0003	Res	0.0024
582584.27_4131068.85	582584.27	4131068.85	4.25E-06	5.81E-09	3.48E-09	5.81E-09	4.05E-09	1.06E-08	2.49E-07	8.72E-09	4.90934E-11	2.37036E-10	0	0	0.0003	Res	0.0022
582640.84_4131068.85	582640.84	4131068.85	4.00E-06	5.43E-09	3.26E-09	5.43E-09	3.80E-09	9.92E-09	2.33E-07	8.14E-09	4.62018E-11	2.23074E-10	0	0	0.0003	Res	0.0021
582697.41_4131068.85	582697.41	4131068.85	3.77E-06	5.08E-09	3.05E-09	5.08E-09	3.57E-09	9.28E-09	2.18E-07	7.62E-09	4.35921E-11	2.10474E-10	0	0	0.0003	Res	0.0020
582753.98_4131068.85	582753.98	4131068.85	3.59E-06	4.80E-09	2.88E-09	4.80E-09	3.39E-09	8.77E-09	2.05E-07	7.19E-09	4.1513E-11	2.00435E-10	0	0	0.0002	Res	0.0019
582810.55_4131068.85	582810.55	4131068.85	3.43E-06	4.55E-09	2.73E-09	4.55E-09	3.22E-09	8.30E-09	1.95E-07	6.81E-09	3.96844E-11	1.91606E-10	0	0	0.0002	Res	0.0018
582867.12_4131068.85	582867.12	4131068.85	3.27E-06	4.28E-09	2.57E-09	4.28E-09	3.05E-09	7.82E-09	1.83E-07	6.41E-09	3.7763E-11	1.82329E-10	0	0	0.0002	Res	0.0017
582018.57_4131152.76	582018.57	4131152.76	1.07E-05	1.56E-08	9.36E-09	1.56E-08	1.05E-08	2.86E-08	6.72E-07	2.36E-08	1.23896E-10	5.98199E-10	0	0	0.0007	Res	0.0056
582244.85_4131152.76	582244.85	4131152.76	6.54E-06	9.24E-09	5.55E-09	9.24E-09	6.32E-09	1.69E-08	3.97E-07	1.39E-08	7.56455E-11	3.65236E-10	0	0	0.0004	Res	0.0034
582301.42_4131152.76	582301.42	4131152.76	5.90E-06	8.28E-09	4.97E-09	8.28E-09	5.69E-09	1.52E-08	3.55E-07	1.25E-08	6.82262E-11	3.29414E-10	0	0	0.0004	Res	0.0031
582357.99_4131152.76	582357.99	4131152.76	5.34E-06	7.43E-09	4.46E-09	7.43E-09	5.13E-09	1.36E-08	3.19E-07	1.12E-08	6.16919E-11	2.97864E-10	0	0	0.0004	Res	0.0028
582414.56_4131152.76	582414.56	4131152.76	4.87E-06	6.73E-09	4.04E-09	6.73E-09	4.66E-09	1.23E-08	2.89E-07	1.01E-08	5.62536E-11	2.71607E-10	0	0	0.0003	Res	0.0025
582471.13_4131152.76	582471.13	4131152.76	4.42E-06	6.07E-09	3.64E-09	6.07E-09	4.22E-09	1.11E-08	2.60E-07	9.11E-09	5.11275E-11	2.46857E-10	0	0	0.0003	Res	0.0023
582527.7_4131152.76	582527.7	4131152.76	4.07E-06	5.54E-09	3.33E-09	5.54E-09	3.88E-09	1.01E-08	2.38E-07	8.32E-09	4.70316E-11	2.27081E-10	0	0	0.0003	Res	0.0021
582584.27_4131152.76	582584.27	4131152.76	3.76E-06	5.09E-09	3.06E-09	5.09E-09	3.58E-09	9.32E-09	2.18E-07	7.64E-09	4.35164E-11	2.10108E-10	0	0	0.0003	Res	0.0020
582640.84_4131152.76	582640.84	4131152.76	3.52E-06	4.73E-09	2.84E-09	4.73E-09	3.33E-09	8.65E-09	2.03E-07	7.10E-09	4.06922E-11	1.96472E-10	0	0	0.0002	Res	0.0018
582697.41_4131152.76	582697.41	4131152.76	3.31E-06	4.43E-09	2.66E-09	4.43E-09	3.13E-09	8.09E-09	1.90E-07	6.63E-09	3.82949E-11	1.84898E-10	0	0	0.0002	Res	0.0017
582753.98_4131152.76	582753.98	4131152.76	3.16E-06	4.20E-09	2.52E-09	4.20E-09	2.98E-09	7.67E-09	1.80E-07	6.29E-09	3.65249E-11	1.76352E-10	0	0	0.0002	Res	0.0016
582810.55_4131152.76	582810.55	4131152.76	3.02E-06	3.99E-09	2.39E-09	3.99E-09	2.84E-09	7.28E-09	1.71E-07	5.97E-09	3.4909E-11	1.6855E-10	0	0	0.0002	Res	0.0016
582867.12_4131152.76	582867.12	4131152.76	2.87E-06	3.76E-09	2.26E-09	3.76E-09	2.69E-09	6.87E-09	1.61E-07	5.63E-09	3.31928E-11	1.60263E-10	0	0	0.0002	Res	0.0015

HRA Permanente Creek Restoration Project

Construction Year 2025

Emissions Inputs

Construction Activity	Construction Year & Source	DPM Exhaust (tons/year)	PM10 Dust for speciation (tons/year)	Arsenic (tons/year)	Beryllium (tons/year)	Cadmium (tons/year)	Cobalt (tons/year)	Copper (tons/year)	Lead (tons/year)	Mercury (tons/year)	Nickel (tons/year)	Selenium (tons/year)	Chromium VI (tons/year)	Crystalline Silica (tons/year)
Concrete Channel 2024	2024_CONCRTE	0.000	0.00	2.91E-12	1.74E-12	2.91E-12	1.49E-11	3.26E-11	2.91E-12	4.65E-13	5.35E-11	5.81E-12	2.33E-13	8.63E-09
Paved road	2024_PAVED	2.07E-04	0.08	1.04E-07	6.26E-08	1.04E-07	6.68E-08	2.09E-06	1.92E-07	1.17E-08	4.51E-06	2.09E-07	1.59E-07	5.93E-04
Unpaved road	2024_CCP_UNPV	6.27E-05	0.20	2.56E-07	1.54E-07	2.56E-07	1.64E-07	5.12E-06	4.71E-07	2.87E-08	1.11E-05	5.12E-07	3.89E-07	1.46E-03
Channel Widening 2024	2024_CHAN_RCK	0.002	0.16	2.05E-07	1.23E-07	2.05E-07	1.05E-06	2.29E-06	2.05E-07	3.28E-08	3.77E-06	4.09E-07	1.64E-08	6.08E-04
Paved road	2024_PAVED	1.80E-03	2.39	2.99E-06	1.79E-06	2.99E-06	1.91E-06	5.98E-05	5.50E-06	3.35E-07	1.29E-04	5.98E-06	4.54E-06	1.70E-02
Rock Pile Area 2025	2025_CHAN_RCK	0.006	0.25	3.16E-07	1.89E-07	3.16E-07	1.62E-06	3.54E-06	3.16E-07	5.05E-08	5.81E-06	6.31E-07	2.53E-08	9.37E-04
Paved road	2025_PAVED	5.95E-03	2.44	3.05E-06	1.83E-06	3.05E-06	1.95E-06	6.10E-05	5.61E-06	3.41E-07	1.32E-04	6.10E-06	4.63E-06	1.73E-02
Rock Pile Area 2026	2026_CHAN_RCK	0.006	0.25	3.16E-07	1.89E-07	3.16E-07	1.62E-06	3.54E-06	3.16E-07	5.05E-08	5.81E-06	6.31E-07	2.53E-08	9.37E-04
Paved road	2026_PAVED	5.84E-03	2.44	3.05E-06	1.83E-06	3.05E-06	1.95E-06	6.10E-05	5.61E-06	3.41E-07	1.32E-04	6.10E-06	4.63E-06	1.73E-02
Channel Widening 2027	2027_CHAN_RCK	0.002	0.98	1.23E-06	7.36E-07	1.23E-06	6.28E-06	1.37E-05	1.23E-06	1.96E-07	2.26E-05	2.45E-06	9.82E-08	3.64E-03
Paved road	2027_PAVED	5.61E-03	2.39	2.99E-06	1.79E-06	2.99E-06	1.91E-06	5.98E-05	5.50E-06	3.35E-07	1.29E-04	5.98E-06	4.54E-06	1.70E-02
Material Removal 2028	2028_MATRMVL	0.001	0.25	3.15E-07	1.89E-07	3.15E-07	1.62E-06	3.53E-06	3.15E-07	5.05E-08	5.80E-06	6.31E-07	2.52E-08	9.37E-04
Paved road	2028_PAVED	5.57E-03	2.39	2.99E-06	1.80E-06	2.99E-06	1.92E-06	5.98E-05	5.51E-06	3.35E-07	1.29E-04	5.98E-06	4.55E-06	1.70E-02
Unpaved road	2028_UNPAVED	3.40E-03	11.84	1.48E-05	8.88E-06	1.48E-05	9.47E-06	2.96E-04	2.72E-05	1.66E-06	6.40E-04	2.96E-05	2.25E-05	8.41E-02
Material Removal 2029	2029_MATRMVL	0.001	0.25	3.15E-07	1.89E-07	3.15E-07	1.62E-06	3.53E-06	3.15E-07	5.05E-08	5.80E-06	6.31E-07	2.52E-08	9.37E-04
Paved road	2029_PAVED	5.56E-03	2.41	3.01E-06	1.81E-06	3.01E-06	1.93E-06	6.03E-05	5.55E-06	3.38E-07	1.30E-04	6.03E-06	4.58E-06	1.71E-02
Unpaved road	2029_UNPAVED	3.39E-03	11.93	1.49E-05	8.95E-06	1.49E-05	9.55E-06	2.98E-04	2.74E-05	1.67E-06	6.44E-04	2.98E-05	2.27E-05	8.47E-02

Construction Activity	Construction Year	DPM (g/s)	Arsenic (g/s)	Beryllium (g/s)	Cadmium (g/s)	Cobalt (g/s)	Copper (g/s)	Lead (g/s)	Mercury (g/s)	Nickel (g/s)	Selenium (g/s)	Chromium VI (g/s)	Crystalline Silica (g/s)
Concrete Channel 2024	2024_CONCRTE	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Paved road	2024_PAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Unpaved road	2024_CCP_UNPV	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Channel Widening 2024	2024_CHAN_RCK	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Paved road	2024_PAVED	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Rock Pile Area 2025	2025_CHAN_RCK	1.698E-04	9.08E-09	5.45E-09	9.08E-09	4.65E-08	1.02E-07	9.08E-09	1.45E-09	1.67E-07	1.82E-08	7.26E-10	2.70E-05
Paved road	2025_PAVED	1.711E-04	8.77E-08	5.26E-08	8.77E-08	5.61E-08	1.75E-06	1.61E-07	9.82E-09	3.79E-06	1.75E-07	1.33E-07	4.98E-04
Rock Pile Area 2026	2026_CHAN_RCK	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Paved road	2026_PAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Channel Widening 2027	2027_CHAN_RCK	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Paved road	2027_PAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Material Removal 2028	2028_MATRMVL	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Paved road	2028_PAVED	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Unpaved road	2028_UNPAVED	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Material Removal 2029	2029_MATRMVL	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Paved road	2029_PAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Unpaved road	2029_UNPAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

N/A = not including PM10 on-site dust in HRA calculation; it is only for speciating metals.

Exposure Duration, ED

	Exposure Start	3rd Trimester	0<2	2<16	16<30
Years	1/1/2025	0	1	0	0

Risk Factors

	Abbreviation	UOM	3rd Trimester	0<2	2<16	16<30
Daily Breathing Rate (95th %'ile)	DBR	L/kg-day	361	581	581	302
Fraction Of Time At Home [a]	FAH	unitless	0.85	0.85	0.72	0.73
Exposure Frequency	EF	days/year	0.96	0.96	0.96	0.96
Age Sensitivity Factor	ASF	unitless	10	10	3	1.7
Inhalation Absorption Factor	A	unitless	1	1	1	1
Conversion Factor	CF_1	m^3/L	0.001	0.001	0.001	0.001
Conversion Factor	CF_2	$\mu g/m^3$	0.001	0.001	0.001	0.001
Averaging Time (for residential exposure)	AT	years	70.00	70.00	70.00	70.00

[a] assume school or daycare will have cancer risk of >1 per million

Cancer Potency Factor, CPF

TAC	UOM	
DPM	$mg/kg\text{-}day^{-1}$	1.1
Arsenic	$mg/kg\text{-}day^{-1}$	12
Beryllium	$mg/kg\text{-}day^{-1}$	8.4
Cadmium	$mg/kg\text{-}day^{-1}$	15
Cobalt	$mg/kg\text{-}day^{-1}$	27
Lead	$mg/kg\text{-}day^{-1}$	0.04
Nickel	$mg/kg\text{-}day^{-1}$	0.91
Chromium VI	$mg/kg\text{-}day^{-1}$	510

Intake Factor for Inhalation, IF (m^3/kg-day)

Equation	3rd Trimester	0<2	2<16	16<30
DBR*FAH*EF*ED*ASF*A*CF/AT	0.000	0.068	0.000	0.000

Risk Calculation Part 1, R1

	TAC	3rd Trimester	0<2	2<16	16<30
IF*CPF*CF	DPM	0.00E+00	7.44E-05	0.00E+00	0.00E+00
	Arsenic	0.00E+00	8.12E-04	0.00E+00	0.00E+00
	Beryllium	0.00E+00	5.68E-04	0.00E+00	0.00E+00
	Cadmium	0.00E+00	1.01E-03	0.00E+00	0.00E+00
	Cobalt	0.00E+00	1.83E-03	0.00E+00	0.00E+00
	Lead	0.00E+00	2.71E-06	0.00E+00	0.00E+00
	Nickel	0.00E+00	6.16E-05	0.00E+00	0.00E+00
	Chromium VI	0.00E+00	3.45E-02	0.00E+00	0.00E+00

Risk Calculation Part 2, $\sum R1*C_{TAC}$

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)								3rd Trimester	0<2	2<16	16<30	Cancer Risk - 2025	Receptor Type
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Cobalt	Lead	Nickel	Chromium VI					(per million)	
581336.22_4131207.48	581336.22	4131207.48	2.00E-04	1.01E-07	6.05E-08	1.01E-07	6.54E-08	1.85E-07	4.35E-06	1.53E-07	0	1.48789E-08	0	0	0.0149	CT House
581554.22_4130688.06	581554.22	4130688.06	1.37E-04	6.70E-08	4.02E-08	6.70E-08	4.46E-08	1.23E-07	2.88E-06	1.01E-07	0	1.02128E-08	0	0	0.0102	Res
579793.36_4131503.29	579793.36	4131503.29	1.25E-05	3.69E-09	2.21E-09	3.69E-09	3.78E-09	6.52E-09	1.51E-07	5.15E-09	0	9.29858E-10	0	0	0.0009	Acute
580488.37_4131517.71	580488.37	4131517.71	1.58E-05	6.54E-09	3.92E-09	6.54E-09	5.01E-09	1.19E-08	2.78E-07	9.68E-09	0	1.17799E-09	0	0	0.0012	Acute
581678.43_4131040.03	581678.43	4131040.03	6.34E-04	3.23E-07	1.94E-07	3.23E-07	2.08E-07	5.94E-07	1.39E-05	4.91E-07	0	4.71967E-08	0	0	0.0472	Res
581635.43_4130978.54	581635.43	4130978.54	1.28E-03	6.55E-07	3.93E-07	6.55E-07	4.20E-07	1.20E-06	2.83E-05	9.95E-07	0	9.54273E-08	0	0	0.0954	Res
581830.06_4131027.55	581830.06	4131027.55	5.84E-04	2.97E-07	1.78E-07	2.97E-07	1.91E-07	5.47E-07	1.28E-05	4.52E-07	0	4.34614E-08	0	0	0.0435	Res
581727.48_4130976.54	581727.48	4130976.54	1.55E-03	7.93E-07	4.76E-07	7.93E-07	5.09E-07	1.46E-06	3.43E-05	1.21E-06	0	1.1547E-07	0	0	0.1155	Res
581789.11_4130419.65	581789.11	4130419.65	1.07E-04	5.04E-08	3.02E-08	5.04E-08	3.45E-08	9.23E-08	2.16E-06	7.59E-08	0	7.94375E-09	0	0	0.0079	Res
581700.32_4130781.89	581700.32	4130781.89	3.09E-04	1.56E-07	9.37E-08	1.56E-07	1.01E-07	2.87E-07	6.74E-06	2.37E-07	0	2.30296E-08	0	0	0.0230	Res
581426.07_4131299.01	581426.07	4131299.01	7.29E-05	3.59E-08	2.15E-08	3.59E-08	2.37E-08	6.59E-08	1.55E-06	5.43E-08	0	5.42198E-09	0	0	0.0054	Acute
582301.42_4129474.56	582301.42	4129474.56	3.79E-05	1.55E-08	9.29E-09	1.55E-08	1.20E-08	2.81E-08	6.57E-07	2.29E-08	0	2.82332E-09	0	0	0.0028	Res
582357.99_4129474.56	582357.99	4129474.56	3.55E-05	1.45E-08	8.67E-09	1.45E-08	1.12E-08	2.62E-08	6.14E-07	2.13E-08	0	2.64365E-09	0	0	0.0026	Res
582414.56_4129474.56	582414.56	4129474.56	3.33E-05	1.35E-08	8.11E-09	1.35E-08	1.05E-08	2.45E-08	5.74E-07	2.00E-08	0	2.48114E-09	0	0	0.0025	Res
582471.13_4129474.56	582471.13	4129474.56	3.14E-05	1.27E-08	7.61E-09	1.27E-08	9.88E-09	2.30E-08	5.38E-07	1.87E-08	0	2.33339E-09	0	0	0.0023	Res
582527.7_4129474.56	582527.7	4129474.56	2.96E-05	1.20E-08	7.18E-09	1.20E-08	9.34E-09	2.17E-08	5.08E-07	1.76E-08	0	2.20611E-09	0	0	0.0022	Res
582584.27_4129474.56	582584.27	4129474.56	2.79E-05	1.12E-08	6.74E-09	1.12E-08	8.79E-09	2.04E-08	4.77E-07	1.66E-08	0	2.07706E-09	0	0	0.0021	Res
582640.84_4129474.56	582640.84	4129474.56	2.61E-05	1.05E-08	6.27E-09	1.05E-08	8.22E-09	1.90E-08	4.43E-07	1.54E-08	0	1.94264E-09	0	0	0.0019	Res
582244.85_4129558.47	582244.85	4129558.47	3.95E-05	1.57E-08	9.41E-09	1.57E-08	1.24E-08	2.84E-08	6.64E-07	2.31E-08	0	2.93807E-09	0	0	0.0029	Res
582301.42_4129558.47	582301.42	4129558.47	3.84E-05	1.56E-08	9.34E-09	1.56E-08	1.21E-08	2.82E-08	6.60E-07	2.30E-08	0	2.86028E-09	0	0	0.0029	Res
582357.99_4129558.47	582357.99	4129558.47	3.63E-05	1.48E-08	8.85E-09	1.48E-08	1.14E-08	2.68E-08	6.26E-07	2.18E-08	0	2.6992E-09	0	0	0.0027	Res
582414.56_4129558.47	582414.56	4129558.47	3.41E-05	1.38E-08	8.30E-09	1.38E-08	1.07E-08	2.51E-08	5.87E-07	2.04E-08	0	2.5348E-09	0	0	0.0025	Res
582471.13_4129558.47	582471.13	4129558.47	3.19E-05	1.29E-08	7.76E-09	1.29E-08	1.00E-08	2.35E-08	5.49E-07	1.91E-08	0	2.37056E-09	0	0	0.0024	Res
582527.7_4129558.47	582527.7	4129558.47	2.99E-05	1.21E-08	7.25E-09	1.21E-08	9.42E-09	2.19E-08	5.13E-07	1.78E-08	0	2.22305E-09	0	0	0.0022	Res
582584.27_4129558.47	582584.27	4129558.47	2.80E-05	1.13E-08	6.77E-09	1.13E-08	8.82E-09	2.05E-08	4.78E-07	1.66E-08	0	2.08406E-09	0	0	0.0021	Res
582640.84_4129558.47	582640.84	4129558.47	2.64E-05	1.06E-08	6.36E-09	1.06E-08	8.32E-09	1.92E-08	4.50E-07	1.56E-08	0	1.96669E-09	0	0	0.0020	Res
582697.41_4129558.47	582697.41	4129558.47	2.49E-05	9.96E-09	5.98E-09	9.96E-09	7.84E-09	1.80E-08	4.22E-07	1.47E-08	0	1.8544E-09	0	0	0.0019	Res
582244.85_4129642.38	582244.85	4129642.38	3.62E-05	1.37E-08	8.24E-09	1.37E-08	1.13E-08	2.48E-08	5.79E-07	2.01E-08	0	2.69272E-09	0	0	0.0027	Res

Risk Calculation Part 2, $\sum R1*C_{TAC}$

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)								3rd Trimester	0<2	2<16	16<30	Cancer Risk - 2025	Receptor Type
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Cobalt	Lead	Nickel	Chromium VI					(per million)	
582301.42_4129642.38	582301.42	4129642.38	3.80E-05	1.52E-08	9.10E-09	1.52E-08	1.19E-08	2.75E-08	6.42E-07	2.23E-08	0	2.82556E-09	0	0	0.0028	Res
582357.99_4129642.38	582357.99	4129642.38	3.68E-05	1.50E-08	9.00E-09	1.50E-08	1.16E-08	2.72E-08	6.37E-07	2.22E-08	0	2.74167E-09	0	0	0.0027	Res
582414.56_4129642.38	582414.56	4129642.38	3.47E-05	1.42E-08	8.50E-09	1.42E-08	1.09E-08	2.57E-08	6.01E-07	2.09E-08	0	2.58142E-09	0	0	0.0026	Res
582471.13_4129642.38	582471.13	4129642.38	3.26E-05	1.33E-08	7.97E-09	1.33E-08	1.03E-08	2.41E-08	5.64E-07	1.96E-08	0	2.42263E-09	0	0	0.0024	Res
582527.7_4129642.38	582527.7	4129642.38	3.06E-05	1.25E-08	7.48E-09	1.25E-08	9.66E-09	2.26E-08	5.29E-07	1.84E-08	0	2.2787E-09	0	0	0.0023	Res
582584.27_4129642.38	582584.27	4129642.38	2.86E-05	1.16E-08	6.95E-09	1.16E-08	9.01E-09	2.10E-08	4.91E-07	1.71E-08	0	2.12597E-09	0	0	0.0021	Res
582640.84_4129642.38	582640.84	4129642.38	2.68E-05	1.08E-08	6.48E-09	1.08E-08	8.44E-09	1.96E-08	4.58E-07	1.59E-08	0	1.99358E-09	0	0	0.0020	Res
582697.41_4129642.38	582697.41	4129642.38	2.52E-05	1.01E-08	6.06E-09	1.01E-08	7.92E-09	1.83E-08	4.28E-07	1.49E-08	0	1.87289E-09	0	0	0.0019	Res
582753.98_4129642.38	582753.98	4129642.38	2.36E-05	9.42E-09	5.65E-09	9.42E-09	7.43E-09	1.71E-08	3.99E-07	1.39E-08	0	1.7569E-09	0	0	0.0018	Res
582810.55_4129642.38	582810.55	4129642.38	2.22E-05	8.81E-09	5.28E-09	8.81E-09	6.98E-09	1.60E-08	3.73E-07	1.30E-08	0	1.65299E-09	0	0	0.0017	Res
582867.12_4129642.38	582867.12	4129642.38	2.07E-05	8.14E-09	4.88E-09	8.14E-09	6.50E-09	1.47E-08	3.45E-07	1.20E-08	0	1.54131E-09	0	0	0.0015	Res
582244.85_4129726.29	582244.85	4129726.29	3.86E-05	1.51E-08	9.08E-09	1.51E-08	1.21E-08	2.74E-08	6.40E-07	2.22E-08	0	2.87551E-09	0	0	0.0029	Res
582301.42_4129726.29	582301.42	4129726.29	3.72E-05	1.48E-08	8.85E-09	1.48E-08	1.17E-08	2.67E-08	6.25E-07	2.17E-08	0	2.77026E-09	0	0	0.0028	Res
582357.99_4129726.29	582357.99	4129726.29	3.70E-05	1.51E-08	9.07E-09	1.51E-08	1.17E-08	2.74E-08	6.42E-07	2.23E-08	0	2.75658E-09	0	0	0.0028	Res
582414.56_4129726.29	582414.56	4129726.29	3.52E-05	1.44E-08	8.67E-09	1.44E-08	1.11E-08	2.62E-08	6.14E-07	2.13E-08	0	2.62041E-09	0	0	0.0026	Res
582471.13_4129726.29	582471.13	4129726.29	3.32E-05	1.36E-08	8.17E-09	1.36E-08	1.05E-08	2.47E-08	5.78E-07	2.01E-08	0	2.47053E-09	0	0	0.0025	Res
582527.7_4129726.29	582527.7	4129726.29	3.12E-05	1.28E-08	7.68E-09	1.28E-08	9.86E-09	2.32E-08	5.44E-07	1.89E-08	0	2.32293E-09	0	0	0.0023	Res
582584.27_4129726.29	582584.27	4129726.29	2.93E-05	1.20E-08	7.18E-09	1.20E-08	9.24E-09	2.17E-08	5.08E-07	1.77E-08	0	2.17936E-09	0	0	0.0022	Res
582640.84_4129726.29	582640.84	4129726.29	2.74E-05	1.12E-08	6.69E-09	1.12E-08	8.65E-09	2.02E-08	4.73E-07	1.65E-08	0	2.04035E-09	0	0	0.0020	Res
582697.41_4129726.29	582697.41	4129726.29	2.55E-05	1.03E-08	6.18E-09	1.03E-08	8.03E-09	1.87E-08	4.37E-07	1.52E-08	0	1.89687E-09	0	0	0.0019	Res
582753.98_4129726.29	582753.98	4129726.29	2.36E-05	9.45E-09	5.67E-09	9.45E-09	7.43E-09	1.71E-08	4.00E-07	1.39E-08	0	1.75617E-09	0	0	0.0018	Res
582810.55_4129726.29	582810.55	4129726.29	2.17E-05	8.57E-09	5.14E-09	8.57E-09	6.80E-09	1.55E-08	3.63E-07	1.26E-08	0	1.61154E-09	0	0	0.0016	Res
582244.85_4129810.2	582244.85	4129810.2	3.78E-05	1.47E-08	8.82E-09	1.47E-08	1.18E-08	2.66E-08	6.22E-07	2.16E-08	0	2.80921E-09	0	0	0.0028	Res
582301.42_4129810.2	582301.42	4129810.2	3.74E-05	1.50E-08	8.98E-09	1.50E-08	1.18E-08	2.71E-08	6.35E-07	2.21E-08	0	2.78569E-09	0	0	0.0028	Res
582357.99_4129810.2	582357.99	4129810.2	3.66E-05	1.49E-08	8.95E-09	1.49E-08	1.15E-08	2.71E-08	6.33E-07	2.20E-08	0	2.72388E-09	0	0	0.0027	Res
582414.56_4129810.2	582414.56	4129810.2	3.53E-05	1.46E-08	8.73E-09	1.46E-08	1.12E-08	2.64E-08	6.18E-07	2.15E-08	0	2.6285E-09	0	0	0.0026	Res
582471.13_4129810.2	582471.13	4129810.2	3.36E-05	1.39E-08	8.34E-09	1.39E-08	1.06E-08	2.52E-08	5.91E-07	2.06E-08	0	2.49852E-09	0	0	0.0025	Res
582527.7_4129810.2	582527.7	4129810.2	3.15E-05	1.30E-08	7.81E-09	1.30E-08	9.97E-09	2.36E-08	5.53E-07	1.92E-08	0	2.34592E-09	0	0	0.0023	Res
582584.27_4129810.2	582584.27	4129810.2	2.94E-05	1.21E-08	7.26E-09	1.21E-08	9.30E-09	2.20E-08	5.14E-07	1.79E-08	0	2.18962E-09	0	0	0.0022	Res
582640.84_4129810.2	582640.84	4129810.2	2.71E-05	1.10E-08	6.62E-09	1.10E-08	8.54E-09	2.00E-08	4.68E-07	1.63E-08	0	2.01356E-09	0	0	0.0020	Res
582697.41_4129810.2	582697.41	4129810.2	2.49E-05	1.01E-08	6.04E-09	1.01E-08	7.86E-09	1.83E-08	4.27E-07	1.49E-08	0	1.8553E-09	0	0	0.0019	Res
581905.43_4129894.11	581905.43	4129894.11	4.55E-05	1.93E-08	1.16E-08	1.93E-08	1.44E-08	3.51E-08	8.21E-07	2.86E-08	0	3.38319E-09	0	0	0.0034	Res
581962_4129894.11	581962	4129894.11	4.85E-05	1.95E-08	1.17E-08	1.95E-08	1.53E-08	3.53E-08	8.25E-07	2.87E-08	0	3.60763E-09	0	0	0.0036	Res
582131.71_4129894.11	582131.71	4129894.11	4.31E-05	1.69E-08	1.02E-08	1.69E-08	1.35E-08	3.07E-08	7.17E-07	2.49E-08	0	3.20552E-09	0	0	0.0032	Res
582188.28_4129894.11	582188.28	4129894.11	4.11E-05	1.63E-08	9.79E-09	1.63E-08	1.29E-08	2.95E-08	6.91E-07	2.40E-08	0	3.05917E-09	0	0	0.0031	Res
582244.85_4129894.11	582244.85	4129894.11	3.97E-05	1.60E-08	9.60E-09	1.60E-08	1.25E-08	2.90E-08	6.79E-07	2.36E-08	0	2.95628E-09	0	0	0.0030	Res
582301.42_4129894.11	582301.42	4129894.11	3.80E-05	1.55E-08	9.28E-09	1.55E-08	1.20E-08	2.81E-08	6.57E-07	2.28E-08	0	2.83037E-09	0	0	0.0028	Res
582357.99_4129894.11	582357.99	4129894.11	3.61E-05	1.48E-08	8.86E-09	1.48E-08	1.14E-08	2.68E-08	6.27E-07	2.18E-08	0	2.68798E-09	0	0	0.0027	Res
582414.56_4129894.11	582414.56	4129894.11	3.60E-05	1.51E-08	9.03E-09	1.51E-08	1.14E-08	2.74E-08	6.40E-07	2.23E-08	0	2.67786E-09	0	0	0.0027	Res
582471.13_4129894.11	582471.13	4129894.11	3.37E-05	1.41E-08	8.45E-09	1.41E-08	1.07E-08	2.56E-08	5.99E-07	2.09E-08	0	2.50672E-09	0	0	0.0025	Res
582527.7_4129894.11	582527.7	4129894.11	3.12E-05	1.29E-08	7.77E-09	1.29E-08	9.86E-09	2.35E-08	5.51E-07	1.92E-08	0	2.31807E-09	0	0	0.0023	Res
582584.27_4129894.11	582584.27	4129894.11	2.87E-05	1.18E-08	7.09E-09	1.18E-08	9.06E-09	2.15E-08	5.02E-07	1.75E-08	0	2.13385E-09	0	0	0.0021	Res
582640.84_4129894.11	582640.84	4129894.11	2.63E-05	1.07E-08	6.45E-09	1.07E-08	8.31E-09	1.95E-08	4.56E-07	1.59E-08	0	1.95917E-09	0	0	0.0020	Res
582697.41_4129894.11	582697.41	4129894.11	2.41E-05	9.75E-09	5.85E-09	9.75E-09	7.61E-09	1.77E-08	4.14E-07	1.44E-08	0	1.79683E-09	0	0	0.0018	Res
581962_4129978.02	581962	4129978.02	5.00E-05	2.03E-08	1.22E-08	2.03E-08	1.58E-08	3.69E-08	8.62E-07	3.00E-08	0	3.72446E-09	0	0	0.0037	Res
582018.57_4129978.02	582018.57	4129978.02	4.79E-05	1.91E-08	1.15E-08	1.91E-08	1.51E-08	3.46E-08	8.10E-07	2.82E-08	0	3.5625E-09	0	0	0.0036	Res
582075.14_4129978.02	582075.14	4129978.02	4.86E-05	1.98E-08	1.19E-08	1.98E-08	1.53E-08	3.59E-08	8.40E-07	2.92E-08	0	3.61726E-09	0	0	0.0036	Res
582131.71_4129978.02	582131.71	4129978.02	4.77E-05	1.98E-08	1.19E-08	1.98E-08	1.51E-08	3.60E-08	8.42E-07	2.93E-08	0	3.5491E-09	0	0	0.0035	Res
582188.28_4129978.02	582188.28	4129978.02	4.69E-05	1.98E-08	1.19E-08	1.98E-08	1.49E-08	3.61E-08	8.44E-07	2.94E-08	0	3.4874E-09	0	0	0.0035	Res
582244.85_4129978.02	582244.85	4129978.02	4.26E-05	1.79E-08	1.07E-08	1.79E-08	1.35E-08	3.25E-08	7.61E-07	2.65E-08	0	3.17148E-09	0	0	0.0032	Res
582301.42_4129978.02	582301.42	4129978.02	4.16E-05	1.77E-08	1.06E-08	1.77E-08	1.32E-08	3.22E-08	7.53E-07	2.63E-08	0	3.09272E-09	0	0	0.0031	Res
582357.99_4129978.02	582357.99	4129978.02	3.92E-05	1.67E-08	1.00E-08	1.67E-08	1.25E-08	3.04E-08	7.12E-07	2.48E-08	0	2.91691E-09	0	0	0.0029	Res
582414.56_4129978.02	582414.56	4129978.02	3.63E-05	1.54E-08	9.26E-09	1.54E-08	1.15E-08	2.81E-08	6.57E-07	2.29E-08	0	2.70371E-09	0	0	0.0027	Res
582471.13_4129978.02	582471.13	4129978.02	3.34E-05	1.41E-08	8.46E-09	1.41E-08	1.06E-08	2.56E-08	6.00E-07	2.09E-08	0	2.48654E-09	0	0	0.0025	Res
582527.7_4129978.02	582527.7	4129978.02	3.06E-05	1.28E-08	7.68E-09	1.28E-08	9.69E-09	2.33E-08	5.44E-07	1.90E-08	0	2.27609E-09	0	0	0.0023	Res

Risk Calculation Part 2, $\sum R1*C_{TAC}$

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)								3rd Trimester	0<2	2<16	16<30	Cancer Risk - 2025	Receptor Type
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Cobalt	Lead	Nickel	Chromium VI					(per million)	
582584.27_4129978.02	582584.27	4129978.02	2.80E-05	1.16E-08	6.95E-09	1.16E-08	8.85E-09	2.10E-08	4.92E-07	1.71E-08	0	2.08116E-09	0	0	0.0021	Res
582640.84_4129978.02	582640.84	4129978.02	2.56E-05	1.05E-08	6.30E-09	1.05E-08	8.09E-09	1.90E-08	4.46E-07	1.55E-08	0	1.90583E-09	0	0	0.0019	Res
582697.41_4129978.02	582697.41	4129978.02	2.34E-05	9.49E-09	5.70E-09	9.49E-09	7.39E-09	1.72E-08	4.03E-07	1.40E-08	0	1.74437E-09	0	0	0.0017	Res
582753.98_4129978.02	582753.98	4129978.02	2.13E-05	8.51E-09	5.11E-09	8.51E-09	6.71E-09	1.54E-08	3.61E-07	1.25E-08	0	1.58621E-09	0	0	0.0016	Res
582810.55_4129978.02	582810.55	4129978.02	1.90E-05	7.46E-09	4.47E-09	7.46E-09	5.97E-09	1.35E-08	3.15E-07	1.09E-08	0	1.41547E-09	0	0	0.0014	Res
581905.43_4130061.93	581905.43	4130061.93	6.85E-05	2.97E-08	1.78E-08	2.97E-08	2.18E-08	5.40E-08	1.27E-06	4.42E-08	0	5.09459E-09	0	0	0.0051	Res
581962_4130061.93	581962	4130061.93	6.44E-05	2.80E-08	1.68E-08	2.80E-08	2.05E-08	5.09E-08	1.19E-06	4.16E-08	0	4.79212E-09	0	0	0.0048	Res
582018.57_4130061.93	582018.57	4130061.93	5.58E-05	2.37E-08	1.42E-08	2.37E-08	1.77E-08	4.31E-08	1.01E-06	3.52E-08	0	4.14945E-09	0	0	0.0041	Res
582075.14_4130061.93	582075.14	4130061.93	5.01E-05	2.11E-08	1.26E-08	2.11E-08	1.59E-08	3.83E-08	8.96E-07	3.12E-08	0	3.73145E-09	0	0	0.0037	Res
582131.71_4130061.93	582131.71	4130061.93	4.86E-05	2.07E-08	1.24E-08	2.07E-08	1.54E-08	3.77E-08	8.82E-07	3.07E-08	0	3.61852E-09	0	0	0.0036	Res
582188.28_4130061.93	582188.28	4130061.93	4.70E-05	2.02E-08	1.21E-08	2.02E-08	1.50E-08	3.69E-08	8.63E-07	3.01E-08	0	3.49992E-09	0	0	0.0035	Res
582244.85_4130061.93	582244.85	4130061.93	4.56E-05	1.99E-08	1.19E-08	1.99E-08	1.45E-08	3.62E-08	8.47E-07	2.96E-08	0	3.39528E-09	0	0	0.0034	Res
582301.42_4130061.93	582301.42	4130061.93	4.24E-05	1.84E-08	1.10E-08	1.84E-08	1.35E-08	3.36E-08	7.86E-07	2.74E-08	0	3.15499E-09	0	0	0.0032	Res
582357.99_4130061.93	582357.99	4130061.93	3.94E-05	1.70E-08	1.02E-08	1.70E-08	1.25E-08	3.11E-08	7.27E-07	2.54E-08	0	2.92983E-09	0	0	0.0029	Res
582414.56_4130061.93	582414.56	4130061.93	3.62E-05	1.56E-08	9.35E-09	1.56E-08	1.15E-08	2.84E-08	6.65E-07	2.32E-08	0	2.69469E-09	0	0	0.0027	Res
582471.13_4130061.93	582471.13	4130061.93	3.30E-05	1.41E-08	8.46E-09	1.41E-08	1.05E-08	2.57E-08	6.01E-07	2.10E-08	0	2.45687E-09	0	0	0.0025	Res
582527.7_4130061.93	582527.7	4130061.93	3.00E-05	1.27E-08	7.60E-09	1.27E-08	9.51E-09	2.30E-08	5.40E-07	1.88E-08	0	2.23112E-09	0	0	0.0022	Res
582584.27_4130061.93	582584.27	4130061.93	2.73E-05	1.14E-08	6.84E-09	1.14E-08	8.64E-09	2.07E-08	4.85E-07	1.69E-08	0	2.02929E-09	0	0	0.0020	Res
582640.84_4130061.93	582640.84	4130061.93	2.48E-05	1.02E-08	6.13E-09	1.02E-08	7.83E-09	1.86E-08	4.34E-07	1.51E-08	0	1.84223E-09	0	0	0.0018	Res
582697.41_4130061.93	582697.41	4130061.93	2.26E-05	9.19E-09	5.52E-09	9.19E-09	7.12E-09	1.67E-08	3.90E-07	1.36E-08	0	1.67898E-09	0	0	0.0017	Res
582753.98_4130061.93	582753.98	4130061.93	2.06E-05	8.30E-09	4.98E-09	8.30E-09	6.50E-09	1.50E-08	3.52E-07	1.22E-08	0	1.53557E-09	0	0	0.0015	Res
582810.55_4130061.93	582810.55	4130061.93	1.89E-05	7.49E-09	4.49E-09	7.49E-09	5.93E-09	1.36E-08	3.17E-07	1.10E-08	0	1.40465E-09	0	0	0.0014	Res
581962_4130145.84	581962	4130145.84	7.24E-05	3.28E-08	1.97E-08	3.28E-08	2.32E-08	5.99E-08	1.40E-06	4.91E-08	0	5.38991E-09	0	0	0.0054	Res
582018.57_4130145.84	582018.57	4130145.84	6.71E-05	3.03E-08	1.82E-08	3.03E-08	2.15E-08	5.54E-08	1.30E-06	4.54E-08	0	4.99435E-09	0	0	0.0050	Res
582075.14_4130145.84	582075.14	4130145.84	5.78E-05	2.57E-08	1.54E-08	2.57E-08	1.85E-08	4.69E-08	1.10E-06	3.84E-08	0	4.30377E-09	0	0	0.0043	Res
582131.71_4130145.84	582131.71	4130145.84	5.36E-05	2.38E-08	1.43E-08	2.38E-08	1.71E-08	4.34E-08	1.02E-06	3.55E-08	0	3.98676E-09	0	0	0.0040	Res
582188.28_4130145.84	582188.28	4130145.84	5.14E-05	2.30E-08	1.38E-08	2.30E-08	1.65E-08	4.20E-08	9.84E-07	3.44E-08	0	3.82708E-09	0	0	0.0038	Res
582244.85_4130145.84	582244.85	4130145.84	4.70E-05	2.09E-08	1.26E-08	2.09E-08	1.50E-08	3.82E-08	8.95E-07	3.13E-08	0	3.50004E-09	0	0	0.0035	Res
582301.42_4130145.84	582301.42	4130145.84	4.28E-05	1.89E-08	1.14E-08	1.89E-08	1.37E-08	3.46E-08	8.10E-07	2.83E-08	0	3.18697E-09	0	0	0.0032	Res
582357.99_4130145.84	582357.99	4130145.84	3.91E-05	1.72E-08	1.03E-08	1.72E-08	1.25E-08	3.14E-08	7.35E-07	2.57E-08	0	2.91298E-09	0	0	0.0029	Res
582414.56_4130145.84	582414.56	4130145.84	3.57E-05	1.56E-08	9.34E-09	1.56E-08	1.14E-08	2.84E-08	6.65E-07	2.32E-08	0	2.65528E-09	0	0	0.0027	Res
582471.13_4130145.84	582471.13	4130145.84	3.23E-05	1.40E-08	8.37E-09	1.40E-08	1.03E-08	2.54E-08	5.95E-07	2.08E-08	0	2.4038E-09	0	0	0.0024	Res
582527.7_4130145.84	582527.7	4130145.84	2.90E-05	1.24E-08	7.44E-09	1.24E-08	9.23E-09	2.26E-08	5.29E-07	1.84E-08	0	2.16122E-09	0	0	0.0022	Res
582584.27_4130145.84	582584.27	4130145.84	2.61E-05	1.10E-08	6.60E-09	1.10E-08	8.27E-09	2.00E-08	4.68E-07	1.63E-08	0	1.9413E-09	0	0	0.0019	Res
582640.84_4130145.84	582640.84	4130145.84	2.35E-05	9.78E-09	5.87E-09	9.78E-09	7.45E-09	1.78E-08	4.16E-07	1.45E-08	0	1.75105E-09	0	0	0.0018	Res
582697.41_4130145.84	582697.41	4130145.84	2.14E-05	8.76E-09	5.25E-09	8.76E-09	6.74E-09	1.59E-08	3.72E-07	1.29E-08	0	1.58905E-09	0	0	0.0016	Res
582753.98_4130145.84	582753.98	4130145.84	1.95E-05	7.91E-09	4.74E-09	7.91E-09	6.16E-09	1.43E-08	3.36E-07	1.17E-08	0	1.45353E-09	0	0	0.0015	Res
582810.55_4130145.84	582810.55	4130145.84	1.80E-05	7.19E-09	4.32E-09	7.19E-09	5.66E-09	1.30E-08	3.05E-07	1.06E-08	0	1.33863E-09	0	0	0.0013	Res
582867.12_4130145.84	582867.12	4130145.84	1.60E-05	6.29E-09	3.77E-09	6.29E-09	5.03E-09	1.14E-08	2.66E-07	9.24E-09	0	1.1932E-09	0	0	0.0012	Res
581962_4130229.75	581962	4130229.75	7.35E-05	3.35E-08	2.01E-08	3.35E-08	2.36E-08	6.13E-08	1.44E-06	5.03E-08	0	5.46737E-09	0	0	0.0055	Res
582018.57_4130229.75	582018.57	4130229.75	6.98E-05	3.20E-08	1.92E-08	3.20E-08	2.24E-08	5.85E-08	1.37E-06	4.80E-08	0	5.19312E-09	0	0	0.0052	Res
582075.14_4130229.75	582075.14	4130229.75	6.48E-05	2.97E-08	1.78E-08	2.97E-08	2.08E-08	5.43E-08	1.27E-06	4.46E-08	0	4.82365E-09	0	0	0.0048	Res
582131.71_4130229.75	582131.71	4130229.75	5.85E-05	2.67E-08	1.60E-08	2.67E-08	1.88E-08	4.88E-08	1.14E-06	4.00E-08	0	4.35351E-09	0	0	0.0044	Res
582188.28_4130229.75	582188.28	4130229.75	5.24E-05	2.37E-08	1.42E-08	2.37E-08	1.68E-08	4.34E-08	1.02E-06	3.56E-08	0	3.89771E-09	0	0	0.0039	Res
582244.85_4130229.75	582244.85	4130229.75	4.70E-05	2.12E-08	1.27E-08	2.12E-08	1.51E-08	3.87E-08	9.06E-07	3.17E-08	0	3.50047E-09	0	0	0.0035	Res
582301.42_4130229.75	582301.42	4130229.75	4.25E-05	1.90E-08	1.14E-08	1.90E-08	1.36E-08	3.47E-08	8.13E-07	2.84E-08	0	3.16256E-09	0	0	0.0032	Res
582357.99_4130229.75	582357.99	4130229.75	3.85E-05	1.71E-08	1.03E-08	1.71E-08	1.23E-08	3.12E-08	7.31E-07	2.55E-08	0	2.86512E-09	0	0	0.0029	Res
582414.56_4130229.75	582414.56	4130229.75	3.46E-05	1.52E-08	9.12E-09	1.52E-08	1.10E-08	2.77E-08	6.49E-07	2.27E-08	0	2.57226E-09	0	0	0.0026	Res
582471.13_4130229.75	582471.13	4130229.75	3.08E-05	1.34E-08	8.02E-09	1.34E-08	9.80E-09	2.43E-08	5.70E-07	1.99E-08	0	2.28855E-09	0	0	0.0023	Res
582527.7_4130229.75	582527.7	4130229.75	2.74E-05	1.17E-08	7.04E-09	1.17E-08	8.71E-09	2.14E-08	5.01E-07	1.75E-08	0	2.03781E-09	0	0	0.0020	Res
582584.27_4130229.75	582584.27	4130229.75	2.45E-05	1.04E-08	6.22E-09	1.04E-08	7.78E-09	1.89E-08	4.41E-07	1.54E-08	0	1.82374E-09	0	0	0.0018	Res
582640.84_4130229.75	582640.84	4130229.75	2.21E-05	9.22E-09	5.53E-09	9.22E-09	6.99E-09	1.68E-08	3.92E-07	1.37E-08	0	1.64366E-09	0	0	0.0016	Res
582697.41_4130229.75	582697.41	4130229.75	2.01E-05	8.30E-09	4.98E-09	8.30E-09	6.37E-09	1.51E-08	3.53E-07	1.23E-08	0	1.49871E-09	0	0	0.0015	Res
582753.98_4130229.75	582753.98	4130229.75	1.85E-05	7.52E-09	4.51E-09	7.52E-09	5.83E-09	1.36E-08	3.19E-07	1.11E-08	0	1.37389E-09	0	0	0.0014	Res
582810.55_4130229.75	582810.55	4130229.75	1.71E-05	6.88E-09	4.13E-09	6.88E-09	5.38E-09	1.25E-08	2.92E-07	1.01E-08	0	1.27108E-09	0	0	0.0013	Res

Risk Calculation Part 2, $\sum R1*C_{TAC}$

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)								3rd Trimester	0<2	2<16	16<30	Cancer Risk - 2025	Receptor Type
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Cobalt	Lead	Nickel	Chromium VI					(per million)	
582867.12_4130229.75	582867.12	4130229.75	1.59E-05	6.35E-09	3.81E-09	6.35E-09	5.01E-09	1.15E-08	2.69E-07	9.35E-09	0	1.18432E-09	0	0	0.0012	Res
582018.57_4130313.66	582018.57	4130313.66	7.45E-05	3.46E-08	2.07E-08	3.46E-08	2.40E-08	6.33E-08	1.48E-06	5.19E-08	0	5.54265E-09	0	0	0.0055	Res
582075.14_4130313.66	582075.14	4130313.66	6.89E-05	3.20E-08	1.92E-08	3.20E-08	2.22E-08	5.85E-08	1.37E-06	4.81E-08	0	5.12975E-09	0	0	0.0051	Res
582131.71_4130313.66	582131.71	4130313.66	6.06E-05	2.79E-08	1.68E-08	2.79E-08	1.95E-08	5.11E-08	1.20E-06	4.19E-08	0	4.51109E-09	0	0	0.0045	Res
582188.28_4130313.66	582188.28	4130313.66	5.33E-05	2.43E-08	1.46E-08	2.43E-08	1.71E-08	4.45E-08	1.04E-06	3.65E-08	0	3.96461E-09	0	0	0.0040	Res
582244.85_4130313.66	582244.85	4130313.66	4.73E-05	2.14E-08	1.28E-08	2.14E-08	1.52E-08	3.91E-08	9.17E-07	3.21E-08	0	3.51668E-09	0	0	0.0035	Res
582301.42_4130313.66	582301.42	4130313.66	4.22E-05	1.90E-08	1.14E-08	1.90E-08	1.35E-08	3.46E-08	8.11E-07	2.84E-08	0	3.13814E-09	0	0	0.0031	Res
582357.99_4130313.66	582357.99	4130313.66	3.73E-05	1.66E-08	9.96E-09	1.66E-08	1.19E-08	3.03E-08	7.10E-07	2.48E-08	0	2.77601E-09	0	0	0.0028	Res
582414.56_4130313.66	582414.56	4130313.66	3.28E-05	1.44E-08	8.64E-09	1.44E-08	1.05E-08	2.63E-08	6.15E-07	2.15E-08	0	2.43882E-09	0	0	0.0024	Res
582471.13_4130313.66	582471.13	4130313.66	2.89E-05	1.25E-08	7.51E-09	1.25E-08	9.20E-09	2.28E-08	5.34E-07	1.86E-08	0	2.14849E-09	0	0	0.0021	Res
582527.7_4130313.66	582527.7	4130313.66	2.57E-05	1.10E-08	6.58E-09	1.10E-08	8.16E-09	2.00E-08	4.68E-07	1.63E-08	0	1.90946E-09	0	0	0.0019	Res
582584.27_4130313.66	582584.27	4130313.66	2.30E-05	9.70E-09	5.82E-09	9.70E-09	7.29E-09	1.76E-08	4.13E-07	1.44E-08	0	1.71105E-09	0	0	0.0017	Res
582640.84_4130313.66	582640.84	4130313.66	2.08E-05	8.69E-09	5.21E-09	8.69E-09	6.60E-09	1.58E-08	3.70E-07	1.29E-08	0	1.55071E-09	0	0	0.0016	Res
582697.41_4130313.66	582697.41	4130313.66	1.90E-05	7.84E-09	4.71E-09	7.84E-09	6.02E-09	1.42E-08	3.33E-07	1.16E-08	0	1.41621E-09	0	0	0.0014	Res
582753.98_4130313.66	582753.98	4130313.66	1.75E-05	7.13E-09	4.28E-09	7.13E-09	5.52E-09	1.29E-08	3.03E-07	1.05E-08	0	1.30169E-09	0	0	0.0013	Res
582810.55_4130313.66	582810.55	4130313.66	1.61E-05	6.50E-09	3.90E-09	6.50E-09	5.08E-09	1.18E-08	2.76E-07	9.59E-09	0	1.20016E-09	0	0	0.0012	Res
582867.12_4130313.66	582867.12	4130313.66	1.49E-05	5.96E-09	3.57E-09	5.96E-09	4.70E-09	1.08E-08	2.52E-07	8.77E-09	0	1.11123E-09	0	0	0.0011	Res
581848.86_4130397.57	581848.86	4130397.57	1.01E-04	4.76E-08	2.86E-08	4.76E-08	3.27E-08	8.73E-08	2.05E-06	7.17E-08	0	7.52382E-09	0	0	0.0075	Res
581905.43_4130397.57	581905.43	4130397.57	9.77E-05	4.62E-08	2.77E-08	4.62E-08	3.16E-08	8.46E-08	1.98E-06	6.96E-08	0	7.27293E-09	0	0	0.0073	Res
581962_4130397.57	581962	4130397.57	9.23E-05	4.37E-08	2.62E-08	4.37E-08	2.98E-08	8.00E-08	1.88E-06	6.58E-08	0	6.86652E-09	0	0	0.0069	Res
582018.57_4130397.57	582018.57	4130397.57	8.29E-05	3.91E-08	2.35E-08	3.91E-08	2.68E-08	7.16E-08	1.68E-06	5.88E-08	0	6.17021E-09	0	0	0.0062	Res
582075.14_4130397.57	582075.14	4130397.57	7.29E-05	3.41E-08	2.05E-08	3.41E-08	2.35E-08	6.25E-08	1.47E-06	5.14E-08	0	5.42484E-09	0	0	0.0054	Res
582131.71_4130397.57	582131.71	4130397.57	6.27E-05	2.91E-08	1.75E-08	2.91E-08	2.02E-08	5.32E-08	1.25E-06	4.37E-08	0	4.66721E-09	0	0	0.0047	Res
582188.28_4130397.57	582188.28	4130397.57	5.47E-05	2.52E-08	1.51E-08	2.52E-08	1.76E-08	4.60E-08	1.08E-06	3.78E-08	0	4.0727E-09	0	0	0.0041	Res
582244.85_4130397.57	582244.85	4130397.57	4.75E-05	2.16E-08	1.30E-08	2.16E-08	1.52E-08	3.95E-08	9.25E-07	3.24E-08	0	3.53344E-09	0	0	0.0035	Res
582301.42_4130397.57	582301.42	4130397.57	4.12E-05	1.85E-08	1.11E-08	1.85E-08	1.32E-08	3.38E-08	7.91E-07	2.77E-08	0	3.06345E-09	0	0	0.0031	Res
582357.99_4130397.57	582357.99	4130397.57	3.55E-05	1.57E-08	9.43E-09	1.57E-08	1.14E-08	2.87E-08	6.72E-07	2.35E-08	0	2.64209E-09	0	0	0.0026	Res
582414.56_4130397.57	582414.56	4130397.57	3.09E-05	1.35E-08	8.10E-09	1.35E-08	9.87E-09	2.46E-08	5.77E-07	2.01E-08	0	2.30274E-09	0	0	0.0023	Res
582471.13_4130397.57	582471.13	4130397.57	2.73E-05	1.18E-08	7.05E-09	1.18E-08	8.69E-09	2.14E-08	5.01E-07	1.75E-08	0	2.03164E-09	0	0	0.0020	Res
582527.7_4130397.57	582527.7	4130397.57	2.43E-05	1.03E-08	6.20E-09	1.03E-08	7.72E-09	1.88E-08	4.40E-07	1.53E-08	0	1.81006E-09	0	0	0.0018	Res
582584.27_4130397.57	582584.27	4130397.57	2.19E-05	9.17E-09	5.50E-09	9.17E-09	6.93E-09	1.67E-08	3.90E-07	1.36E-08	0	1.62706E-09	0	0	0.0016	Res
582640.84_4130397.57	582640.84	4130397.57	1.98E-05	8.21E-09	4.92E-09	8.21E-09	6.27E-09	1.49E-08	3.49E-07	1.21E-08	0	1.47436E-09	0	0	0.0015	Res
582697.41_4130397.57	582697.41	4130397.57	1.80E-05	7.35E-09	4.41E-09	7.35E-09	5.68E-09	1.33E-08	3.12E-07	1.09E-08	0	1.33833E-09	0	0	0.0013	Res
582753.98_4130397.57	582753.98	4130397.57	1.64E-05	6.64E-09	3.99E-09	6.64E-09	5.18E-09	1.21E-08	2.82E-07	9.80E-09	0	1.22407E-09	0	0	0.0012	Res
582810.55_4130397.57	582810.55	4130397.57	1.51E-05	6.04E-09	3.62E-09	6.04E-09	4.76E-09	1.09E-08	2.56E-07	8.89E-09	0	1.1256E-09	0	0	0.0011	Res
582867.12_4130397.57	582867.12	4130397.57	1.40E-05	5.51E-09	3.31E-09	5.51E-09	4.39E-09	9.98E-09	2.33E-07	8.10E-09	0	1.03921E-09	0	0	0.0010	Res
581848.86_4130481.48	581848.86	4130481.48	1.28E-04	6.20E-08	3.72E-08	6.20E-08	4.15E-08	1.14E-07	2.67E-06	9.36E-08	0	9.508E-09	0	0	0.0095	Res
581905.43_4130481.48	581905.43	4130481.48	1.19E-04	5.74E-08	3.44E-08	5.74E-08	3.85E-08	1.05E-07	2.47E-06	8.67E-08	0	8.82329E-09	0	0	0.0088	Res
581962_4130481.48	581962	4130481.48	1.02E-04	4.88E-08	2.93E-08	4.88E-08	3.29E-08	8.94E-08	2.10E-06	7.36E-08	0	7.55465E-09	0	0	0.0076	Res
582018.57_4130481.48	582018.57	4130481.48	8.96E-05	4.28E-08	2.57E-08	4.28E-08	2.90E-08	7.85E-08	1.84E-06	6.46E-08	0	6.67067E-09	0	0	0.0067	Res
582075.14_4130481.48	582075.14	4130481.48	7.61E-05	3.60E-08	2.16E-08	3.60E-08	2.46E-08	6.60E-08	1.55E-06	5.43E-08	0	5.66619E-09	0	0	0.0057	Res
582131.71_4130481.48	582131.71	4130481.48	6.50E-05	3.04E-08	1.82E-08	3.04E-08	2.10E-08	5.57E-08	1.31E-06	4.58E-08	0	4.83349E-09	0	0	0.0048	Res
582188.28_4130481.48	582188.28	4130481.48	5.52E-05	2.55E-08	1.53E-08	2.55E-08	1.78E-08	4.67E-08	1.10E-06	3.84E-08	0	4.10903E-09	0	0	0.0041	Res
582244.85_4130481.48	582244.85	4130481.48	4.64E-05	2.11E-08	1.27E-08	2.11E-08	1.49E-08	3.86E-08	9.04E-07	3.16E-08	0	3.44977E-09	0	0	0.0034	Res
582301.42_4130481.48	582301.42	4130481.48	3.92E-05	1.75E-08	1.05E-08	1.75E-08	1.25E-08	3.20E-08	7.51E-07	2.62E-08	0	2.91544E-09	0	0	0.0029	Res
582357.99_4130481.48	582357.99	4130481.48	3.36E-05	1.48E-08	8.89E-09	1.48E-08	1.07E-08	2.70E-08	6.33E-07	2.21E-08	0	2.50234E-09	0	0	0.0025	Res
582414.56_4130481.48	582414.56	4130481.48	2.94E-05	1.27E-08	7.65E-09	1.27E-08	9.36E-09	2.32E-08	5.44E-07	1.90E-08	0	2.18678E-09	0	0	0.0022	Res
582471.13_4130481.48	582471.13	4130481.48	2.60E-05	1.11E-08	6.65E-09	1.11E-08	8.25E-09	2.02E-08	4.72E-07	1.65E-08	0	1.93157E-09	0	0	0.0019	Res
582527.7_4130481.48	582527.7	4130481.48	2.31E-05	9.71E-09	5.82E-09	9.71E-09	7.32E-09	1.77E-08	4.13E-07	1.44E-08	0	1.71712E-09	0	0	0.0017	Res
582584.27_4130481.48	582584.27	4130481.48	2.07E-05	8.58E-09	5.15E-09	8.58E-09	6.55E-09	1.56E-08	3.65E-07	1.27E-08	0	1.54009E-09	0	0	0.0015	Res
582640.84_4130481.48	582640.84	4130481.48	1.86E-05	7.61E-09	4.57E-09	7.61E-09	5.88E-09	1.38E-08	3.23E-07	1.12E-08	0	1.38713E-09	0	0	0.0014	Res
582697.41_4130481.48	582697.41	4130481.48	1.69E-05	6.81E-09	4.09E-09	6.81E-09	5.33E-09	1.23E-08	2.89E-07	1.00E-08	0	1.25836E-09	0	0	0.0013	Res
582753.98_4130481.48	582753.98	4130481.48	1.55E-05	6.15E-09	3.69E-09	6.15E-09	4.87E-09	1.11E-08	2.61E-07	9.05E-09	0	1.152E-09	0	0	0.0012	Res
582810.55_4130481.48	582810.55	4130481.48	1.43E-05	5.60E-09	3.36E-09	5.60E-09	4.48E-09	1.01E-08	2.37E-07	8.22E-09	0	1.06129E-09	0	0	0.0011	Res
582867.12_4130481.48	582867.12	4130481.48	1.32E-05	5.13E-09	3.08E-09	5.13E-09	4.14E-09	9.27E-09	2.17E-07	7.52E-09	0	9.82679E-10	0	0	0.0010	Res
581735.72_4130565.39	581735.72	4130565.39	1.54E-04	7.57E-08	4.54E-08	7.57E-08	5.00E-08	1.39E-07	3.26E-06	1.14E-07	0	1.14382E-08	0	0	0.0114	Res
581792.29_4130565.39	581792.29	4130565.39	1.51E-04	7.45E-08	4.47E-08	7.45E-08	4.93E-08	1.37E-07	3.21E-06	1.13E-07	0	1.12613E-08	0	0	0.0113	Res

Risk Calculation Part 2, $\sum R1*C_{TAC}$

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)								3rd Trimester	0<2	2<16	16<30	Cancer Risk - 2025	Receptor Type
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Cobalt	Lead	Nickel	Chromium VI					(per million)	
581848.86_4130565.39	581848.86	4130565.39	1.44E-04	7.09E-08	4.25E-08	7.09E-08	4.69E-08	1.30E-07	3.05E-06	1.07E-07	0	1.07185E-08	0	0	0.0107	Res
581905.43_4130565.39	581905.43	4130565.39	1.38E-04	6.77E-08	4.06E-08	6.77E-08	4.48E-08	1.24E-07	2.92E-06	1.02E-07	0	1.02394E-08	0	0	0.0102	Res
581962_4130565.39	581962	4130565.39	1.19E-04	5.83E-08	3.50E-08	5.83E-08	3.87E-08	1.07E-07	2.51E-06	8.81E-08	0	8.8596E-09	0	0	0.0089	Res
582018.57_4130565.39	582018.57	4130565.39	9.68E-05	4.69E-08	2.81E-08	4.69E-08	3.14E-08	8.61E-08	2.02E-06	7.09E-08	0	7.20365E-09	0	0	0.0072	Res
582075.14_4130565.39	582075.14	4130565.39	7.91E-05	3.79E-08	2.27E-08	3.79E-08	2.56E-08	6.95E-08	1.63E-06	5.71E-08	0	5.88377E-09	0	0	0.0059	Res
582131.71_4130565.39	582131.71	4130565.39	6.53E-05	3.09E-08	1.85E-08	3.09E-08	2.11E-08	5.66E-08	1.33E-06	4.65E-08	0	4.85693E-09	0	0	0.0049	Res
582188.28_4130565.39	582188.28	4130565.39	5.29E-05	2.46E-08	1.48E-08	2.46E-08	1.71E-08	4.50E-08	1.06E-06	3.70E-08	0	3.93794E-09	0	0	0.0039	Res
582244.85_4130565.39	582244.85	4130565.39	4.34E-05	1.98E-08	1.19E-08	1.98E-08	1.40E-08	3.62E-08	8.49E-07	2.97E-08	0	3.23189E-09	0	0	0.0032	Res
582301.42_4130565.39	582301.42	4130565.39	3.69E-05	1.65E-08	9.93E-09	1.65E-08	1.18E-08	3.02E-08	7.08E-07	2.48E-08	0	2.7459E-09	0	0	0.0027	Res
582357.99_4130565.39	582357.99	4130565.39	3.16E-05	1.39E-08	8.33E-09	1.39E-08	1.01E-08	2.53E-08	5.93E-07	2.07E-08	0	2.3488E-09	0	0	0.0023	Res
582414.56_4130565.39	582414.56	4130565.39	2.74E-05	1.18E-08	7.10E-09	1.18E-08	8.73E-09	2.16E-08	5.05E-07	1.76E-08	0	2.03944E-09	0	0	0.0020	Res
582471.13_4130565.39	582471.13	4130565.39	2.41E-05	1.02E-08	6.13E-09	1.02E-08	7.65E-09	1.86E-08	4.35E-07	1.52E-08	0	1.79401E-09	0	0	0.0018	Res
582527.7_4130565.39	582527.7	4130565.39	2.14E-05	8.92E-09	5.35E-09	8.92E-09	6.78E-09	1.62E-08	3.79E-07	1.32E-08	0	1.59468E-09	0	0	0.0016	Res
582584.27_4130565.39	582584.27	4130565.39	1.93E-05	7.89E-09	4.73E-09	7.89E-09	6.09E-09	1.43E-08	3.35E-07	1.17E-08	0	1.43444E-09	0	0	0.0014	Res
582640.84_4130565.39	582640.84	4130565.39	1.74E-05	6.99E-09	4.20E-09	6.99E-09	5.47E-09	1.27E-08	2.97E-07	1.03E-08	0	1.29369E-09	0	0	0.0013	Res
582697.41_4130565.39	582697.41	4130565.39	1.59E-05	6.29E-09	3.77E-09	6.29E-09	4.99E-09	1.14E-08	2.66E-07	9.25E-09	0	1.18121E-09	0	0	0.0012	Res
582753.98_4130565.39	582753.98	4130565.39	1.46E-05	5.71E-09	3.43E-09	5.71E-09	4.58E-09	1.03E-08	2.41E-07	8.38E-09	0	1.08693E-09	0	0	0.0011	Res
582810.55_4130565.39	582810.55	4130565.39	1.36E-05	5.23E-09	3.14E-09	5.23E-09	4.24E-09	9.46E-09	2.21E-07	7.67E-09	0	1.00844E-09	0	0	0.0010	Res
582867.12_4130565.39	582867.12	4130565.39	1.27E-05	4.83E-09	2.90E-09	4.83E-09	3.95E-09	8.73E-09	2.04E-07	7.07E-09	0	9.41409E-10	0	0	0.0009	Res
581735.72_4130649.3	581735.72	4130649.3	1.66E-04	8.22E-08	4.93E-08	8.22E-08	5.40E-08	1.51E-07	3.54E-06	1.24E-07	0	1.23275E-08	0	0	0.0123	Res
581792.29_4130649.3	581792.29	4130649.3	1.60E-04	7.95E-08	4.77E-08	7.95E-08	5.23E-08	1.46E-07	3.43E-06	1.20E-07	0	1.19278E-08	0	0	0.0119	Res
581905.43_4130649.3	581905.43	4130649.3	1.60E-04	7.97E-08	4.78E-08	7.97E-08	5.22E-08	1.46E-07	3.43E-06	1.21E-07	0	1.19083E-08	0	0	0.0119	Res
581962_4130649.3	581962	4130649.3	1.33E-04	6.59E-08	3.96E-08	6.59E-08	4.34E-08	1.21E-07	2.84E-06	9.98E-08	0	9.9075E-09	0	0	0.0099	Res
582018.57_4130649.3	582018.57	4130649.3	1.02E-04	4.98E-08	2.99E-08	4.98E-08	3.30E-08	9.14E-08	2.15E-06	7.53E-08	0	7.55875E-09	0	0	0.0076	Res
582075.14_4130649.3	582075.14	4130649.3	7.93E-05	3.84E-08	2.31E-08	3.84E-08	2.57E-08	7.05E-08	1.65E-06	5.80E-08	0	5.90163E-09	0	0	0.0059	Res
582131.71_4130649.3	582131.71	4130649.3	6.21E-05	2.96E-08	1.78E-08	2.96E-08	2.01E-08	5.43E-08	1.27E-06	4.47E-08	0	4.61813E-09	0	0	0.0046	Res
582188.28_4130649.3	582188.28	4130649.3	4.93E-05	2.31E-08	1.39E-08	2.31E-08	1.59E-08	4.23E-08	9.91E-07	3.47E-08	0	3.6651E-09	0	0	0.0037	Res
582244.85_4130649.3	582244.85	4130649.3	4.00E-05	1.84E-08	1.10E-08	1.84E-08	1.29E-08	3.36E-08	7.88E-07	2.76E-08	0	2.97696E-09	0	0	0.0030	Res
582301.42_4130649.3	582301.42	4130649.3	3.34E-05	1.50E-08	9.01E-09	1.50E-08	1.07E-08	2.74E-08	6.43E-07	2.25E-08	0	2.48417E-09	0	0	0.0025	Res
582357.99_4130649.3	582357.99	4130649.3	2.85E-05	1.26E-08	7.55E-09	1.26E-08	9.12E-09	2.29E-08	5.37E-07	1.88E-08	0	2.1242E-09	0	0	0.0021	Res
582414.56_4130649.3	582414.56	4130649.3	2.49E-05	1.08E-08	6.45E-09	1.08E-08	7.93E-09	1.96E-08	4.59E-07	1.60E-08	0	1.85389E-09	0	0	0.0019	Res
582471.13_4130649.3	582471.13	4130649.3	2.20E-05	9.28E-09	5.57E-09	9.28E-09	6.97E-09	1.69E-08	3.95E-07	1.38E-08	0	1.63415E-09	0	0	0.0016	Res
582527.7_4130649.3	582527.7	4130649.3	1.96E-05	8.13E-09	4.88E-09	8.13E-09	6.21E-09	1.48E-08	3.46E-07	1.20E-08	0	1.46089E-09	0	0	0.0015	Res
582584.27_4130649.3	582584.27	4130649.3	1.78E-05	7.23E-09	4.34E-09	7.23E-09	5.61E-09	1.31E-08	3.07E-07	1.07E-08	0	1.32328E-09	0	0	0.0013	Res
582640.84_4130649.3	582640.84	4130649.3	1.63E-05	6.52E-09	3.91E-09	6.52E-09	5.13E-09	1.18E-08	2.76E-07	9.60E-09	0	1.21243E-09	0	0	0.0012	Res
582697.41_4130649.3	582697.41	4130649.3	1.51E-05	5.94E-09	3.56E-09	5.94E-09	4.73E-09	1.07E-08	2.51E-07	8.72E-09	0	1.12042E-09	0	0	0.0011	Res
582753.98_4130649.3	582753.98	4130649.3	1.40E-05	5.47E-09	3.28E-09	5.47E-09	4.40E-09	9.90E-09	2.31E-07	8.02E-09	0	1.04535E-09	0	0	0.0010	Res
582810.55_4130649.3	582810.55	4130649.3	1.32E-05	5.09E-09	3.05E-09	5.09E-09	4.13E-09	9.20E-09	2.15E-07	7.45E-09	0	9.82885E-10	0	0	0.0010	Res
582867.12_4130649.3	582867.12	4130649.3	1.25E-05	4.75E-09	2.85E-09	4.75E-09	3.89E-09	8.59E-09	2.01E-07	6.95E-09	0	9.2679E-10	0	0	0.0009	Res
581848.86_4130733.21	581848.86	4130733.21	2.37E-04	1.19E-07	7.14E-08	1.19E-07	7.73E-08	2.19E-07	5.14E-06	1.81E-07	0	1.76E-08	0	0	0.0176	Res
581905.43_4130733.21	581905.43	4130733.21	2.02E-04	1.01E-07	6.09E-08	1.01E-07	6.60E-08	1.87E-07	4.38E-06	1.54E-07	0	1.50322E-08	0	0	0.0150	Res
581962_4130733.21	581962	4130733.21	1.49E-04	7.43E-08	4.46E-08	7.43E-08	4.86E-08	1.37E-07	3.21E-06	1.13E-07	0	1.10765E-08	0	0	0.0111	Res
582018.57_4130733.21	582018.57	4130733.21	1.05E-04	5.18E-08	3.11E-08	5.18E-08	3.42E-08	9.52E-08	2.23E-06	7.84E-08	0	7.80065E-09	0	0	0.0078	Res
582075.14_4130733.21	582075.14	4130733.21	7.45E-05	3.63E-08	2.18E-08	3.63E-08	2.42E-08	6.66E-08	1.56E-06	5.49E-08	0	5.54436E-09	0	0	0.0055	Res
582131.71_4130733.21	582131.71	4130733.21	5.49E-05	2.63E-08	1.58E-08	2.63E-08	1.78E-08	4.82E-08	1.13E-06	3.97E-08	0	4.08321E-09	0	0	0.0041	Res
582188.28_4130733.21	582188.28	4130733.21	4.28E-05	2.01E-08	1.21E-08	2.01E-08	1.38E-08	3.69E-08	8.65E-07	3.03E-08	0	3.18863E-09	0	0	0.0032	Res
582244.85_4130733.21	582244.85	4130733.21	3.47E-05	1.60E-08	9.61E-09	1.60E-08	1.12E-08	2.93E-08	6.86E-07	2.40E-08	0	2.58502E-09	0	0	0.0026	Res
582301.42_4130733.21	582301.42	4130733.21	2.91E-05	1.32E-08	7.89E-09	1.32E-08	9.34E-09	2.40E-08	5.63E-07	1.97E-08	0	2.16824E-09	0	0	0.0022	Res
582357.99_4130733.21	582357.99	4130733.21	2.51E-05	1.11E-08	6.66E-09	1.11E-08	8.03E-09	2.03E-08	4.75E-07	1.66E-08	0	1.86873E-09	0	0	0.0019	Res
582414.56_4130733.21	582414.56	4130733.21	2.21E-05	9.59E-09	5.75E-09	9.59E-09	7.05E-09	1.75E-08	4.09E-07	1.43E-08	0	1.64666E-09	0	0	0.0016	Res
582471.13_4130733.21	582471.13	4130733.21	1.99E-05	8.46E-09	5.08E-09	8.46E-09	6.32E-09	1.54E-08	3.60E-07	1.26E-08	0	1.48011E-09	0	0	0.0015	Res
582527.7_4130733.21	582527.7	4130733.21	1.82E-05	7.59E-09	4.55E-09	7.59E-09	5.75E-09	1.38E-08	3.23E-07	1.12E-08	0	1.35087E-09	0	0	0.0014	Res
582584.27_4130733.21	582584.27	4130733.21	1.68E-05	6.90E-09	4.14E-09	6.90E-09	5.30E-09	1.25E-08	2.93E-07	1.02E-08	0	1.24839E-09	0	0	0.0012	Res
582640.84_4130733.21	582640.84	4130733.21	1.56E-05	6.35E-09	3.81E-09	6.35E-09	4.93E-09	1.15E-08	2.69E-07	9.37E-09	0	1.16411E-09	0	0	0.0012	Res
582697.41_4130733.21	582697.41	4130733.21	1.47E-05	5.88E-09	3.53E-09	5.88E-09	4.62E-09	1.07E-08	2.49E-07	8.66E-09	0	1.09283E-09	0	0	0.0011	Res
582753.98_4130733.21	582753.98	4130733.21	1.38E-05	5.48E-09	3.29E-09	5.48E-09	4.35E-09	9.92E-09	2.32E-07	8.06E-09	0	1.03034E-09	0	0	0.0010	Res
582810.55_4130733.21	582810.55	4130733.21	1.31E-05	5.15E-09	3.09E-09	5.15E-09	4.12E-09	9.32E-09	2.18E-07	7.56E-09	0	9.78163E-10	0	0	0.0010	Res

Risk Calculation Part 2, $\sum R1*C_{TAC}$

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)								3rd Trimester	0<2	2<16	16<30	Cancer Risk - 2025	Receptor Type
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Cobalt	Lead	Nickel	Chromium VI					(per million)	
582867.12_4130733.21	582867.12	4130733.21	1.25E-05	4.84E-09	2.90E-09	4.84E-09	3.91E-09	8.75E-09	2.04E-07	7.09E-09	0	9.2841E-10	0	0	0.0009	Res
581735.72_4130817.12	581735.72	4130817.12	3.47E-04	1.76E-07	1.05E-07	1.76E-07	1.13E-07	3.23E-07	7.58E-06	2.66E-07	0	2.58168E-08	0	0	0.0258	Res
581792.29_4130817.12	581792.29	4130817.12	3.91E-04	1.98E-07	1.19E-07	1.98E-07	1.28E-07	3.65E-07	8.56E-06	3.01E-07	0	2.90985E-08	0	0	0.0291	Res
581848.86_4130817.12	581848.86	4130817.12	3.51E-04	1.78E-07	1.07E-07	1.78E-07	1.15E-07	3.27E-07	7.68E-06	2.70E-07	0	2.61071E-08	0	0	0.0261	Res
581905.43_4130817.12	581905.43	4130817.12	2.66E-04	1.34E-07	8.05E-08	1.34E-07	8.69E-08	2.47E-07	5.79E-06	2.04E-07	0	1.9762E-08	0	0	0.0198	Res
581962_4130817.12	581962	4130817.12	1.62E-04	8.10E-08	4.86E-08	8.10E-08	5.28E-08	1.49E-07	3.50E-06	1.23E-07	0	1.20245E-08	0	0	0.0120	Res
582018.57_4130817.12	582018.57	4130817.12	9.73E-05	4.82E-08	2.89E-08	4.82E-08	3.17E-08	8.85E-08	2.08E-06	7.29E-08	0	7.24072E-09	0	0	0.0072	Res
582075.14_4130817.12	582075.14	4130817.12	6.34E-05	3.09E-08	1.85E-08	3.09E-08	2.06E-08	5.67E-08	1.33E-06	4.67E-08	0	4.72123E-09	0	0	0.0047	Res
582131.71_4130817.12	582131.71	4130817.12	4.61E-05	2.20E-08	1.32E-08	2.20E-08	1.49E-08	4.04E-08	9.47E-07	3.32E-08	0	3.42718E-09	0	0	0.0034	Res
582188.28_4130817.12	582188.28	4130817.12	3.60E-05	1.69E-08	1.02E-08	1.69E-08	1.16E-08	3.10E-08	7.27E-07	2.55E-08	0	2.68199E-09	0	0	0.0027	Res
582244.85_4130817.12	582244.85	4130817.12	2.97E-05	1.37E-08	8.23E-09	1.37E-08	9.58E-09	2.51E-08	5.88E-07	2.06E-08	0	2.21364E-09	0	0	0.0022	Res
582301.42_4130817.12	582301.42	4130817.12	2.56E-05	1.16E-08	6.97E-09	1.16E-08	8.21E-09	2.12E-08	4.97E-07	1.74E-08	0	1.90409E-09	0	0	0.0019	Res
582357.99_4130817.12	582357.99	4130817.12	2.27E-05	1.01E-08	6.07E-09	1.01E-08	7.25E-09	1.85E-08	4.33E-07	1.51E-08	0	1.6857E-09	0	0	0.0017	Res
582414.56_4130817.12	582414.56	4130817.12	2.04E-05	8.99E-09	5.40E-09	8.99E-09	6.53E-09	1.64E-08	3.84E-07	1.34E-08	0	1.52093E-09	0	0	0.0015	Res
582471.13_4130817.12	582471.13	4130817.12	1.88E-05	8.13E-09	4.88E-09	8.13E-09	5.97E-09	1.48E-08	3.47E-07	1.21E-08	0	1.39537E-09	0	0	0.0014	Res
582527.7_4130817.12	582527.7	4130817.12	1.73E-05	7.41E-09	4.45E-09	7.41E-09	5.51E-09	1.35E-08	3.16E-07	1.10E-08	0	1.28968E-09	0	0	0.0013	Res
582584.27_4130817.12	582584.27	4130817.12	1.62E-05	6.82E-09	4.09E-09	6.82E-09	5.13E-09	1.24E-08	2.90E-07	1.01E-08	0	1.2036E-09	0	0	0.0012	Res
582640.84_4130817.12	582640.84	4130817.12	1.52E-05	6.32E-09	3.79E-09	6.32E-09	4.81E-09	1.15E-08	2.69E-07	9.36E-09	0	1.12999E-09	0	0	0.0011	Res
582697.41_4130817.12	582697.41	4130817.12	1.43E-05	5.88E-09	3.53E-09	5.88E-09	4.52E-09	1.07E-08	2.50E-07	8.69E-09	0	1.06531E-09	0	0	0.0011	Res
582753.98_4130817.12	582753.98	4130817.12	1.35E-05	5.48E-09	3.29E-09	5.48E-09	4.26E-09	9.94E-09	2.33E-07	8.09E-09	0	1.0056E-09	0	0	0.0010	Res
582810.55_4130817.12	582810.55	4130817.12	1.28E-05	5.13E-09	3.08E-09	5.13E-09	4.03E-09	9.30E-09	2.17E-07	7.56E-09	0	9.53398E-10	0	0	0.0010	Res
582867.12_4130817.12	582867.12	4130817.12	1.22E-05	4.82E-09	2.89E-09	4.82E-09	3.83E-09	8.73E-09	2.04E-07	7.09E-09	0	9.06805E-10	0	0	0.0009	Res
581735.72_4130901.03	581735.72	4130901.03	6.87E-04	3.50E-07	2.10E-07	3.50E-07	2.25E-07	6.44E-07	1.51E-05	5.32E-07	0	5.11547E-08	0	0	0.0512	Res
581792.29_4130901.03	581792.29	4130901.03	7.34E-04	3.74E-07	2.24E-07	3.74E-07	2.40E-07	6.88E-07	1.62E-05	5.68E-07	0	5.4605E-08	0	0	0.0546	Res
581848.86_4130901.03	581848.86	4130901.03	6.54E-04	3.33E-07	2.00E-07	3.33E-07	2.14E-07	6.13E-07	1.44E-05	5.06E-07	0	4.86713E-08	0	0	0.0487	Res
581905.43_4130901.03	581905.43	4130901.03	3.44E-04	1.75E-07	1.05E-07	1.75E-07	1.13E-07	3.21E-07	7.54E-06	2.65E-07	0	2.56053E-08	0	0	0.0256	Res
581962_4130901.03	581962	4130901.03	1.40E-04	7.03E-08	4.22E-08	7.03E-08	4.59E-08	1.29E-07	3.03E-06	1.07E-07	0	1.04514E-08	0	0	0.0105	Res
582018.57_4130901.03	582018.57	4130901.03	7.59E-05	3.73E-08	2.24E-08	3.73E-08	2.47E-08	6.85E-08	1.61E-06	5.65E-08	0	5.64914E-09	0	0	0.0056	Res
582075.14_4130901.03	582075.14	4130901.03	5.13E-05	2.48E-08	1.49E-08	2.48E-08	1.66E-08	4.54E-08	1.07E-06	3.74E-08	0	3.81734E-09	0	0	0.0038	Res
582131.71_4130901.03	582131.71	4130901.03	3.95E-05	1.88E-08	1.13E-08	1.88E-08	1.28E-08	3.44E-08	8.08E-07	2.83E-08	0	2.93936E-09	0	0	0.0029	Res
582188.28_4130901.03	582188.28	4130901.03	3.25E-05	1.53E-08	9.17E-09	1.53E-08	1.05E-08	2.80E-08	6.56E-07	2.30E-08	0	2.42075E-09	0	0	0.0024	Res
582244.85_4130901.03	582244.85	4130901.03	2.78E-05	1.29E-08	7.74E-09	1.29E-08	8.95E-09	2.36E-08	5.53E-07	1.94E-08	0	2.0683E-09	0	0	0.0021	Res
582301.42_4130901.03	582301.42	4130901.03	2.43E-05	1.11E-08	6.68E-09	1.11E-08	7.81E-09	2.04E-08	4.77E-07	1.67E-08	0	1.8078E-09	0	0	0.0018	Res
582357.99_4130901.03	582357.99	4130901.03	2.16E-05	9.79E-09	5.88E-09	9.79E-09	6.94E-09	1.79E-08	4.19E-07	1.47E-08	0	1.60955E-09	0	0	0.0016	Res
582414.56_4130901.03	582414.56	4130901.03	1.95E-05	8.72E-09	5.23E-09	8.72E-09	6.24E-09	1.59E-08	3.73E-07	1.30E-08	0	1.45077E-09	0	0	0.0015	Res
582471.13_4130901.03	582471.13	4130901.03	1.78E-05	7.86E-09	4.72E-09	7.86E-09	5.69E-09	1.43E-08	3.36E-07	1.17E-08	0	1.3242E-09	0	0	0.0013	Res
582527.7_4130901.03	582527.7	4130901.03	1.64E-05	7.14E-09	4.28E-09	7.14E-09	5.22E-09	1.30E-08	3.05E-07	1.06E-08	0	1.21877E-09	0	0	0.0012	Res
582584.27_4130901.03	582584.27	4130901.03	1.52E-05	6.56E-09	3.93E-09	6.56E-09	4.85E-09	1.19E-08	2.80E-07	9.76E-09	0	1.13345E-09	0	0	0.0011	Res
582640.84_4130901.03	582640.84	4130901.03	1.43E-05	6.06E-09	3.64E-09	6.06E-09	4.53E-09	1.10E-08	2.58E-07	9.01E-09	0	1.06201E-09	0	0	0.0011	Res
582697.41_4130901.03	582697.41	4130901.03	1.34E-05	5.64E-09	3.38E-09	5.64E-09	4.26E-09	1.03E-08	2.40E-07	8.36E-09	0	1.00037E-09	0	0	0.0010	Res
582753.98_4130901.03	582753.98	4130901.03	1.27E-05	5.27E-09	3.16E-09	5.27E-09	4.02E-09	9.57E-09	2.24E-07	7.79E-09	0	9.46374E-10	0	0	0.0009	Res
582810.55_4130901.03	582810.55	4130901.03	1.21E-05	4.93E-09	2.96E-09	4.93E-09	3.81E-09	8.94E-09	2.09E-07	7.28E-09	0	8.97345E-10	0	0	0.0009	Res
582867.12_4130901.03	582867.12	4130901.03	1.15E-05	4.64E-09	2.78E-09	4.64E-09	3.62E-09	8.41E-09	1.97E-07	6.84E-09	0	8.55065E-10	0	0	0.0009	Res
581735.72_4130984.94	581735.72	4130984.94	1.83E-03	9.35E-07	5.61E-07	9.35E-07	5.99E-07	1.72E-06	4.04E-05	1.42E-06	0	1.36096E-07	0	0	0.1361	Res
581792.29_4130984.94	581792.29	4130984.94	2.40E-03	1.23E-06	7.37E-07	1.23E-06	7.87E-07	2.26E-06	5.30E-05	1.87E-06	0	1.78618E-07	0	0	0.1786	Res
581848.86_4130984.94	581848.86	4130984.94	2.79E-03	1.43E-06	8.57E-07	1.43E-06	9.15E-07	2.63E-06	6.17E-05	2.17E-06	0	2.07769E-07	0	0	0.2078	Res
581905.43_4130984.94	581905.43	4130984.94	2.24E-04	1.13E-07	6.77E-08	1.13E-07	7.31E-08	2.08E-07	4.87E-06	1.71E-07	0	1.66425E-08	0	0	0.0166	Res
581962_4130984.94	581962	4130984.94	9.68E-05	4.80E-08	2.88E-08	4.80E-08	3.15E-08	8.81E-08	2.07E-06	7.26E-08	0	7.1998E-09	0	0	0.0072	Res
582018.57_4130984.94	582018.57	4130984.94	6.27E-05	3.06E-08	1.84E-08	3.06E-08	2.04E-08	5.61E-08	1.32E-06	4.62E-08	0	4.66494E-09	0	0	0.0047	Res
582075.14_4130984.94	582075.14	4130984.94	4.64E-05	2.23E-08	1.34E-08	2.23E-08	1.51E-08	4.10E-08	9.61E-07	3.37E-08	0	3.45613E-09	0	0	0.0035	Res
582131.71_4130984.94	582131.71	4130984.94	3.69E-05	1.75E-08	1.05E-08	1.75E-08	1.19E-08	3.21E-08	7.52E-07	2.64E-08	0	2.74383E-09	0	0	0.0027	Res
582188.28_4130984.94	582188.28	4130984.94	3.05E-05	1.43E-08	8.58E-09	1.43E-08	9.84E-09	2.62E-08	6.14E-07	2.15E-08	0	2.26853E-09	0	0	0.0023	Res
582244.85_4130984.94	582244.85	4130984.94	2.59E-05	1.20E-08	7.22E-09	1.20E-08	8.36E-09	2.20E-08	5.16E-07	1.81E-08	0	1.93037E-09	0	0	0.0019	Res
582301.42_4130984.94	582301.42	4130984.94	2.26E-05	1.03E-08	6.21E-09	1.03E-08	7.26E-09	1.89E-08	4.44E-07	1.55E-08	0	1.67943E-09	0	0	0.0017	Res
582357.99_4130984.94	582357.99	4130984.94	2.00E-05	9.07E-09	5.44E-09	9.07E-09	6.42E-09	1.66E-08	3.88E-07	1.36E-08	0	1.4877E-09	0	0	0.0015	Res
582414.56_4130984.94	582414.56	4130984.94	1.80E-05	8.06E-09	4.84E-09	8.06E-09	5.75E-09	1.47E-08	3.45E-07	1.21E-08	0	1.33633E-09	0	0	0.0013	Res
582471.13_4130984.94	582471.13	4130984.94	1.63E-05	7.25E-09	4.35E-09	7.25E-09	5.22E-09	1.32E-08	3.10E-07	1.08E-08	0	1.21436E-09	0	0	0.0012	Res

Risk Calculation Part 2, $\sum R1*C_{TAC}$

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)								3rd Trimester	0<2	2<16	16<30	Cancer Risk - 2025	Receptor Type
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Cobalt	Lead	Nickel	Chromium VI					(per million)	
582527.7_4130984.94	582527.7	4130984.94	1.50E-05	6.58E-09	3.95E-09	6.58E-09	4.78E-09	1.20E-08	2.81E-07	9.82E-09	0	1.11416E-09	0	0	0.0011	Res
582584.27_4130984.94	582584.27	4130984.94	1.39E-05	6.04E-09	3.62E-09	6.04E-09	4.43E-09	1.10E-08	2.58E-07	9.00E-09	0	1.03408E-09	0	0	0.0010	Res
582640.84_4130984.94	582640.84	4130984.94	1.30E-05	5.60E-09	3.36E-09	5.60E-09	4.15E-09	1.02E-08	2.39E-07	8.34E-09	0	9.6965E-10	0	0	0.0010	Res
582697.41_4130984.94	582697.41	4130984.94	1.23E-05	5.21E-09	3.12E-09	5.21E-09	3.89E-09	9.48E-09	2.22E-07	7.74E-09	0	9.11839E-10	0	0	0.0009	Res
582753.98_4130984.94	582753.98	4130984.94	1.16E-05	4.89E-09	2.93E-09	4.89E-09	3.69E-09	8.88E-09	2.08E-07	7.25E-09	0	8.65101E-10	0	0	0.0009	Res
582810.55_4130984.94	582810.55	4130984.94	1.11E-05	4.59E-09	2.76E-09	4.59E-09	3.50E-09	8.34E-09	1.95E-07	6.80E-09	0	8.22693E-10	0	0	0.0008	Res
582867.12_4130984.94	582867.12	4130984.94	1.05E-05	4.33E-09	2.60E-09	4.33E-09	3.33E-09	7.86E-09	1.84E-07	6.40E-09	0	7.84994E-10	0	0	0.0008	Res
581735.72_4131068.85	581735.72	4131068.85	3.00E-04	1.52E-07	9.12E-08	1.52E-07	9.82E-08	2.79E-07	6.56E-06	2.31E-07	0	2.2347E-08	0	0	0.0223	Res
581792.29_4131068.85	581792.29	4131068.85	2.40E-04	1.21E-07	7.26E-08	1.21E-07	7.84E-08	2.23E-07	5.22E-06	1.84E-07	0	1.78432E-08	0	0	0.0178	Res
581848.86_4131068.85	581848.86	4131068.85	1.30E-04	6.48E-08	3.89E-08	6.48E-08	4.23E-08	1.19E-07	2.79E-06	9.81E-08	0	9.65378E-09	0	0	0.0097	Res
581905.43_4131068.85	581905.43	4131068.85	8.31E-05	4.09E-08	2.46E-08	4.09E-08	2.71E-08	7.52E-08	1.76E-06	6.20E-08	0	6.18355E-09	0	0	0.0062	Res
581962_4131068.85	581962	4131068.85	6.05E-05	2.94E-08	1.77E-08	2.94E-08	1.97E-08	5.40E-08	1.27E-06	4.45E-08	0	4.50177E-09	0	0	0.0045	Res
582018.57_4131068.85	582018.57	4131068.85	4.61E-05	2.21E-08	1.33E-08	2.21E-08	1.49E-08	4.06E-08	9.52E-07	3.34E-08	0	3.42947E-09	0	0	0.0034	Res
582075.14_4131068.85	582075.14	4131068.85	3.67E-05	1.74E-08	1.04E-08	1.74E-08	1.19E-08	3.19E-08	7.48E-07	2.62E-08	0	2.73259E-09	0	0	0.0027	Res
582131.71_4131068.85	582131.71	4131068.85	3.04E-05	1.42E-08	8.53E-09	1.42E-08	9.80E-09	2.60E-08	6.10E-07	2.14E-08	0	2.26085E-09	0	0	0.0023	Res
582188.28_4131068.85	582188.28	4131068.85	2.57E-05	1.19E-08	7.14E-09	1.19E-08	8.29E-09	2.18E-08	5.11E-07	1.79E-08	0	1.9162E-09	0	0	0.0019	Res
582244.85_4131068.85	582244.85	4131068.85	2.23E-05	1.02E-08	6.12E-09	1.02E-08	7.17E-09	1.87E-08	4.37E-07	1.53E-08	0	1.66069E-09	0	0	0.0017	Res
582301.42_4131068.85	582301.42	4131068.85	1.97E-05	8.90E-09	5.34E-09	8.90E-09	6.31E-09	1.63E-08	3.81E-07	1.33E-08	0	1.46236E-09	0	0	0.0015	Res
582357.99_4131068.85	582357.99	4131068.85	1.75E-05	7.86E-09	4.72E-09	7.86E-09	5.62E-09	1.44E-08	3.36E-07	1.18E-08	0	1.30476E-09	0	0	0.0013	Res
582414.56_4131068.85	582414.56	4131068.85	1.58E-05	7.04E-09	4.22E-09	7.04E-09	5.07E-09	1.29E-08	3.01E-07	1.05E-08	0	1.17913E-09	0	0	0.0012	Res
582471.13_4131068.85	582471.13	4131068.85	1.45E-05	6.37E-09	3.82E-09	6.37E-09	4.62E-09	1.16E-08	2.72E-07	9.51E-09	0	1.07578E-09	0	0	0.0011	Res
582527.7_4131068.85	582527.7	4131068.85	1.33E-05	5.81E-09	3.49E-09	5.81E-09	4.24E-09	1.06E-08	2.48E-07	8.66E-09	0	9.89605E-10	0	0	0.0010	Res
582584.27_4131068.85	582584.27	4131068.85	1.23E-05	5.33E-09	3.20E-09	5.33E-09	3.92E-09	9.71E-09	2.27E-07	7.93E-09	0	9.15651E-10	0	0	0.0009	Res
582640.84_4131068.85	582640.84	4131068.85	1.16E-05	4.98E-09	2.99E-09	4.98E-09	3.68E-09	9.06E-09	2.12E-07	7.40E-09	0	8.61808E-10	0	0	0.0009	Res
582697.41_4131068.85	582697.41	4131068.85	1.09E-05	4.66E-09	2.79E-09	4.66E-09	3.47E-09	8.48E-09	1.98E-07	6.92E-09	0	8.13307E-10	0	0	0.0008	Res
582753.98_4131068.85	582753.98	4131068.85	1.04E-05	4.40E-09	2.64E-09	4.40E-09	3.30E-09	8.00E-09	1.87E-07	6.53E-09	0	7.74731E-10	0	0	0.0008	Res
582810.55_4131068.85	582810.55	4131068.85	9.96E-06	4.17E-09	2.50E-09	4.17E-09	3.15E-09	7.58E-09	1.77E-07	6.18E-09	0	7.40861E-10	0	0	0.0007	Res
582867.12_4131068.85	582867.12	4131068.85	9.48E-06	3.93E-09	2.36E-09	3.93E-09	3.00E-09	7.14E-09	1.67E-07	5.82E-09	0	7.05337E-10	0	0	0.0007	Res
582018.57_4131152.76	582018.57	4131152.76	3.12E-05	1.45E-08	8.72E-09	1.45E-08	1.01E-08	2.66E-08	6.24E-07	2.19E-08	0	2.32009E-09	0	0	0.0023	Res
582244.85_4131152.76	582244.85	4131152.76	1.90E-05	8.51E-09	5.11E-09	8.51E-09	6.08E-09	1.55E-08	3.64E-07	1.27E-08	0	1.41188E-09	0	0	0.0014	Res
582301.42_4131152.76	582301.42	4131152.76	1.71E-05	7.61E-09	4.57E-09	7.61E-09	5.47E-09	1.39E-08	3.25E-07	1.14E-08	0	1.27276E-09	0	0	0.0013	Res
582357.99_4131152.76	582357.99	4131152.76	1.55E-05	6.82E-09	4.09E-09	6.82E-09	4.94E-09	1.24E-08	2.91E-07	1.02E-08	0	1.15032E-09	0	0	0.0012	Res
582414.56_4131152.76	582414.56	4131152.76	1.41E-05	6.16E-09	3.70E-09	6.16E-09	4.50E-09	1.12E-08	2.63E-07	9.19E-09	0	1.0485E-09	0	0	0.0010	Res
582471.13_4131152.76	582471.13	4131152.76	1.28E-05	5.55E-09	3.33E-09	5.55E-09	4.08E-09	1.01E-08	2.37E-07	8.27E-09	0	9.52667E-10	0	0	0.0010	Res
582527.7_4131152.76	582527.7	4131152.76	1.18E-05	5.07E-09	3.04E-09	5.07E-09	3.75E-09	9.23E-09	2.16E-07	7.54E-09	0	8.76185E-10	0	0	0.0009	Res
582584.27_4131152.76	582584.27	4131152.76	1.09E-05	4.65E-09	2.79E-09	4.65E-09	3.46E-09	8.47E-09	1.98E-07	6.92E-09	0	8.1065E-10	0	0	0.0008	Res
582640.84_4131152.76	582640.84	4131152.76	1.02E-05	4.32E-09	2.59E-09	4.32E-09	3.23E-09	7.86E-09	1.84E-07	6.42E-09	0	7.58096E-10	0	0	0.0008	Res
582697.41_4131152.76	582697.41	4131152.76	9.59E-06	4.04E-09	2.43E-09	4.04E-09	3.04E-09	7.35E-09	1.72E-07	6.00E-09	0	7.13558E-10	0	0	0.0007	Res
582753.98_4131152.76	582753.98	4131152.76	9.15E-06	3.84E-09	2.30E-09	3.84E-09	2.90E-09	6.97E-09	1.63E-07	5.69E-09	0	6.80728E-10	0	0	0.0007	Res
582810.55_4131152.76	582810.55	4131152.76	8.75E-06	3.64E-09	2.19E-09	3.64E-09	2.77E-09	6.62E-09	1.55E-07	5.40E-09	0	6.50819E-10	0	0	0.0007	Res
582867.12_4131152.76	582867.12	4131152.76	8.32E-06	3.44E-09	2.06E-09	3.44E-09	2.63E-09	6.25E-09	1.46E-07	5.09E-09	0	6.19128E-10	0	0	0.0006	Res

HRA Permanente Creek Restoration Project

Construction Year 2026

Emissions Inputs

Construction Activity	Construction Year & Source	DPM Exhaust (tons/year)	PM10 Dust for speciation (tons/year)	Arsenic (tons/year)	Beryllium (tons/year)	Cadmium (tons/year)	Cobalt (tons/year)	Copper (tons/year)	Lead (tons/year)	Mercury (tons/year)	Nickel (tons/year)	Selenium (tons/year)	Chromium VI (tons/year)	Crystalline Silica (tons/year)
Concrete Channel 2024	2024_CONCRTE	0.000	0.00	2.91E-12	1.74E-12	2.91E-12	1.49E-11	3.26E-11	2.91E-12	4.65E-13	5.35E-11	5.81E-12	2.33E-13	8.63E-09
Paved road	2024_PAVED	2.07E-04	0.08	1.04E-07	6.26E-08	1.04E-07	6.68E-08	2.09E-06	1.92E-07	1.17E-08	4.51E-06	2.09E-07	1.59E-07	5.93E-04
Unpaved road	2024_CCP_UNPV	6.27E-05	0.20	2.56E-07	1.54E-07	2.56E-07	1.64E-07	5.12E-06	4.71E-07	2.87E-08	1.11E-05	5.12E-07	3.89E-07	1.46E-03
Channel Widening 2024	2024_CHAN_RCK	0.002	0.16	2.05E-07	1.23E-07	2.05E-07	1.05E-06	2.29E-06	2.05E-07	3.28E-08	3.77E-06	4.09E-07	1.64E-08	6.08E-04
Paved road	2024_PAVED	1.80E-03	2.39	2.99E-06	1.79E-06	2.99E-06	1.91E-06	5.98E-05	5.50E-06	3.35E-07	1.29E-04	5.98E-06	4.54E-06	1.70E-02
Rock Pile Area 2025	2025_CHAN_RCK	0.006	0.25	3.16E-07	1.89E-07	3.16E-07	1.62E-06	3.54E-06	3.16E-07	5.05E-08	5.81E-06	6.31E-07	2.53E-08	9.37E-04
Paved road	2025_PAVED	5.95E-03	2.44	3.05E-06	1.83E-06	3.05E-06	1.95E-06	6.10E-05	5.61E-06	3.41E-07	1.32E-04	6.10E-06	4.63E-06	1.73E-02
Rock Pile Area 2026	2026_CHAN_RCK	0.006	0.25	3.16E-07	1.89E-07	3.16E-07	1.62E-06	3.54E-06	3.16E-07	5.05E-08	5.81E-06	6.31E-07	2.53E-08	9.37E-04
Paved road	2026_PAVED	5.84E-03	2.44	3.05E-06	1.83E-06	3.05E-06	1.95E-06	6.10E-05	5.61E-06	3.41E-07	1.32E-04	6.10E-06	4.63E-06	1.73E-02
Channel Widening 2027	2027_CHAN_RCK	0.002	0.98	1.23E-06	7.36E-07	1.23E-06	6.28E-06	1.37E-05	1.23E-06	1.96E-07	2.26E-05	2.45E-06	9.82E-08	3.64E-03
Paved road	2027_PAVED	5.61E-03	2.39	2.99E-06	1.79E-06	2.99E-06	1.91E-06	5.98E-05	5.50E-06	3.35E-07	1.29E-04	5.98E-06	4.54E-06	1.70E-02
Material Removal 2028	2028_MATRMVL	0.001	0.25	3.15E-07	1.89E-07	3.15E-07	1.62E-06	3.53E-06	3.15E-07	5.05E-08	5.80E-06	6.31E-07	2.52E-08	9.37E-04
Paved road	2028_PAVED	5.57E-03	2.39	2.99E-06	1.80E-06	2.99E-06	1.92E-06	5.98E-05	5.51E-06	3.35E-07	1.29E-04	5.98E-06	4.55E-06	1.70E-02
Unpaved road	2028_UNPAVED	3.40E-03	11.84	1.48E-05	8.88E-06	1.48E-05	9.47E-06	2.96E-04	2.72E-05	1.66E-06	6.40E-04	2.96E-05	2.25E-05	8.41E-02
Material Removal 2029	2029_MATRMVL	0.001	0.25	3.15E-07	1.89E-07	3.15E-07	1.62E-06	3.53E-06	3.15E-07	5.05E-08	5.80E-06	6.31E-07	2.52E-08	9.37E-04
Paved road	2029_PAVED	5.56E-03	2.41	3.01E-06	1.81E-06	3.01E-06	1.93E-06	6.03E-05	5.55E-06	3.38E-07	1.30E-04	6.03E-06	4.58E-06	1.71E-02
Unpaved road	2029_UNPAVED	3.39E-03	11.93	1.49E-05	8.95E-06	1.49E-05	9.55E-06	2.98E-04	2.74E-05	1.67E-06	6.44E-04	2.98E-05	2.27E-05	8.47E-02

Construction Activity	Construction Year	DPM (g/s)	Arsenic (g/s)	Beryllium (g/s)	Cadmium (g/s)	Cobalt (g/s)	Copper (g/s)	Lead (g/s)	Mercury (g/s)	Nickel (g/s)	Selenium (g/s)	Chromium VI (g/s)	Crystalline Silica (g/s)
Concrete Channel 2024	2024_CONCRTE	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Paved road	2024_PAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Unpaved road	2024_CCP_UNPV	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Channel Widening 2024	2024_CHAN_RCK	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Paved road	2024_PAVED	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Rock Pile Area 2025	2025_CHAN_RCK	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Paved road	2025_PAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Rock Pile Area 2026	2026_CHAN_RCK	1.698E-04	9.08E-09	5.45E-09	9.08E-09	4.65E-08	1.02E-07	9.08E-09	1.45E-09	1.67E-07	1.82E-08	7.26E-10	2.70E-05
Paved road	2026_PAVED	1.681E-04	8.77E-08	5.26E-08	8.77E-08	5.61E-08	1.75E-06	1.61E-07	9.82E-09	3.79E-06	1.75E-07	1.33E-07	4.98E-04
Channel Widening 2027	2027_CHAN_RCK	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Paved road	2027_PAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Material Removal 2028	2028_MATRMVL	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Paved road	2028_PAVED	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Unpaved road	2028_UNPAVED	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Material Removal 2029	2029_MATRMVL	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Paved road	2029_PAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Unpaved road	2029_UNPAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

N/A = not including PM10 on-site dust in HRA calculation; it is only for speciating metals.

Exposure Duration, ED

	Exposure Start	3rd Trimester	0<2	2<16	16<30
Years	1/1/2026	0	0.25	0.75	0

Risk Factors

	Abbreviation	UOM	3rd Trimester	0<2	2<16	16<30
Daily Breathing Rate (95th %'ile)	DBR	L/kg-day	361	581	581	302
Fraction Of Time At Home [a]	FAH	unitless	0.85	0.85	0.72	0.73
Exposure Frequency	EF	days/year	0.96	0.96	0.96	0.96
Age Sensitivity Factor	ASF	unitless	10	10	3	1.7
Inhalation Absorption Factor	A	unitless	1	1	1	1
Conversion Factor	CF_1	m^3/L	0.001	0.001	0.001	0.001
Conversion Factor	CF_2	$\mu g/m^3$	0.001	0.001	0.001	0.001
Averaging Time (for residential exposure)	AT	years	70.00	70.00	70.00	70.00

[a] assume school or daycare will have cancer risk of >1 per million

Cancer Potency Factor, CPF

TAC	UOM	
DPM	$mg/kg\text{-}day^{-1}$	1.1
Arsenic	$mg/kg\text{-}day^{-1}$	12
Beryllium	$mg/kg\text{-}day^{-1}$	8.4
Cadmium	$mg/kg\text{-}day^{-1}$	15
Cobalt	$mg/kg\text{-}day^{-1}$	27
Lead	$mg/kg\text{-}day^{-1}$	0.04
Nickel	$mg/kg\text{-}day^{-1}$	0.91
Chromium VI	$mg/kg\text{-}day^{-1}$	510

Intake Factor for Inhalation, IF (m^3/kg-day)

Equation	3rd Trimester	0<2	2<16	16<30
DBR*FAH*EF*ED*ASF*A*CF/AT	0.000	0.017	0.013	0.000

Risk Calculation Part 1, R1

	TAC	3rd Trimester	0<2	2<16	16<30
IF*CPF*CF	DPM	0.00E+00	1.86E-05	1.42E-05	0.00E+00
	Arsenic	0.00E+00	2.03E-04	1.55E-04	0.00E+00
	Beryllium	0.00E+00	1.42E-04	1.08E-04	0.00E+00
	Cadmium	0.00E+00	2.54E-04	1.94E-04	0.00E+00
	Cobalt	0.00E+00	4.57E-04	3.49E-04	0.00E+00
	Lead	0.00E+00	6.77E-07	5.16E-07	0.00E+00
	Nickel	0.00E+00	1.54E-05	1.17E-05	0.00E+00
	Chromium VI	0.00E+00	8.63E-03	6.58E-03	0.00E+00

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)								Risk Calculation Part 2, $\sum R1*C_{TAC}$					
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Cobalt	Lead	Nickel	Chromium VI	3rd Trimester	0<2	2<16	16<30	Cancer Risk - 2026 (per million)	Receptor Type
581336.22_4131207.48	581336.22	4131207.48	1.96E-04	1.01E-07	6.05E-08	1.01E-07	6.54E-08	1.85E-07	4.35E-06	1.53E-07	0	3.65525E-09	2.78978E-09	0	0.0064	CT House
581554.22_4130688.06	581554.22	4130688.06	1.35E-04	6.70E-08	4.02E-08	6.70E-08	4.46E-08	1.23E-07	2.88E-06	1.01E-07	0	2.51053E-09	1.91609E-09	0	0.0044	Res
579793.36_4131503.29	579793.36	4131503.29	1.24E-05	3.69E-09	2.21E-09	3.69E-09	3.78E-09	6.52E-09	1.51E-07	5.15E-09	0	2.30304E-10	1.75773E-10	0	0.0004	Acute
580488.37_4131517.71	580488.37	4131517.71	1.56E-05	6.54E-09	3.92E-09	6.54E-09	5.01E-09	1.19E-08	2.78E-07	9.68E-09	0	2.90424E-10	2.21659E-10	0	0.0005	Acute
581678.43_4131040.03	581678.43	4131040.03	6.23E-04	3.23E-07	1.94E-07	3.23E-07	2.08E-07	5.94E-07	1.39E-05	4.91E-07	0	1.15924E-08	8.84757E-09	0	0.0204	Res
581635.43_4130978.54	581635.43	4130978.54	1.26E-03	6.55E-07	3.93E-07	6.55E-07	4.20E-07	1.20E-06	2.83E-05	9.95E-07	0	2.34373E-08	1.78879E-08	0	0.0413	Res
581830.06_4131027.55	581830.06	4131027.55	5.74E-04	2.97E-07	1.78E-07	2.97E-07	1.91E-07	5.47E-07	1.28E-05	4.52E-07	0	1.06748E-08	8.1473E-09	0	0.0188	Res
581727.48_4130976.54	581727.48	4130976.54	1.52E-03	7.93E-07	4.76E-07	7.93E-07	5.09E-07	1.46E-06	3.43E-05	1.21E-06	0	2.83593E-08	2.16445E-08	0	0.0500	Res
581789.11_4130419.65	581789.11	4130419.65	1.05E-04	5.04E-08	3.02E-08	5.04E-08	3.45E-08	9.23E-08	2.16E-06	7.59E-08	0	1.95397E-09	1.49131E-09	0	0.0034	Res
581700.32_4130781.89	581700.32	4130781.89	3.04E-04	1.56E-07	9.37E-08	1.56E-07	1.01E-07	2.87E-07	6.74E-06	2.37E-07	0	5.65747E-09	4.31792E-09	0	0.0100	Res
581426.07_4131299.01	581426.07	4131299.01	7.16E-05	3.59E-08	2.15E-08	3.59E-08	2.37E-08	6.59E-08	1.55E-06	5.43E-08	0	1.33261E-09	1.01708E-09	0	0.0023	Acute
582301.42_4129474.56	582301.42	4129474.56	3.74E-05	1.55E-08	9.29E-09	1.55E-08	1.20E-08	2.81E-08	6.57E-07	2.29E-08	0	6.96203E-10	5.31359E-10	0	0.0012	Res
582357.99_4129474.56	582357.99	4129474.56	3.50E-05	1.45E-08	8.67E-09	1.45E-08	1.12E-08	2.62E-08	6.14E-07	2.13E-08	0	6.51928E-10	4.97567E-10	0	0.0011	Res
582414.56_4129474.56	582414.56	4129474.56	3.29E-05	1.35E-08	8.11E-09	1.35E-08	1.05E-08	2.45E-08	5.74E-07	2.00E-08	0	6.11883E-10	4.67004E-10	0	0.0011	Res
582471.13_4129474.56	582471.13	4129474.56	3.09E-05	1.27E-08	7.61E-09	1.27E-08	9.88E-09	2.30E-08	5.38E-07	1.87E-08	0	5.7547E-10	4.39213E-10	0	0.0010	Res
582527.7_4129474.56	582527.7	4129474.56	2.92E-05	1.20E-08	7.18E-09	1.20E-08	9.34E-09	2.17E-08	5.08E-07	1.76E-08	0	5.44102E-10	4.15271E-10	0	0.0010	Res
582584.27_4129474.56	582584.27	4129474.56	2.75E-05	1.12E-08	6.74E-09	1.12E-08	8.79E-09	2.04E-08	4.77E-07	1.66E-08	0	5.12293E-10	3.90995E-10	0	0.0009	Res
582640.84_4129474.56	582640.84	4129474.56	2.58E-05	1.05E-08	6.27E-09	1.05E-08	8.22E-09	1.90E-08	4.43E-07	1.54E-08	0	4.79177E-10	3.6572E-10	0	0.0008	Res
582244.85_4129558.47	582244.85	4129558.47	3.90E-05	1.57E-08	9.41E-09	1.57E-08	1.24E-08	2.84E-08	6.64E-07	2.31E-08	0	7.24808E-10	5.53191E-10	0	0.0013	Res
582301.42_4129558.47	582301.42	4129558.47	3.79E-05	1.56E-08	9.34E-09	1.56E-08	1.21E-08	2.82E-08	6.60E-07	2.30E-08	0	7.05407E-10	5.38384E-10	0	0.0012	Res
582357.99_4129558.47	582357.99	4129558.47	3.58E-05	1.48E-08	8.85E-09	1.48E-08	1.14E-08	2.68E-08	6.26E-07	2.18E-08	0	6.65627E-10	5.08023E-10	0	0.0012	Res
582414.56_4129558.47	582414.56	4129558.47	3.36E-05	1.38E-08	8.30E-09	1.38E-08	1.07E-08	2.51E-08	5.87E-07	2.04E-08	0	6.25105E-10	4.77096E-10	0	0.0011	Res
582471.13_4129558.47	582471.13	4129558.47	3.14E-05	1.29E-08	7.76E-09	1.29E-08	1.00E-08	2.35E-08	5.49E-07	1.91E-08	0	5.84607E-10	4.46186E-10	0	0.0010	Res
582527.7_4129558.47	582527.7	4129558.47	2.95E-05	1.21E-08	7.25E-09	1.21E-08	9.42E-09	2.19E-08	5.13E-07	1.78E-08	0	5.48261E-10	4.18446E-10	0	0.0010	Res
582584.27_4129558.47	582584.27	4129558.47	2.76E-05	1.13E-08	6.77E-09	1.13E-08	8.82E-09	2.05E-08	4.78E-07	1.66E-08	0	5.14015E-10	3.92309E-10	0	0.0009	Res
582640.84_4129558.47	582640.84	4129558.47	2.61E-05	1.06E-08	6.36E-09	1.06E-08	8.32E-09	1.92E-08	4.50E-07	1.56E-08	0	4.85095E-10	3.70236E-10	0	0.0009	Res
582697.41_4129558.47	582697.41	4129558.47	2.46E-05	9.96E-09	5.98E-09	9.96E-09	7.84E-09	1.80E-08	4.22E-07	1.47E-08	0	4.57428E-10	3.4912E-10	0	0.0008	Res
582244.85_4129642.38	582244.85	4129642.38	3.57E-05	1.37E-08	8.24E-09	1.37E-08	1.13E-08	2.48E-08	5.79E-07	2.01E-08	0	6.64741E-10	5.07346E-10	0	0.0012	Res
582301.42_4129642.38	582301.42	4129642.38	3.75E-05	1.52E-08	9.10E-09	1.52E-08	1.19E-08	2.75E-08	6.42E-07	2.23E-08	0	6.96996E-10	5.31964E-10	0	0.0012	Res

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)							
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Cobalt	Lead	Nickel	Chromium VI
582357.99_4129642.38	582357.99	4129642.38	3.63E-05	1.50E-08	9.00E-09	1.50E-08	1.16E-08	2.72E-08	6.37E-07	2.22E-08
582414.56_4129642.38	582414.56	4129642.38	3.42E-05	1.42E-08	8.50E-09	1.42E-08	1.09E-08	2.57E-08	6.01E-07	2.09E-08
582471.13_4129642.38	582471.13	4129642.38	3.21E-05	1.33E-08	7.97E-09	1.33E-08	1.03E-08	2.41E-08	5.64E-07	1.96E-08
582527.7_4129642.38	582527.7	4129642.38	3.02E-05	1.25E-08	7.48E-09	1.25E-08	9.66E-09	2.26E-08	5.29E-07	1.84E-08
582584.27_4129642.38	582584.27	4129642.38	2.82E-05	1.16E-08	6.95E-09	1.16E-08	9.01E-09	2.10E-08	4.91E-07	1.71E-08
582640.84_4129642.38	582640.84	4129642.38	2.64E-05	1.08E-08	6.48E-09	1.08E-08	8.44E-09	1.96E-08	4.58E-07	1.59E-08
582697.41_4129642.38	582697.41	4129642.38	2.48E-05	1.01E-08	6.06E-09	1.01E-08	7.92E-09	1.83E-08	4.28E-07	1.49E-08
582753.98_4129642.38	582753.98	4129642.38	2.33E-05	9.42E-09	5.65E-09	9.42E-09	7.43E-09	1.71E-08	3.99E-07	1.39E-08
582810.55_4129642.38	582810.55	4129642.38	2.19E-05	8.81E-09	5.28E-09	8.81E-09	6.98E-09	1.60E-08	3.73E-07	1.30E-08
582867.12_4129642.38	582867.12	4129642.38	2.04E-05	8.14E-09	4.88E-09	8.14E-09	6.50E-09	1.47E-08	3.45E-07	1.20E-08
582244.85_4129726.29	582244.85	4129726.29	3.81E-05	1.51E-08	9.08E-09	1.51E-08	1.21E-08	2.74E-08	6.40E-07	2.22E-08
582301.42_4129726.29	582301.42	4129726.29	3.67E-05	1.48E-08	8.85E-09	1.48E-08	1.17E-08	2.67E-08	6.25E-07	2.17E-08
582357.99_4129726.29	582357.99	4129726.29	3.65E-05	1.51E-08	9.07E-09	1.51E-08	1.17E-08	2.74E-08	6.42E-07	2.23E-08
582414.56_4129726.29	582414.56	4129726.29	3.47E-05	1.44E-08	8.67E-09	1.44E-08	1.11E-08	2.62E-08	6.14E-07	2.13E-08
582471.13_4129726.29	582471.13	4129726.29	3.27E-05	1.36E-08	8.17E-09	1.36E-08	1.05E-08	2.47E-08	5.78E-07	2.01E-08
582527.7_4129726.29	582527.7	4129726.29	3.08E-05	1.28E-08	7.68E-09	1.28E-08	9.86E-09	2.32E-08	5.44E-07	1.89E-08
582584.27_4129726.29	582584.27	4129726.29	2.89E-05	1.20E-08	7.18E-09	1.20E-08	9.24E-09	2.17E-08	5.08E-07	1.77E-08
582640.84_4129726.29	582640.84	4129726.29	2.70E-05	1.12E-08	6.69E-09	1.12E-08	8.65E-09	2.02E-08	4.73E-07	1.65E-08
582697.41_4129726.29	582697.41	4129726.29	2.51E-05	1.03E-08	6.18E-09	1.03E-08	8.03E-09	1.87E-08	4.37E-07	1.52E-08
582753.98_4129726.29	582753.98	4129726.29	2.33E-05	9.45E-09	5.67E-09	9.45E-09	7.43E-09	1.71E-08	4.00E-07	1.39E-08
582810.55_4129726.29	582810.55	4129726.29	2.14E-05	8.57E-09	5.14E-09	8.57E-09	6.80E-09	1.55E-08	3.63E-07	1.26E-08
582244.85_4129810.2	582244.85	4129810.2	3.73E-05	1.47E-08	8.82E-09	1.47E-08	1.18E-08	2.66E-08	6.22E-07	2.16E-08
582301.42_4129810.2	582301.42	4129810.2	3.69E-05	1.50E-08	8.98E-09	1.50E-08	1.18E-08	2.71E-08	6.35E-07	2.21E-08
582357.99_4129810.2	582357.99	4129810.2	3.61E-05	1.49E-08	8.95E-09	1.49E-08	1.15E-08	2.71E-08	6.33E-07	2.20E-08
582414.56_4129810.2	582414.56	4129810.2	3.48E-05	1.46E-08	8.73E-09	1.46E-08	1.12E-08	2.64E-08	6.18E-07	2.15E-08
582471.13_4129810.2	582471.13	4129810.2	3.31E-05	1.39E-08	8.34E-09	1.39E-08	1.06E-08	2.52E-08	5.91E-07	2.06E-08
582527.7_4129810.2	582527.7	4129810.2	3.11E-05	1.30E-08	7.81E-09	1.30E-08	9.97E-09	2.36E-08	5.53E-07	1.92E-08
582584.27_4129810.2	582584.27	4129810.2	2.90E-05	1.21E-08	7.26E-09	1.21E-08	9.30E-09	2.20E-08	5.14E-07	1.79E-08
582640.84_4129810.2	582640.84	4129810.2	2.67E-05	1.10E-08	6.62E-09	1.10E-08	8.54E-09	2.00E-08	4.68E-07	1.63E-08
582697.41_4129810.2	582697.41	4129810.2	2.46E-05	1.01E-08	6.04E-09	1.01E-08	7.86E-09	1.83E-08	4.27E-07	1.49E-08
581905.43_4129894.11	581905.43	4129894.11	4.48E-05	1.93E-08	1.16E-08	1.93E-08	1.44E-08	3.51E-08	8.21E-07	2.86E-08
581962_4129894.11	581962	4129894.11	4.78E-05	1.95E-08	1.17E-08	1.95E-08	1.53E-08	3.53E-08	8.25E-07	2.87E-08
582131.71_4129894.11	582131.71	4129894.11	4.25E-05	1.69E-08	1.02E-08	1.69E-08	1.35E-08	3.07E-08	7.17E-07	2.49E-08
582188.28_4129894.11	582188.28	4129894.11	4.06E-05	1.63E-08	9.79E-09	1.63E-08	1.29E-08	2.95E-08	6.91E-07	2.40E-08
582244.85_4129894.11	582244.85	4129894.11	3.92E-05	1.60E-08	9.60E-09	1.60E-08	1.25E-08	2.90E-08	6.79E-07	2.36E-08
582301.42_4129894.11	582301.42	4129894.11	3.75E-05	1.55E-08	9.28E-09	1.55E-08	1.20E-08	2.81E-08	6.57E-07	2.28E-08
582357.99_4129894.11	582357.99	4129894.11	3.56E-05	1.48E-08	8.86E-09	1.48E-08	1.14E-08	2.68E-08	6.27E-07	2.18E-08
582414.56_4129894.11	582414.56	4129894.11	3.55E-05	1.51E-08	9.03E-09	1.51E-08	1.14E-08	2.74E-08	6.40E-07	2.23E-08
582471.13_4129894.11	582471.13	4129894.11	3.32E-05	1.41E-08	8.45E-09	1.41E-08	1.07E-08	2.56E-08	5.99E-07	2.09E-08
582527.7_4129894.11	582527.7	4129894.11	3.07E-05	1.29E-08	7.77E-09	1.29E-08	9.86E-09	2.35E-08	5.51E-07	1.92E-08
582584.27_4129894.11	582584.27	4129894.11	2.83E-05	1.18E-08	7.09E-09	1.18E-08	9.06E-09	2.15E-08	5.02E-07	1.75E-08
582640.84_4129894.11	582640.84	4129894.11	2.60E-05	1.07E-08	6.45E-09	1.07E-08	8.31E-09	1.95E-08	4.56E-07	1.59E-08
582697.41_4129894.11	582697.41	4129894.11	2.38E-05	9.75E-09	5.85E-09	9.75E-09	7.61E-09	1.77E-08	4.14E-07	1.44E-08
581962_4129978.02	581962	4129978.02	4.94E-05	2.03E-08	1.22E-08	2.03E-08	1.58E-08	3.69E-08	8.62E-07	3.00E-08
582018.57_4129978.02	582018.57	4129978.02	4.72E-05	1.91E-08	1.15E-08	1.91E-08	1.51E-08	3.46E-08	8.10E-07	2.82E-08
582075.14_4129978.02	582075.14	4129978.02	4.79E-05	1.98E-08	1.19E-08	1.98E-08	1.53E-08	3.59E-08	8.40E-07	2.92E-08
582131.71_4129978.02	582131.71	4129978.02	4.70E-05	1.98E-08	1.19E-08	1.98E-08	1.51E-08	3.60E-08	8.42E-07	2.93E-08
582188.28_4129978.02	582188.28	4129978.02	4.62E-05	1.98E-08	1.19E-08	1.98E-08	1.49E-08	3.61E-08	8.44E-07	2.94E-08
582244.85_4129978.02	582244.85	4129978.02	4.20E-05	1.79E-08	1.07E-08	1.79E-08	1.35E-08	3.25E-08	7.61E-07	2.65E-08
582301.42_4129978.02	582301.42	4129978.02	4.10E-05	1.77E-08	1.06E-08	1.77E-08	1.32E-08	3.22E-08	7.53E-07	2.63E-08
582357.99_4129978.02	582357.99	4129978.02	3.86E-05	1.67E-08	1.00E-08	1.67E-08	1.25E-08	3.04E-08	7.12E-07	2.48E-08
582414.56_4129978.02	582414.56	4129978.02	3.58E-05	1.54E-08	9.26E-09	1.54E-08	1.15E-08	2.81E-08	6.57E-07	2.29E-08
582471.13_4129978.02	582471.13	4129978.02	3.29E-05	1.41E-08	8.46E-09	1.41E-08	1.06E-08	2.56E-08	6.00E-07	2.09E-08
582527.7_4129978.02	582527.7	4129978.02	3.02E-05	1.28E-08	7.68E-09	1.28E-08	9.69E-09	2.33E-08	5.44E-07	1.90E-08
582584.27_4129978.02	582584.27	4129978.02	2.76E-05	1.16E-08	6.95E-09	1.16E-08	8.85E-09	2.10E-08	4.92E-07	1.71E-08
582640.84_4129978.02	582640.84	4129978.02	2.53E-05	1.05E-08	6.30E-09	1.05E-08	8.09E-09	1.90E-08	4.46E-07	1.55E-08

Risk Calculation Part 2, $\sum R1*C_{TAC}$

3rd Trimester	0<2	2<16	16<30	Cancer Risk - 2026 (per million)	Receptor Type
0	6.76091E-10	5.16009E-10	0	0.0012	Res
0	6.36548E-10	4.85829E-10	0	0.0011	Res
0	5.97402E-10	4.55951E-10	0	0.0011	Res
0	5.61928E-10	4.28877E-10	0	0.0010	Res
0	5.24301E-10	4.0016E-10	0	0.0009	Res
0	4.91687E-10	3.75267E-10	0	0.0009	Res
0	4.61956E-10	3.52576E-10	0	0.0008	Res
0	4.33387E-10	3.30771E-10	0	0.0008	Res
0	4.07794E-10	3.11239E-10	0	0.0007	Res
0	3.80294E-10	2.9025E-10	0	0.0007	Res
0	7.09532E-10	5.41532E-10	0	0.0013	Res
0	6.83433E-10	5.21613E-10	0	0.0012	Res
0	6.79748E-10	5.188E-10	0	0.0012	Res
0	6.46114E-10	4.9313E-10	0	0.0011	Res
0	6.09158E-10	4.64924E-10	0	0.0011	Res
0	5.7277E-10	4.37152E-10	0	0.0010	Res
0	5.37396E-10	4.10154E-10	0	0.0009	Res
0	5.03156E-10	3.84021E-10	0	0.0009	Res
0	4.67826E-10	3.57056E-10	0	0.0008	Res
0	4.33187E-10	3.30619E-10	0	0.0008	Res
0	3.97578E-10	3.03441E-10	0	0.0007	Res
0	6.93223E-10	5.29085E-10	0	0.0012	Res
0	6.87141E-10	5.24442E-10	0	0.0012	Res
0	6.71701E-10	5.12659E-10	0	0.0012	Res
0	6.48062E-10	4.94617E-10	0	0.0011	Res
0	6.15973E-10	4.70126E-10	0	0.0011	Res
0	5.78376E-10	4.41431E-10	0	0.0010	Res
0	5.39875E-10	4.12046E-10	0	0.0010	Res
0	4.96531E-10	3.78964E-10	0	0.0009	Res
0	4.57573E-10	3.49231E-10	0	0.0008	Res
0	8.33744E-10	6.36334E-10	0	0.0015	Res
0	8.89831E-10	6.79141E-10	0	0.0016	Res
0	7.90906E-10	6.03639E-10	0	0.0014	Res
0	7.54694E-10	5.76001E-10	0	0.0013	Res
0	7.29139E-10	5.56496E-10	0	0.0013	Res
0	6.9798E-10	5.32715E-10	0	0.0012	Res
0	6.62807E-10	5.0587E-10	0	0.0012	Res
0	6.60071E-10	5.03782E-10	0	0.0012	Res
0	6.1789E-10	4.71588E-10	0	0.0011	Res
0	5.71445E-10	4.36141E-10	0	0.0010	Res
0	5.26102E-10	4.01534E-10	0	0.0009	Res
0	4.8311E-10	3.68721E-10	0	0.0009	Res
0	4.43154E-10	3.38226E-10	0	0.0008	Res
0	9.18493E-10	7.01016E-10	0	0.0016	Res
0	8.78776E-10	6.70703E-10	0	0.0015	Res
0	8.9201E-10	6.80804E-10	0	0.0016	Res
0	8.74929E-10	6.67767E-10	0	0.0015	Res
0	8.59455E-10	6.55957E-10	0	0.0015	Res
0	7.81711E-10	5.96621E-10	0	0.0014	Res
0	7.62117E-10	5.81666E-10	0	0.0013	Res
0	7.18766E-10	5.4858E-10	0	0.0013	Res
0	6.66275E-10	5.08518E-10	0	0.0012	Res
0	6.12824E-10	4.67722E-10	0	0.0011	Res
0	5.61038E-10	4.28198E-10	0	0.0010	Res
0	5.13073E-10	3.9159E-10	0	0.0009	Res
0	4.69928E-10	3.58661E-10	0	0.0008	Res

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)								Risk Calculation Part 2, $\sum R1*C_{TAC}$					
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Cobalt	Lead	Nickel	Chromium VI	3rd Trimester	0<2	2<16	16<30	Cancer Risk - 2026 (per million)	Receptor Type
582697.41_4129978.02	582697.41	4129978.02	2.31E-05	9.49E-09	5.70E-09	9.49E-09	7.39E-09	1.72E-08	4.03E-07	1.40E-08	0	4.30196E-10	3.28336E-10	0	0.0008	Res
582753.98_4129978.02	582753.98	4129978.02	2.10E-05	8.51E-09	5.11E-09	8.51E-09	6.71E-09	1.54E-08	3.61E-07	1.25E-08	0	3.91277E-10	2.98632E-10	0	0.0007	Res
582810.55_4129978.02	582810.55	4129978.02	1.88E-05	7.46E-09	4.47E-09	7.46E-09	5.97E-09	1.35E-08	3.15E-07	1.09E-08	0	3.49259E-10	2.66563E-10	0	0.0006	Res
581905.43_4130061.93	581905.43	4130061.93	6.75E-05	2.97E-08	1.78E-08	2.97E-08	2.18E-08	5.40E-08	1.27E-06	4.42E-08	0	1.25505E-09	9.57884E-10	0	0.0022	Res
581962_4130061.93	581962	4130061.93	6.35E-05	2.80E-08	1.68E-08	2.80E-08	2.05E-08	5.09E-08	1.19E-06	4.16E-08	0	1.18049E-09	9.00981E-10	0	0.0021	Res
582018.57_4130061.93	582018.57	4130061.93	5.50E-05	2.37E-08	1.42E-08	2.37E-08	1.77E-08	4.31E-08	1.01E-06	3.52E-08	0	1.02256E-09	7.80443E-10	0	0.0018	Res
582075.14_4130061.93	582075.14	4130061.93	4.94E-05	2.11E-08	1.26E-08	2.11E-08	1.59E-08	3.83E-08	8.96E-07	3.12E-08	0	9.19717E-10	7.0195E-10	0	0.0016	Res
582131.71_4130061.93	582131.71	4130061.93	4.79E-05	2.07E-08	1.24E-08	2.07E-08	1.54E-08	3.77E-08	8.82E-07	3.07E-08	0	8.91683E-10	6.80554E-10	0	0.0016	Res
582188.28_4130061.93	582188.28	4130061.93	4.64E-05	2.02E-08	1.21E-08	2.02E-08	1.50E-08	3.69E-08	8.63E-07	3.01E-08	0	8.62295E-10	6.58125E-10	0	0.0015	Res
582244.85_4130061.93	582244.85	4130061.93	4.50E-05	1.99E-08	1.19E-08	1.99E-08	1.45E-08	3.62E-08	8.47E-07	2.96E-08	0	8.3636E-10	6.3833E-10	0	0.0015	Res
582301.42_4130061.93	582301.42	4130061.93	4.18E-05	1.84E-08	1.10E-08	1.84E-08	1.35E-08	3.36E-08	7.86E-07	2.74E-08	0	7.77197E-10	5.93175E-10	0	0.0014	Res
582357.99_4130061.93	582357.99	4130061.93	3.88E-05	1.70E-08	1.02E-08	1.70E-08	1.25E-08	3.11E-08	7.27E-07	2.54E-08	0	7.21765E-10	5.50869E-10	0	0.0013	Res
582414.56_4130061.93	582414.56	4130061.93	3.57E-05	1.56E-08	9.35E-09	1.56E-08	1.15E-08	2.84E-08	6.65E-07	2.32E-08	0	6.63905E-10	5.06709E-10	0	0.0012	Res
582471.13_4130061.93	582471.13	4130061.93	3.25E-05	1.41E-08	8.46E-09	1.41E-08	1.05E-08	2.57E-08	6.01E-07	2.10E-08	0	6.05394E-10	4.62051E-10	0	0.0011	Res
582527.7_4130061.93	582527.7	4130061.93	2.96E-05	1.27E-08	7.60E-09	1.27E-08	9.51E-09	2.30E-08	5.40E-07	1.88E-08	0	5.49861E-10	4.19667E-10	0	0.0010	Res
582584.27_4130061.93	582584.27	4130061.93	2.69E-05	1.14E-08	6.84E-09	1.14E-08	8.64E-09	2.07E-08	4.85E-07	1.69E-08	0	5.00212E-10	3.81774E-10	0	0.0009	Res
582640.84_4130061.93	582640.84	4130061.93	2.44E-05	1.02E-08	6.13E-09	1.02E-08	7.83E-09	1.86E-08	4.34E-07	1.51E-08	0	4.54194E-10	3.46652E-10	0	0.0008	Res
582697.41_4130061.93	582697.41	4130061.93	2.23E-05	9.19E-09	5.52E-09	9.19E-09	7.12E-09	1.67E-08	3.90E-07	1.36E-08	0	4.14029E-10	3.15997E-10	0	0.0007	Res
582753.98_4130061.93	582753.98	4130061.93	2.04E-05	8.30E-09	4.98E-09	8.30E-09	6.50E-09	1.50E-08	3.52E-07	1.22E-08	0	3.78745E-10	2.89067E-10	0	0.0007	Res
582810.55_4130061.93	582810.55	4130061.93	1.86E-05	7.49E-09	4.49E-09	7.49E-09	5.93E-09	1.36E-08	3.17E-07	1.10E-08	0	3.46526E-10	2.64477E-10	0	0.0006	Res
581962_4130145.84	581962	4130145.84	7.13E-05	3.28E-08	1.97E-08	3.28E-08	2.32E-08	5.99E-08	1.40E-06	4.91E-08	0	1.32679E-09	1.01264E-09	0	0.0023	Res
582018.57_4130145.84	582018.57	4130145.84	6.61E-05	3.03E-08	1.82E-08	3.03E-08	2.15E-08	5.54E-08	1.30E-06	4.54E-08	0	1.22944E-09	9.38341E-10	0	0.0022	Res
582075.14_4130145.84	582075.14	4130145.84	5.70E-05	2.57E-08	1.54E-08	2.57E-08	1.85E-08	4.69E-08	1.10E-06	3.84E-08	0	1.05976E-09	8.08836E-10	0	0.0019	Res
582131.71_4130145.84	582131.71	4130145.84	5.28E-05	2.38E-08	1.43E-08	2.38E-08	1.71E-08	4.34E-08	1.02E-06	3.55E-08	0	9.81718E-10	7.49271E-10	0	0.0017	Res
582188.28_4130145.84	582188.28	4130145.84	5.06E-05	2.30E-08	1.38E-08	2.30E-08	1.65E-08	4.20E-08	9.84E-07	3.44E-08	0	9.42282E-10	7.19173E-10	0	0.0017	Res
582244.85_4130145.84	582244.85	4130145.84	4.63E-05	2.09E-08	1.26E-08	2.09E-08	1.50E-08	3.82E-08	8.95E-07	3.13E-08	0	8.61828E-10	6.57768E-10	0	0.0015	Res
582301.42_4130145.84	582301.42	4130145.84	4.22E-05	1.89E-08	1.14E-08	1.89E-08	1.37E-08	3.46E-08	8.10E-07	2.83E-08	0	7.84829E-10	5.99E-10	0	0.0014	Res
582357.99_4130145.84	582357.99	4130145.84	3.86E-05	1.72E-08	1.03E-08	1.72E-08	1.25E-08	3.14E-08	7.35E-07	2.57E-08	0	7.17434E-10	5.47563E-10	0	0.0013	Res
582414.56_4130145.84	582414.56	4130145.84	3.52E-05	1.56E-08	9.34E-09	1.56E-08	1.14E-08	2.84E-08	6.65E-07	2.32E-08	0	6.54048E-10	4.99185E-10	0	0.0012	Res
582471.13_4130145.84	582471.13	4130145.84	3.18E-05	1.40E-08	8.37E-09	1.40E-08	1.03E-08	2.54E-08	5.95E-07	2.08E-08	0	5.92199E-10	4.5198E-10	0	0.0010	Res
582527.7_4130145.84	582527.7	4130145.84	2.86E-05	1.24E-08	7.44E-09	1.24E-08	9.23E-09	2.26E-08	5.29E-07	1.84E-08	0	5.32543E-10	4.0645E-10	0	0.0009	Res
582584.27_4130145.84	582584.27	4130145.84	2.57E-05	1.10E-08	6.60E-09	1.10E-08	8.27E-09	2.00E-08	4.68E-07	1.63E-08	0	4.78457E-10	3.6517E-10	0	0.0008	Res
582640.84_4130145.84	582640.84	4130145.84	2.32E-05	9.78E-09	5.87E-09	9.78E-09	7.45E-09	1.78E-08	4.16E-07	1.45E-08	0	4.31662E-10	3.29455E-10	0	0.0008	Res
582697.41_4130145.84	582697.41	4130145.84	2.11E-05	8.76E-09	5.25E-09	8.76E-09	6.74E-09	1.59E-08	3.72E-07	1.29E-08	0	3.91812E-10	2.99041E-10	0	0.0007	Res
582753.98_4130145.84	582753.98	4130145.84	1.93E-05	7.91E-09	4.74E-09	7.91E-09	6.16E-09	1.43E-08	3.36E-07	1.17E-08	0	3.58472E-10	2.73594E-10	0	0.0006	Res
582810.55_4130145.84	582810.55	4130145.84	1.77E-05	7.19E-09	4.32E-09	7.19E-09	5.66E-09	1.30E-08	3.05E-07	1.06E-08	0	3.30199E-10	2.52016E-10	0	0.0006	Res
582867.12_4130145.84	582867.12	4130145.84	1.58E-05	6.29E-09	3.77E-09	6.29E-09	5.03E-09	1.14E-08	2.66E-07	9.24E-09	0	2.94412E-10	2.24703E-10	0	0.0005	Res
581962_4130229.75	581962	4130229.75	7.23E-05	3.35E-08	2.01E-08	3.35E-08	2.36E-08	6.13E-08	1.44E-06	5.03E-08	0	1.34565E-09	1.02703E-09	0	0.0024	Res
582018.57_4130229.75	582018.57	4130229.75	6.87E-05	3.20E-08	1.92E-08	3.20E-08	2.24E-08	5.85E-08	1.37E-06	4.80E-08	0	1.27806E-09	9.75443E-10	0	0.0023	Res
582075.14_4130229.75	582075.14	4130229.75	6.38E-05	2.97E-08	1.78E-08	2.97E-08	2.08E-08	5.43E-08	1.27E-06	4.46E-08	0	1.18712E-09	9.06042E-10	0	0.0021	Res
582131.71_4130229.75	582131.71	4130229.75	5.76E-05	2.67E-08	1.60E-08	2.67E-08	1.88E-08	4.88E-08	1.14E-06	4.00E-08	0	1.07151E-09	8.17801E-10	0	0.0019	Res
582188.28_4130229.75	582188.28	4130229.75	5.16E-05	2.37E-08	1.42E-08	2.37E-08	1.68E-08	4.34E-08	1.02E-06	3.56E-08	0	9.5944E-10	7.32268E-10	0	0.0017	Res
582244.85_4130229.75	582244.85	4130229.75	4.63E-05	2.12E-08	1.27E-08	2.12E-08	1.51E-08	3.87E-08	9.06E-07	3.17E-08	0	8.61764E-10	6.57719E-10	0	0.0015	Res
582301.42_4130229.75	582301.42	4130229.75	4.19E-05	1.90E-08	1.14E-08	1.90E-08	1.36E-08	3.47E-08	8.13E-07	2.84E-08	0	7.78669E-10	5.94299E-10	0	0.0014	Res
582357.99_4130229.75	582357.99	4130229.75	3.79E-05	1.71E-08	1.03E-08	1.71E-08	1.23E-08	3.12E-08	7.31E-07	2.55E-08	0	7.05525E-10	5.38473E-10	0	0.0012	Res
582414.56_4130229.75	582414.56	4130229.75	3.41E-05	1.52E-08	9.12E-09	1.52E-08	1.10E-08	2.77E-08	6.49E-07	2.27E-08	0	6.33511E-10	4.83511E-10	0	0.0011	Res
582471.13_4130229.75	582471.13	4130229.75	3.03E-05	1.34E-08	8.02E-09	1.34E-08	9.80E-09	2.43E-08	5.70E-07	1.99E-08	0	5.63753E-10	4.3027E-10	0	0.0010	Res
582527.7_4130229.75	582527.7	4130229.75	2.70E-05	1.17E-08	7.04E-09	1.17E-08	8.71E-09	2.14E-08	5.01E-07	1.75E-08	0	5.02099E-10	3.83214E-10	0	0.0009	Res
582584.27_4130229.75	582584.27	4130229.75	2.42E-05	1.04E-08	6.22E-09	1.04E-08	7.78E-09	1.89E-08	4.41E-07	1.54E-08	0	4.49455E-10	3.43035E-10	0	0.0008	Res
582640.84_4130229.75	582640.84	4130229.75	2.18E-05	9.22E-09	5.53E-09	9.22E-09	6.99E-09	1.68E-08	3.92E-07	1.37E-08	0	4.05165E-10	3.09232E-10	0	0.0007	Res
582697.41_4130229.75	582697.41	4130229.75	1.99E-05	8.30E-09	4.98E-09	8.30E-09	6.37E-09	1.51E-08	3.53E-07	1.23E-08	0	3.6951E-10	2.82019E-10	0	0.0007	Res
582753.98_4130229.75	582753.98	4130229.75	1.82E-05	7.52E-09	4.51E-09	7.52E-09	5.83E-09	1.36E-08	3.19E-07	1.11E-08	0	3.38798E-10	2.58579E-10	0	0.0006	Res
582810.55_4130229.75	582810.55	4130229.75	1.69E-05	6.88E-09	4.13E-09	6.88E-09	5.38E-09	1.25E-08	2.92E-07	1.01E-08	0	3.13499E-10	2.3927E-10	0	0.0006	Res
582867.12_4130229.75	582867.12	4130229.75	1.57E-05	6.35E-09	3.81E-09	6.35E-09	5.01E-09	1.15E-08	2.69E-07	9.35E-09	0	2.92143E-10	2.22971E-10	0	0.0005	Res
582018.57_4130313.66	582018.57	4130313.66	7.33E-05	3.46E-08	2.07E-08	3.46E-08	2.40E-08	6.33E-08	1.48E-06	5.19E-08	0	1.36377E-09	1.04087E-09	0	0.0024	Res
582075.14_4130313.66	582075.14	4130313.66	6.78E-05	3.20E-08	1.92E-08	3.20E-08	2.22E-08	5.85E-08	1.37E-06	4.81E-08	0	1.26218E-09	9.63326E-10	0	0.0022	Res

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)								Risk Calculation Part 2, $\sum R1*C_{TAC}$					
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Cobalt	Lead	Nickel	Chromium VI	3rd Trimester	0<2	2<16	16<30	Cancer Risk - 2026 (per million)	Receptor Type
582131.71_4130313.66	582131.71	4130313.66	5.97E-05	2.79E-08	1.68E-08	2.79E-08	1.95E-08	5.11E-08	1.20E-06	4.19E-08	0	1.11011E-09	8.4726E-10	0	0.0020	Res
582188.28_4130313.66	582188.28	4130313.66	5.24E-05	2.43E-08	1.46E-08	2.43E-08	1.71E-08	4.45E-08	1.04E-06	3.65E-08	0	9.75774E-10	7.44734E-10	0	0.0017	Res
582244.85_4130313.66	582244.85	4130313.66	4.65E-05	2.14E-08	1.28E-08	2.14E-08	1.52E-08	3.91E-08	9.17E-07	3.21E-08	0	8.65654E-10	6.60688E-10	0	0.0015	Res
582301.42_4130313.66	582301.42	4130313.66	4.15E-05	1.90E-08	1.14E-08	1.90E-08	1.35E-08	3.46E-08	8.11E-07	2.84E-08	0	7.72584E-10	5.89655E-10	0	0.0014	Res
582357.99_4130313.66	582357.99	4130313.66	3.67E-05	1.66E-08	9.96E-09	1.66E-08	1.19E-08	3.03E-08	7.10E-07	2.48E-08	0	6.83553E-10	5.21704E-10	0	0.0012	Res
582414.56_4130313.66	582414.56	4130313.66	3.23E-05	1.44E-08	8.64E-09	1.44E-08	1.05E-08	2.63E-08	6.15E-07	2.15E-08	0	6.00656E-10	4.58436E-10	0	0.0011	Res
582471.13_4130313.66	582471.13	4130313.66	2.84E-05	1.25E-08	7.51E-09	1.25E-08	9.20E-09	2.28E-08	5.34E-07	1.86E-08	0	5.29273E-10	4.03954E-10	0	0.0009	Res
582527.7_4130313.66	582527.7	4130313.66	2.53E-05	1.10E-08	6.58E-09	1.10E-08	8.16E-09	2.00E-08	4.68E-07	1.63E-08	0	4.70497E-10	3.59094E-10	0	0.0008	Res
582584.27_4130313.66	582584.27	4130313.66	2.27E-05	9.70E-09	5.82E-09	9.70E-09	7.29E-09	1.76E-08	4.13E-07	1.44E-08	0	4.217E-10	3.21852E-10	0	0.0007	Res
582640.84_4130313.66	582640.84	4130313.66	2.05E-05	8.69E-09	5.21E-09	8.69E-09	6.60E-09	1.58E-08	3.70E-07	1.29E-08	0	3.82258E-10	2.91749E-10	0	0.0007	Res
582697.41_4130313.66	582697.41	4130313.66	1.88E-05	7.84E-09	4.71E-09	7.84E-09	6.02E-09	1.42E-08	3.33E-07	1.16E-08	0	3.49167E-10	2.66493E-10	0	0.0006	Res
582753.98_4130313.66	582753.98	4130313.66	1.73E-05	7.13E-09	4.28E-09	7.13E-09	5.52E-09	1.29E-08	3.03E-07	1.05E-08	0	3.2099E-10	2.44987E-10	0	0.0006	Res
582810.55_4130313.66	582810.55	4130313.66	1.59E-05	6.50E-09	3.90E-09	6.50E-09	5.08E-09	1.18E-08	2.76E-07	9.59E-09	0	2.96004E-10	2.25917E-10	0	0.0005	Res
582867.12_4130313.66	582867.12	4130313.66	1.47E-05	5.96E-09	3.57E-09	5.96E-09	4.70E-09	1.08E-08	2.52E-07	8.77E-09	0	2.74117E-10	2.09213E-10	0	0.0005	Res
581848.86_4130397.57	581848.86	4130397.57	9.95E-05	4.76E-08	2.86E-08	4.76E-08	3.27E-08	8.73E-08	2.05E-06	7.17E-08	0	1.85073E-09	1.41252E-09	0	0.0033	Res
581905.43_4130397.57	581905.43	4130397.57	9.62E-05	4.62E-08	2.77E-08	4.62E-08	3.16E-08	8.46E-08	1.98E-06	6.96E-08	0	1.78891E-09	1.36534E-09	0	0.0032	Res
581962_4130397.57	581962	4130397.57	9.08E-05	4.37E-08	2.62E-08	4.37E-08	2.98E-08	8.00E-08	1.88E-06	6.58E-08	0	1.68891E-09	1.28902E-09	0	0.0030	Res
582018.57_4130397.57	582018.57	4130397.57	8.16E-05	3.91E-08	2.35E-08	3.91E-08	2.68E-08	7.16E-08	1.68E-06	5.88E-08	0	1.51776E-09	1.15839E-09	0	0.0027	Res
582075.14_4130397.57	582075.14	4130397.57	7.17E-05	3.41E-08	2.05E-08	3.41E-08	2.35E-08	6.25E-08	1.47E-06	5.14E-08	0	1.33456E-09	1.01857E-09	0	0.0024	Res
582131.71_4130397.57	582131.71	4130397.57	6.17E-05	2.91E-08	1.75E-08	2.91E-08	2.02E-08	5.32E-08	1.25E-06	4.37E-08	0	1.14838E-09	8.76472E-10	0	0.0020	Res
582188.28_4130397.57	582188.28	4130397.57	5.39E-05	2.52E-08	1.51E-08	2.52E-08	1.76E-08	4.60E-08	1.08E-06	3.78E-08	0	1.00226E-09	7.64953E-10	0	0.0018	Res
582244.85_4130397.57	582244.85	4130397.57	4.67E-05	2.16E-08	1.30E-08	2.16E-08	1.52E-08	3.95E-08	9.25E-07	3.24E-08	0	8.69727E-10	6.63797E-10	0	0.0015	Res
582301.42_4130397.57	582301.42	4130397.57	4.05E-05	1.85E-08	1.11E-08	1.85E-08	1.32E-08	3.38E-08	7.91E-07	2.77E-08	0	7.54205E-10	5.75628E-10	0	0.0013	Res
582357.99_4130397.57	582357.99	4130397.57	3.50E-05	1.57E-08	9.43E-09	1.57E-08	1.14E-08	2.87E-08	6.72E-07	2.35E-08	0	6.50634E-10	4.96579E-10	0	0.0011	Res
582414.56_4130397.57	582414.56	4130397.57	3.05E-05	1.35E-08	8.10E-09	1.35E-08	9.87E-09	2.46E-08	5.77E-07	2.01E-08	0	5.67206E-10	4.32905E-10	0	0.0010	Res
582471.13_4130397.57	582471.13	4130397.57	2.69E-05	1.18E-08	7.05E-09	1.18E-08	8.69E-09	2.14E-08	5.01E-07	1.75E-08	0	5.00545E-10	3.82028E-10	0	0.0009	Res
582527.7_4130397.57	582527.7	4130397.57	2.40E-05	1.03E-08	6.20E-09	1.03E-08	7.72E-09	1.88E-08	4.40E-07	1.53E-08	0	4.46054E-10	3.40439E-10	0	0.0008	Res
582584.27_4130397.57	582584.27	4130397.57	2.16E-05	9.17E-09	5.50E-09	9.17E-09	6.93E-09	1.67E-08	3.90E-07	1.36E-08	0	4.01041E-10	3.06084E-10	0	0.0007	Res
582640.84_4130397.57	582640.84	4130397.57	1.95E-05	8.21E-09	4.92E-09	8.21E-09	6.27E-09	1.49E-08	3.49E-07	1.21E-08	0	3.63476E-10	2.77414E-10	0	0.0006	Res
582697.41_4130397.57	582697.41	4130397.57	1.77E-05	7.35E-09	4.41E-09	7.35E-09	5.68E-09	1.33E-08	3.12E-07	1.09E-08	0	3.30009E-10	2.51871E-10	0	0.0006	Res
582753.98_4130397.57	582753.98	4130397.57	1.62E-05	6.64E-09	3.99E-09	6.64E-09	5.18E-09	1.21E-08	2.82E-07	9.80E-09	0	3.01893E-10	2.30412E-10	0	0.0005	Res
582810.55_4130397.57	582810.55	4130397.57	1.49E-05	6.04E-09	3.62E-09	6.04E-09	4.76E-09	1.09E-08	2.56E-07	8.89E-09	0	2.77658E-10	2.11915E-10	0	0.0005	Res
582867.12_4130397.57	582867.12	4130397.57	1.38E-05	5.51E-09	3.31E-09	5.51E-09	4.39E-09	9.98E-09	2.33E-07	8.10E-09	0	2.56395E-10	1.95687E-10	0	0.0005	Res
581848.86_4130481.48	581848.86	4130481.48	1.26E-04	6.20E-08	3.72E-08	6.20E-08	4.15E-08	1.14E-07	2.67E-06	9.36E-08	0	2.33753E-09	1.78406E-09	0	0.0041	Res
581905.43_4130481.48	581905.43	4130481.48	1.17E-04	5.74E-08	3.44E-08	5.74E-08	3.85E-08	1.05E-07	2.47E-06	8.67E-08	0	2.16928E-09	1.65565E-09	0	0.0038	Res
581962_4130481.48	581962	4130481.48	9.99E-05	4.88E-08	2.93E-08	4.88E-08	3.29E-08	8.94E-08	2.10E-06	7.36E-08	0	1.85766E-09	1.41781E-09	0	0.0033	Res
582018.57_4130481.48	582018.57	4130481.48	8.82E-05	4.28E-08	2.57E-08	4.28E-08	2.90E-08	7.85E-08	1.84E-06	6.46E-08	0	1.64046E-09	1.25204E-09	0	0.0029	Res
582075.14_4130481.48	582075.14	4130481.48	7.49E-05	3.60E-08	2.16E-08	3.60E-08	2.46E-08	6.60E-08	1.55E-06	5.43E-08	0	1.39368E-09	1.06369E-09	0	0.0025	Res
582131.71_4130481.48	582131.71	4130481.48	6.39E-05	3.04E-08	1.82E-08	3.04E-08	2.10E-08	5.57E-08	1.31E-06	4.58E-08	0	1.18909E-09	9.07545E-10	0	0.0021	Res
582188.28_4130481.48	582188.28	4130481.48	5.43E-05	2.55E-08	1.53E-08	2.55E-08	1.78E-08	4.67E-08	1.10E-06	3.84E-08	0	1.01109E-09	7.71691E-10	0	0.0018	Res
582244.85_4130481.48	582244.85	4130481.48	4.56E-05	2.11E-08	1.27E-08	2.11E-08	1.49E-08	3.86E-08	9.04E-07	3.16E-08	0	8.49108E-10	6.4806E-10	0	0.0015	Res
582301.42_4130481.48	582301.42	4130481.48	3.86E-05	1.75E-08	1.05E-08	1.75E-08	1.25E-08	3.20E-08	7.51E-07	2.62E-08	0	7.17803E-10	5.47844E-10	0	0.0013	Res
582357.99_4130481.48	582357.99	4130481.48	3.31E-05	1.48E-08	8.89E-09	1.48E-08	1.07E-08	2.70E-08	6.33E-07	2.21E-08	0	6.16272E-10	4.70354E-10	0	0.0011	Res
582414.56_4130481.48	582414.56	4130481.48	2.90E-05	1.27E-08	7.65E-09	1.27E-08	9.36E-09	2.32E-08	5.44E-07	1.90E-08	0	5.38699E-10	4.11148E-10	0	0.0009	Res
582471.13_4130481.48	582471.13	4130481.48	2.56E-05	1.11E-08	6.65E-09	1.11E-08	8.25E-09	2.02E-08	4.72E-07	1.65E-08	0	4.75954E-10	3.6326E-10	0	0.0008	Res
582527.7_4130481.48	582527.7	4130481.48	2.27E-05	9.71E-09	5.82E-09	9.71E-09	7.32E-09	1.77E-08	4.13E-07	1.44E-08	0	4.23217E-10	3.2301E-10	0	0.0007	Res
582584.27_4130481.48	582584.27	4130481.48	2.04E-05	8.58E-09	5.15E-09	8.58E-09	6.55E-09	1.56E-08	3.65E-07	1.27E-08	0	3.79677E-10	2.89779E-10	0	0.0007	Res
582640.84_4130481.48	582640.84	4130481.48	1.84E-05	7.61E-09	4.57E-09	7.61E-09	5.88E-09	1.38E-08	3.23E-07	1.12E-08	0	3.42049E-10	2.6106E-10	0	0.0006	Res
582697.41_4130481.48	582697.41	4130481.48	1.67E-05	6.81E-09	4.09E-09	6.81E-09	5.33E-09	1.23E-08	2.89E-07	1.00E-08	0	3.10366E-10	2.36879E-10	0	0.0005	Res
582753.98_4130481.48	582753.98	4130481.48	1.53E-05	6.15E-09	3.69E-09	6.15E-09	4.87E-09	1.11E-08	2.61E-07	9.05E-09	0	2.8419E-10	2.16901E-10	0	0.0005	Res
582810.55_4130481.48	582810.55	4130481.48	1.41E-05	5.60E-09	3.36E-09	5.60E-09	4.48E-09	1.01E-08	2.37E-07	8.22E-09	0	2.61862E-10	1.9986E-10	0	0.0005	Res
582867.12_4130481.48	582867.12	4130481.48	1.30E-05	5.13E-09	3.08E-09	5.13E-09	4.14E-09	9.27E-09	2.17E-07	7.52E-09	0	2.42507E-10	1.85087E-10	0	0.0004	Res
581735.72_4130565.39	581735.72	4130565.39	1.51E-04	7.57E-08	4.54E-08	7.57E-08	5.00E-08	1.39E-07	3.26E-06	1.14E-07	0	2.81128E-09	2.14564E-09	0	0.0050	Res
581792.29_4130565.39	581792.29	4130565.39	1.49E-04	7.45E-08	4.47E-08	7.45E-08	4.93E-08	1.37E-07	3.21E-06	1.13E-07	0	2.76777E-09	2.11243E-09	0	0.0049	Res
581848.86_4130565.39	581848.86	4130565.39	1.42E-04	7.09E-08	4.25E-08	7.09E-08	4.69E-08	1.30E-07	3.05E-06	1.07E-07	0	2.63442E-09	2.01065E-09	0	0.0046	Res
581905.43_4130565.39	581905.43	4130565.39	1.35E-04	6.77E-08	4.06E-08	6.77E-08	4.48E-08	1.24E-07	2.92E-06	1.02E-07	0	2.51669E-09	1.9208E-09	0	0.0044	Res
581962_4130565.39	581962	4130565.39	1.17E-04	5.83E-08	3.50E-08	5.83E-08	3.87E-08	1.07E-07	2.51E-06	8.81E-08	0	2.17777E-09	1.66212E-09	0	0.0038	Res

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)								Risk Calculation Part 2, $\sum R1*C_{TAC}$					
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Cobalt	Lead	Nickel	Chromium VI	3rd Trimester	0<2	2<16	16<30	Cancer Risk - 2026 (per million)	Receptor Type
582018.57_4130565.39	582018.57	4130565.39	9.52E-05	4.69E-08	2.81E-08	4.69E-08	3.14E-08	8.61E-08	2.02E-06	7.09E-08	0	1.77105E-09	1.3517E-09	0	0.0031	Res
582075.14_4130565.39	582075.14	4130565.39	7.78E-05	3.79E-08	2.27E-08	3.79E-08	2.56E-08	6.95E-08	1.63E-06	5.71E-08	0	1.44686E-09	1.10428E-09	0	0.0026	Res
582131.71_4130565.39	582131.71	4130565.39	6.42E-05	3.09E-08	1.85E-08	3.09E-08	2.11E-08	5.66E-08	1.33E-06	4.65E-08	0	1.19463E-09	9.11772E-10	0	0.0021	Res
582188.28_4130565.39	582188.28	4130565.39	5.21E-05	2.46E-08	1.48E-08	2.46E-08	1.71E-08	4.50E-08	1.06E-06	3.70E-08	0	9.68897E-10	7.39485E-10	0	0.0017	Res
582244.85_4130565.39	582244.85	4130565.39	4.28E-05	1.98E-08	1.19E-08	1.98E-08	1.40E-08	3.62E-08	8.49E-07	2.97E-08	0	7.95451E-10	6.07108E-10	0	0.0014	Res
582301.42_4130565.39	582301.42	4130565.39	3.63E-05	1.65E-08	9.93E-09	1.65E-08	1.18E-08	3.02E-08	7.08E-07	2.48E-08	0	6.76045E-10	5.15974E-10	0	0.0012	Res
582357.99_4130565.39	582357.99	4130565.39	3.11E-05	1.39E-08	8.33E-09	1.39E-08	1.01E-08	2.53E-08	5.93E-07	2.07E-08	0	5.7847E-10	4.41502E-10	0	0.0010	Res
582414.56_4130565.39	582414.56	4130565.39	2.70E-05	1.18E-08	7.10E-09	1.18E-08	8.73E-09	2.16E-08	5.05E-07	1.76E-08	0	5.02442E-10	3.83476E-10	0	0.0009	Res
582471.13_4130565.39	582471.13	4130565.39	2.38E-05	1.02E-08	6.13E-09	1.02E-08	7.65E-09	1.86E-08	4.35E-07	1.52E-08	0	4.42114E-10	3.37432E-10	0	0.0008	Res
582527.7_4130565.39	582527.7	4130565.39	2.11E-05	8.92E-09	5.35E-09	8.92E-09	6.78E-09	1.62E-08	3.79E-07	1.32E-08	0	3.93108E-10	3.00029E-10	0	0.0007	Res
582584.27_4130565.39	582584.27	4130565.39	1.90E-05	7.89E-09	4.73E-09	7.89E-09	6.09E-09	1.43E-08	3.35E-07	1.17E-08	0	3.53704E-10	2.69955E-10	0	0.0006	Res
582640.84_4130565.39	582640.84	4130565.39	1.72E-05	6.99E-09	4.20E-09	6.99E-09	5.47E-09	1.27E-08	2.97E-07	1.03E-08	0	3.19084E-10	2.43532E-10	0	0.0006	Res
582697.41_4130565.39	582697.41	4130565.39	1.57E-05	6.29E-09	3.77E-09	6.29E-09	4.99E-09	1.14E-08	2.66E-07	9.25E-09	0	2.91409E-10	2.2241E-10	0	0.0005	Res
582753.98_4130565.39	582753.98	4130565.39	1.44E-05	5.71E-09	3.43E-09	5.71E-09	4.58E-09	1.03E-08	2.41E-07	8.38E-09	0	2.68207E-10	2.04702E-10	0	0.0005	Res
582810.55_4130565.39	582810.55	4130565.39	1.34E-05	5.23E-09	3.14E-09	5.23E-09	4.24E-09	9.46E-09	2.21E-07	7.67E-09	0	2.48884E-10	1.89954E-10	0	0.0004	Res
582867.12_4130565.39	582867.12	4130565.39	1.25E-05	4.83E-09	2.90E-09	4.83E-09	3.95E-09	8.73E-09	2.04E-07	7.07E-09	0	2.32377E-10	1.77356E-10	0	0.0004	Res
581735.72_4130649.3	581735.72	4130649.3	1.63E-04	8.22E-08	4.93E-08	8.22E-08	5.40E-08	1.51E-07	3.54E-06	1.24E-07	0	3.02943E-09	2.31214E-09	0	0.0053	Res
581792.29_4130649.3	581792.29	4130649.3	1.58E-04	7.95E-08	4.77E-08	7.95E-08	5.23E-08	1.46E-07	3.43E-06	1.20E-07	0	2.93118E-09	2.23715E-09	0	0.0052	Res
581905.43_4130649.3	581905.43	4130649.3	1.57E-04	7.97E-08	4.78E-08	7.97E-08	5.22E-08	1.46E-07	3.43E-06	1.21E-07	0	2.9262E-09	2.23334E-09	0	0.0052	Res
581962_4130649.3	581962	4130649.3	1.31E-04	6.59E-08	3.96E-08	6.59E-08	4.34E-08	1.21E-07	2.84E-06	9.98E-08	0	2.43478E-09	1.85828E-09	0	0.0043	Res
582018.57_4130649.3	582018.57	4130649.3	9.99E-05	4.98E-08	2.99E-08	4.98E-08	3.30E-08	9.14E-08	2.15E-06	7.53E-08	0	1.85794E-09	1.41802E-09	0	0.0033	Res
582075.14_4130649.3	582075.14	4130649.3	7.80E-05	3.84E-08	2.31E-08	3.84E-08	2.57E-08	7.05E-08	1.65E-06	5.80E-08	0	1.45094E-09	1.1074E-09	0	0.0026	Res
582131.71_4130649.3	582131.71	4130649.3	6.10E-05	2.96E-08	1.78E-08	2.96E-08	2.01E-08	5.43E-08	1.27E-06	4.47E-08	0	1.13571E-09	8.66804E-10	0	0.0020	Res
582188.28_4130649.3	582188.28	4130649.3	4.85E-05	2.31E-08	1.39E-08	2.31E-08	1.59E-08	4.23E-08	9.91E-07	3.47E-08	0	9.0164E-10	6.88154E-10	0	0.0016	Res
582244.85_4130649.3	582244.85	4130649.3	3.94E-05	1.84E-08	1.10E-08	1.84E-08	1.29E-08	3.36E-08	7.88E-07	2.76E-08	0	7.3262E-10	5.59153E-10	0	0.0013	Res
582301.42_4130649.3	582301.42	4130649.3	3.29E-05	1.50E-08	9.01E-09	1.50E-08	1.07E-08	2.74E-08	6.43E-07	2.25E-08	0	6.11573E-10	4.66767E-10	0	0.0011	Res
582357.99_4130649.3	582357.99	4130649.3	2.81E-05	1.26E-08	7.55E-09	1.26E-08	9.12E-09	2.29E-08	5.37E-07	1.88E-08	0	5.23145E-10	3.99277E-10	0	0.0009	Res
582414.56_4130649.3	582414.56	4130649.3	2.46E-05	1.08E-08	6.45E-09	1.08E-08	7.93E-09	1.96E-08	4.59E-07	1.60E-08	0	4.56733E-10	3.4859E-10	0	0.0008	Res
582471.13_4130649.3	582471.13	4130649.3	2.16E-05	9.28E-09	5.57E-09	9.28E-09	6.97E-09	1.69E-08	3.95E-07	1.38E-08	0	4.02735E-10	3.07377E-10	0	0.0007	Res
582527.7_4130649.3	582527.7	4130649.3	1.94E-05	8.13E-09	4.88E-09	8.13E-09	6.21E-09	1.48E-08	3.46E-07	1.20E-08	0	3.60152E-10	2.74877E-10	0	0.0006	Res
582584.27_4130649.3	582584.27	4130649.3	1.75E-05	7.23E-09	4.34E-09	7.23E-09	5.61E-09	1.31E-08	3.07E-07	1.07E-08	0	3.26325E-10	2.49059E-10	0	0.0006	Res
582640.84_4130649.3	582640.84	4130649.3	1.61E-05	6.52E-09	3.91E-09	6.52E-09	5.13E-09	1.18E-08	2.76E-07	9.60E-09	0	2.99065E-10	2.28254E-10	0	0.0005	Res
582697.41_4130649.3	582697.41	4130649.3	1.49E-05	5.94E-09	3.56E-09	5.94E-09	4.73E-09	1.07E-08	2.51E-07	8.72E-09	0	2.76433E-10	2.10981E-10	0	0.0005	Res
582753.98_4130649.3	582753.98	4130649.3	1.39E-05	5.47E-09	3.28E-09	5.47E-09	4.40E-09	9.90E-09	2.31E-07	8.02E-09	0	2.57961E-10	1.96882E-10	0	0.0005	Res
582810.55_4130649.3	582810.55	4130649.3	1.30E-05	5.09E-09	3.05E-09	5.09E-09	4.13E-09	9.20E-09	2.15E-07	7.45E-09	0	2.42585E-10	1.85147E-10	0	0.0004	Res
582867.12_4130649.3	582867.12	4130649.3	1.23E-05	4.75E-09	2.85E-09	4.75E-09	3.89E-09	8.59E-09	2.01E-07	6.95E-09	0	2.28772E-10	1.74604E-10	0	0.0004	Res
581848.86_4130733.21	581848.86	4130733.21	2.32E-04	1.19E-07	7.14E-08	1.19E-07	7.73E-08	2.19E-07	5.14E-06	1.81E-07	0	4.32384E-09	3.30006E-09	0	0.0076	Res
581905.43_4130733.21	581905.43	4130733.21	1.99E-04	1.01E-07	6.09E-08	1.01E-07	6.60E-08	1.87E-07	4.38E-06	1.54E-07	0	3.69314E-09	2.8187E-09	0	0.0065	Res
581962_4130733.21	581962	4130733.21	1.46E-04	7.43E-08	4.46E-08	7.43E-08	4.86E-08	1.37E-07	3.21E-06	1.13E-07	0	2.72163E-09	2.07721E-09	0	0.0048	Res
582018.57_4130733.21	582018.57	4130733.21	1.03E-04	5.18E-08	3.11E-08	5.18E-08	3.42E-08	9.52E-08	2.23E-06	7.84E-08	0	1.91709E-09	1.46317E-09	0	0.0034	Res
582075.14_4130733.21	582075.14	4130733.21	7.33E-05	3.63E-08	2.18E-08	3.63E-08	2.42E-08	6.66E-08	1.56E-06	5.49E-08	0	1.36295E-09	1.04024E-09	0	0.0024	Res
582131.71_4130733.21	582131.71	4130733.21	5.40E-05	2.63E-08	1.58E-08	2.63E-08	1.78E-08	4.82E-08	1.13E-06	3.97E-08	0	1.00409E-09	7.66348E-10	0	0.0018	Res
582188.28_4130733.21	582188.28	4130733.21	4.22E-05	2.01E-08	1.21E-08	2.01E-08	1.38E-08	3.69E-08	8.65E-07	3.03E-08	0	7.84379E-10	5.98657E-10	0	0.0014	Res
582244.85_4130733.21	582244.85	4130733.21	3.42E-05	1.60E-08	9.61E-09	1.60E-08	1.12E-08	2.93E-08	6.86E-07	2.40E-08	0	6.36129E-10	4.85509E-10	0	0.0011	Res
582301.42_4130733.21	582301.42	4130733.21	2.87E-05	1.32E-08	7.89E-09	1.32E-08	9.34E-09	2.40E-08	5.63E-07	1.97E-08	0	5.33761E-10	4.07379E-10	0	0.0009	Res
582357.99_4130733.21	582357.99	4130733.21	2.47E-05	1.11E-08	6.66E-09	1.11E-08	8.03E-09	2.03E-08	4.75E-07	1.66E-08	0	4.60197E-10	3.51234E-10	0	0.0008	Res
582414.56_4130733.21	582414.56	4130733.21	2.18E-05	9.59E-09	5.75E-09	9.59E-09	7.05E-09	1.75E-08	4.09E-07	1.43E-08	0	4.05648E-10	3.09601E-10	0	0.0007	Res
582471.13_4130733.21	582471.13	4130733.21	1.96E-05	8.46E-09	5.08E-09	8.46E-09	6.32E-09	1.54E-08	3.60E-07	1.26E-08	0	3.64734E-10	2.78374E-10	0	0.0006	Res
582527.7_4130733.21	582527.7	4130733.21	1.79E-05	7.59E-09	4.55E-09	7.59E-09	5.75E-09	1.38E-08	3.23E-07	1.12E-08	0	3.32983E-10	2.54141E-10	0	0.0006	Res
582584.27_4130733.21	582584.27	4130733.21	1.65E-05	6.90E-09	4.14E-09	6.90E-09	5.30E-09	1.25E-08	2.93E-07	1.02E-08	0	3.07798E-10	2.34919E-10	0	0.0005	Res
582640.84_4130733.21	582640.84	4130733.21	1.54E-05	6.35E-09	3.81E-09	6.35E-09	4.93E-09	1.15E-08	2.69E-07	9.37E-09	0	2.87085E-10	2.1911E-10	0	0.0005	Res
582697.41_4130733.21	582697.41	4130733.21	1.45E-05	5.88E-09	3.53E-09	5.88E-09	4.62E-09	1.07E-08	2.49E-07	8.66E-09	0	2.69561E-10	2.05735E-10	0	0.0005	Res
582753.98_4130733.21	582753.98	4130733.21	1.37E-05	5.48E-09	3.29E-09	5.48E-09	4.35E-09	9.92E-09	2.32E-07	8.06E-09	0	2.54194E-10	1.94007E-10	0	0.0004	Res
582810.55_4130733.21	582810.55	4130733.21	1.30E-05	5.15E-09	3.09E-09	5.15E-09	4.12E-09	9.32E-09	2.18E-07	7.56E-09	0	2.4136E-10	1.84212E-10	0	0.0004	Res
582867.12_4130733.21	582867.12	4130733.21	1.23E-05	4.84E-09	2.90E-09	4.84E-09	3.91E-09	8.75E-09	2.04E-07	7.09E-09	0	2.29119E-10	1.74869E-10	0	0.0004	Res
581735.72_4130817.12	581735.72	4130817.12	3.41E-04	1.76E-07	1.05E-07	1.76E-07	1.13E-07	3.23E-07	7.58E-06	2.66E-07	0	6.34187E-09	4.84027E-09	0	0.0112	Res
581792.29_4130817.12	581792.29	4130817.12	3.84E-04	1.98E-07	1.19E-07	1.98E-07	1.28E-07	3.65E-07	8.56E-06	3.01E-07	0	7.14769E-09	5.45529E-09	0	0.0126	Res

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)							
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Cobalt	Lead	Nickel	Chromium VI
581848.86_4130817.12	581848.86	4130817.12	3.45E-04	1.78E-07	1.07E-07	1.78E-07	1.15E-07	3.27E-07	7.68E-06	2.70E-07
581905.43_4130817.12	581905.43	4130817.12	2.61E-04	1.34E-07	8.05E-08	1.34E-07	8.69E-08	2.47E-07	5.79E-06	2.04E-07
581962_4130817.12	581962	4130817.12	1.59E-04	8.10E-08	4.86E-08	8.10E-08	5.28E-08	1.49E-07	3.50E-06	1.23E-07
582018.57_4130817.12	582018.57	4130817.12	9.56E-05	4.82E-08	2.89E-08	4.82E-08	3.17E-08	8.85E-08	2.08E-06	7.29E-08
582075.14_4130817.12	582075.14	4130817.12	6.24E-05	3.09E-08	1.85E-08	3.09E-08	2.06E-08	5.67E-08	1.33E-06	4.67E-08
582131.71_4130817.12	582131.71	4130817.12	4.53E-05	2.20E-08	1.32E-08	2.20E-08	1.49E-08	4.04E-08	9.47E-07	3.32E-08
582188.28_4130817.12	582188.28	4130817.12	3.55E-05	1.69E-08	1.02E-08	1.69E-08	1.16E-08	3.10E-08	7.27E-07	2.55E-08
582244.85_4130817.12	582244.85	4130817.12	2.93E-05	1.37E-08	8.23E-09	1.37E-08	9.58E-09	2.51E-08	5.88E-07	2.06E-08
582301.42_4130817.12	582301.42	4130817.12	2.52E-05	1.16E-08	6.97E-09	1.16E-08	8.21E-09	2.12E-08	4.97E-07	1.74E-08
582357.99_4130817.12	582357.99	4130817.12	2.23E-05	1.01E-08	6.07E-09	1.01E-08	7.25E-09	1.85E-08	4.33E-07	1.51E-08
582414.56_4130817.12	582414.56	4130817.12	2.01E-05	8.99E-09	5.40E-09	8.99E-09	6.53E-09	1.64E-08	3.84E-07	1.34E-08
582471.13_4130817.12	582471.13	4130817.12	1.85E-05	8.13E-09	4.88E-09	8.13E-09	5.97E-09	1.48E-08	3.47E-07	1.21E-08
582527.7_4130817.12	582527.7	4130817.12	1.71E-05	7.41E-09	4.45E-09	7.41E-09	5.51E-09	1.35E-08	3.16E-07	1.10E-08
582584.27_4130817.12	582584.27	4130817.12	1.59E-05	6.82E-09	4.09E-09	6.82E-09	5.13E-09	1.24E-08	2.90E-07	1.01E-08
582640.84_4130817.12	582640.84	4130817.12	1.50E-05	6.32E-09	3.79E-09	6.32E-09	4.81E-09	1.15E-08	2.69E-07	9.36E-09
582697.41_4130817.12	582697.41	4130817.12	1.41E-05	5.88E-09	3.53E-09	5.88E-09	4.52E-09	1.07E-08	2.50E-07	8.69E-09
582753.98_4130817.12	582753.98	4130817.12	1.33E-05	5.48E-09	3.29E-09	5.48E-09	4.26E-09	9.94E-09	2.33E-07	8.09E-09
582810.55_4130817.12	582810.55	4130817.12	1.26E-05	5.13E-09	3.08E-09	5.13E-09	4.03E-09	9.30E-09	2.17E-07	7.56E-09
582867.12_4130817.12	582867.12	4130817.12	1.20E-05	4.82E-09	2.89E-09	4.82E-09	3.83E-09	8.73E-09	2.04E-07	7.09E-09
581735.72_4130901.03	581735.72	4130901.03	6.75E-04	3.50E-07	2.10E-07	3.50E-07	2.25E-07	6.44E-07	1.51E-05	5.32E-07
581792.29_4130901.03	581792.29	4130901.03	7.21E-04	3.74E-07	2.24E-07	3.74E-07	2.40E-07	6.88E-07	1.62E-05	5.68E-07
581848.86_4130901.03	581848.86	4130901.03	6.43E-04	3.33E-07	2.00E-07	3.33E-07	2.14E-07	6.13E-07	1.44E-05	5.06E-07
581905.43_4130901.03	581905.43	4130901.03	3.38E-04	1.75E-07	1.05E-07	1.75E-07	1.13E-07	3.21E-07	7.54E-06	2.65E-07
581962_4130901.03	581962	4130901.03	1.38E-04	7.03E-08	4.22E-08	7.03E-08	4.59E-08	1.29E-07	3.03E-06	1.07E-07
582018.57_4130901.03	582018.57	4130901.03	7.46E-05	3.73E-08	2.24E-08	3.73E-08	2.47E-08	6.85E-08	1.61E-06	5.65E-08
582075.14_4130901.03	582075.14	4130901.03	5.05E-05	2.48E-08	1.49E-08	2.48E-08	1.66E-08	4.54E-08	1.07E-06	3.74E-08
582131.71_4130901.03	582131.71	4130901.03	3.89E-05	1.88E-08	1.13E-08	1.88E-08	1.28E-08	3.44E-08	8.08E-07	2.83E-08
582188.28_4130901.03	582188.28	4130901.03	3.20E-05	1.53E-08	9.17E-09	1.53E-08	1.05E-08	2.80E-08	6.56E-07	2.30E-08
582244.85_4130901.03	582244.85	4130901.03	2.74E-05	1.29E-08	7.74E-09	1.29E-08	8.95E-09	2.36E-08	5.53E-07	1.94E-08
582301.42_4130901.03	582301.42	4130901.03	2.39E-05	1.11E-08	6.68E-09	1.11E-08	7.81E-09	2.04E-08	4.77E-07	1.67E-08
582357.99_4130901.03	582357.99	4130901.03	2.13E-05	9.79E-09	5.88E-09	9.79E-09	6.94E-09	1.79E-08	4.19E-07	1.47E-08
582414.56_4130901.03	582414.56	4130901.03	1.92E-05	8.72E-09	5.23E-09	8.72E-09	6.24E-09	1.59E-08	3.73E-07	1.30E-08
582471.13_4130901.03	582471.13	4130901.03	1.75E-05	7.86E-09	4.72E-09	7.86E-09	5.69E-09	1.43E-08	3.36E-07	1.17E-08
582527.7_4130901.03	582527.7	4130901.03	1.61E-05	7.14E-09	4.28E-09	7.14E-09	5.22E-09	1.30E-08	3.05E-07	1.06E-08
582584.27_4130901.03	582584.27	4130901.03	1.50E-05	6.56E-09	3.93E-09	6.56E-09	4.85E-09	1.19E-08	2.80E-07	9.76E-09
582640.84_4130901.03	582640.84	4130901.03	1.41E-05	6.06E-09	3.64E-09	6.06E-09	4.53E-09	1.10E-08	2.58E-07	9.01E-09
582697.41_4130901.03	582697.41	4130901.03	1.33E-05	5.64E-09	3.38E-09	5.64E-09	4.26E-09	1.03E-08	2.40E-07	8.36E-09
582753.98_4130901.03	582753.98	4130901.03	1.25E-05	5.27E-09	3.16E-09	5.27E-09	4.02E-09	9.57E-09	2.24E-07	7.79E-09
582810.55_4130901.03	582810.55	4130901.03	1.19E-05	4.93E-09	2.96E-09	4.93E-09	3.81E-09	8.94E-09	2.09E-07	7.28E-09
582867.12_4130901.03	582867.12	4130901.03	1.13E-05	4.64E-09	2.78E-09	4.64E-09	3.62E-09	8.41E-09	1.97E-07	6.84E-09
581735.72_4130984.94	581735.72	4130984.94	1.80E-03	9.35E-07	5.61E-07	9.35E-07	5.99E-07	1.72E-06	4.04E-05	1.42E-06
581792.29_4130984.94	581792.29	4130984.94	2.36E-03	1.23E-06	7.37E-07	1.23E-06	7.87E-07	2.26E-06	5.30E-05	1.87E-06
581848.86_4130984.94	581848.86	4130984.94	2.74E-03	1.43E-06	8.57E-07	1.43E-06	9.15E-07	2.63E-06	6.17E-05	2.17E-06
581905.43_4130984.94	581905.43	4130984.94	2.20E-04	1.13E-07	6.77E-08	1.13E-07	7.31E-08	2.08E-07	4.87E-06	1.71E-07
581962_4130984.94	581962	4130984.94	9.51E-05	4.80E-08	2.88E-08	4.80E-08	3.15E-08	8.81E-08	2.07E-06	7.26E-08
582018.57_4130984.94	582018.57	4130984.94	6.16E-05	3.06E-08	1.84E-08	3.06E-08	2.04E-08	5.61E-08	1.32E-06	4.62E-08
582075.14_4130984.94	582075.14	4130984.94	4.57E-05	2.23E-08	1.34E-08	2.23E-08	1.51E-08	4.10E-08	9.61E-07	3.37E-08
582131.71_4130984.94	582131.71	4130984.94	3.63E-05	1.75E-08	1.05E-08	1.75E-08	1.19E-08	3.21E-08	7.52E-07	2.64E-08
582188.28_4130984.94	582188.28	4130984.94	3.00E-05	1.43E-08	8.58E-09	1.43E-08	9.84E-09	2.62E-08	6.14E-07	2.15E-08
582244.85_4130984.94	582244.85	4130984.94	2.55E-05	1.20E-08	7.22E-09	1.20E-08	8.36E-09	2.20E-08	5.16E-07	1.81E-08
582301.42_4130984.94	582301.42	4130984.94	2.22E-05	1.03E-08	6.21E-09	1.03E-08	7.26E-09	1.89E-08	4.44E-07	1.55E-08
582357.99_4130984.94	582357.99	4130984.94	1.97E-05	9.07E-09	5.44E-09	9.07E-09	6.42E-09	1.66E-08	3.88E-07	1.36E-08
582414.56_4130984.94	582414.56	4130984.94	1.77E-05	8.06E-09	4.84E-09	8.06E-09	5.75E-09	1.47E-08	3.45E-07	1.21E-08
582471.13_4130984.94	582471.13	4130984.94	1.61E-05	7.25E-09	4.35E-09	7.25E-09	5.22E-09	1.32E-08	3.10E-07	1.08E-08
582527.7_4130984.94	582527.7	4130984.94	1.47E-05	6.58E-09	3.95E-09	6.58E-09	4.78E-09	1.20E-08	2.81E-07	9.82E-09
582584.27_4130984.94	582584.27	4130984.94	1.37E-05	6.04E-09	3.62E-09	6.04E-09	4.43E-09	1.10E-08	2.58E-07	9.00E-09
582640.84_4130984.94	582640.84	4130984.94	1.28E-05	5.60E-09	3.36E-09	5.60E-09	4.15E-09	1.02E-08	2.39E-07	8.34E-09

Risk Calculation Part 2, $\sum R1*C_{TAC}$

3rd Trimester	0<2	2<16	16<30	Cancer Risk - 2026 (per million)	Receptor Type
0	6.41297E-09	4.89453E-09	0	0.0113	Res
0	4.85462E-09	3.70516E-09	0	0.0086	Res
0	2.95433E-09	2.25482E-09	0	0.0052	Res
0	1.77943E-09	1.3581E-09	0	0.0031	Res
0	1.16064E-09	8.85825E-10	0	0.0020	Res
0	8.42803E-10	6.43247E-10	0	0.0015	Res
0	6.59769E-10	5.03551E-10	0	0.0012	Res
0	5.44729E-10	4.15751E-10	0	0.0010	Res
0	4.68693E-10	3.57718E-10	0	0.0008	Res
0	4.15052E-10	3.16777E-10	0	0.0007	Res
0	3.74579E-10	2.85887E-10	0	0.0007	Res
0	3.4374E-10	2.6235E-10	0	0.0006	Res
0	3.17779E-10	2.42537E-10	0	0.0006	Res
0	2.96636E-10	2.264E-10	0	0.0005	Res
0	2.78557E-10	2.12602E-10	0	0.0005	Res
0	2.62667E-10	2.00474E-10	0	0.0005	Res
0	2.47996E-10	1.89276E-10	0	0.0004	Res
0	2.35168E-10	1.79486E-10	0	0.0004	Res
0	2.23717E-10	1.70746E-10	0	0.0004	Res
0	1.25644E-08	9.58948E-09	0	0.0222	Res
0	1.34117E-08	1.02361E-08	0	0.0236	Res
0	1.19544E-08	9.12388E-09	0	0.0211	Res
0	6.2896E-09	4.80038E-09	0	0.0111	Res
0	2.56792E-09	1.9599E-09	0	0.0045	Res
0	1.38849E-09	1.05973E-09	0	0.0024	Res
0	9.38569E-10	7.16339E-10	0	0.0017	Res
0	7.22904E-10	5.51737E-10	0	0.0013	Res
0	5.955E-10	4.545E-10	0	0.0010	Res
0	5.08914E-10	3.88415E-10	0	0.0009	Res
0	4.44912E-10	3.39567E-10	0	0.0008	Res
0	3.96206E-10	3.02394E-10	0	0.0007	Res
0	3.57199E-10	2.72623E-10	0	0.0006	Res
0	3.26107E-10	2.48893E-10	0	0.0006	Res
0	3.00209E-10	2.29127E-10	0	0.0005	Res
0	2.79254E-10	2.13133E-10	0	0.0005	Res
0	2.61709E-10	1.99742E-10	0	0.0005	Res
0	2.46572E-10	1.8819E-10	0	0.0004	Res
0	2.33312E-10	1.78069E-10	0	0.0004	Res
0	2.21271E-10	1.6888E-10	0	0.0004	Res
0	2.10888E-10	1.60955E-10	0	0.0004	Res
0	3.3425E-08	2.55107E-08	0	0.0589	Res
0	4.38677E-08	3.34809E-08	0	0.0773	Res
0	5.10268E-08	3.89449E-08	0	0.0900	Res
0	4.08839E-09	3.12036E-09	0	0.0072	Res
0	1.76933E-09	1.3504E-09	0	0.0031	Res
0	1.14674E-09	8.75221E-10	0	0.0020	Res
0	8.4982E-10	6.48603E-10	0	0.0015	Res
0	6.74841E-10	5.15055E-10	0	0.0012	Res
0	5.58066E-10	4.2593E-10	0	0.0010	Res
0	4.74978E-10	3.62515E-10	0	0.0008	Res
0	4.13315E-10	3.15452E-10	0	0.0007	Res
0	3.66199E-10	2.79492E-10	0	0.0006	Res
0	3.28999E-10	2.511E-10	0	0.0006	Res
0	2.99027E-10	2.28225E-10	0	0.0005	Res
0	2.74406E-10	2.09434E-10	0	0.0005	Res
0	2.54729E-10	1.94416E-10	0	0.0004	Res
0	2.38902E-10	1.82335E-10	0	0.0004	Res

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)								Risk Calculation Part 2, $\sum R1*C_{TAC}$					
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Cobalt	Lead	Nickel	Chromium VI	3rd Trimester	0<2	2<16	16<30	Cancer Risk - 2026 (per million)	Receptor Type
582697.41_4130984.94	582697.41	4130984.94	1.21E-05	5.21E-09	3.12E-09	5.21E-09	3.89E-09	9.48E-09	2.22E-07	7.74E-09	0	2.24702E-10	1.71498E-10	0	0.0004	Res
582753.98_4130984.94	582753.98	4130984.94	1.15E-05	4.89E-09	2.93E-09	4.89E-09	3.69E-09	8.88E-09	2.08E-07	7.25E-09	0	2.13224E-10	1.62738E-10	0	0.0004	Res
582810.55_4130984.94	582810.55	4130984.94	1.09E-05	4.59E-09	2.76E-09	4.59E-09	3.50E-09	8.34E-09	1.95E-07	6.80E-09	0	2.0281E-10	1.5479E-10	0	0.0004	Res
582867.12_4130984.94	582867.12	4130984.94	1.04E-05	4.33E-09	2.60E-09	4.33E-09	3.33E-09	7.86E-09	1.84E-07	6.40E-09	0	1.93554E-10	1.47725E-10	0	0.0003	Res
581735.72_4131068.85	581735.72	4131068.85	2.95E-04	1.52E-07	9.12E-08	1.52E-07	9.82E-08	2.79E-07	6.56E-06	2.31E-07	0	5.48949E-09	4.18971E-09	0	0.0097	Res
581792.29_4131068.85	581792.29	4131068.85	2.36E-04	1.21E-07	7.26E-08	1.21E-07	7.84E-08	2.23E-07	5.22E-06	1.84E-07	0	4.38336E-09	3.34548E-09	0	0.0077	Res
581848.86_4131068.85	581848.86	4131068.85	1.28E-04	6.48E-08	3.89E-08	6.48E-08	4.23E-08	1.19E-07	2.79E-06	9.81E-08	0	2.37207E-09	1.81042E-09	0	0.0042	Res
581905.43_4131068.85	581905.43	4131068.85	8.17E-05	4.09E-08	2.46E-08	4.09E-08	2.71E-08	7.52E-08	1.76E-06	6.20E-08	0	1.51977E-09	1.15992E-09	0	0.0027	Res
581962_4131068.85	581962	4131068.85	5.95E-05	2.94E-08	1.77E-08	2.94E-08	1.97E-08	5.40E-08	1.27E-06	4.45E-08	0	1.10669E-09	8.44652E-10	0	0.0020	Res
582018.57_4131068.85	582018.57	4131068.85	4.53E-05	2.21E-08	1.33E-08	2.21E-08	1.49E-08	4.06E-08	9.52E-07	3.34E-08	0	8.43296E-10	6.43624E-10	0	0.0015	Res
582075.14_4131068.85	582075.14	4131068.85	3.61E-05	1.74E-08	1.04E-08	1.74E-08	1.19E-08	3.19E-08	7.48E-07	2.62E-08	0	6.72101E-10	5.12964E-10	0	0.0012	Res
582131.71_4131068.85	582131.71	4131068.85	2.99E-05	1.42E-08	8.53E-09	1.42E-08	9.80E-09	2.60E-08	6.10E-07	2.14E-08	0	5.56202E-10	4.24507E-10	0	0.0010	Res
582188.28_4131068.85	582188.28	4131068.85	2.53E-05	1.19E-08	7.14E-09	1.19E-08	8.29E-09	2.18E-08	5.11E-07	1.79E-08	0	4.71516E-10	3.59872E-10	0	0.0008	Res
582244.85_4131068.85	582244.85	4131068.85	2.20E-05	1.02E-08	6.12E-09	1.02E-08	7.17E-09	1.87E-08	4.37E-07	1.53E-08	0	4.08724E-10	3.11948E-10	0	0.0007	Res
582301.42_4131068.85	582301.42	4131068.85	1.93E-05	8.90E-09	5.34E-09	8.90E-09	6.31E-09	1.63E-08	3.81E-07	1.33E-08	0	3.59975E-10	2.74742E-10	0	0.0006	Res
582357.99_4131068.85	582357.99	4131068.85	1.73E-05	7.86E-09	4.72E-09	7.86E-09	5.62E-09	1.44E-08	3.36E-07	1.18E-08	0	3.21237E-10	2.45176E-10	0	0.0006	Res
582414.56_4131068.85	582414.56	4131068.85	1.56E-05	7.04E-09	4.22E-09	7.04E-09	5.07E-09	1.29E-08	3.01E-07	1.05E-08	0	2.9035E-10	2.21602E-10	0	0.0005	Res
582471.13_4131068.85	582471.13	4131068.85	1.42E-05	6.37E-09	3.82E-09	6.37E-09	4.62E-09	1.16E-08	2.72E-07	9.51E-09	0	2.64939E-10	2.02208E-10	0	0.0005	Res
582527.7_4131068.85	582527.7	4131068.85	1.31E-05	5.81E-09	3.49E-09	5.81E-09	4.24E-09	1.06E-08	2.48E-07	8.66E-09	0	2.43753E-10	1.86038E-10	0	0.0004	Res
582584.27_4131068.85	582584.27	4131068.85	1.21E-05	5.33E-09	3.20E-09	5.33E-09	3.92E-09	9.71E-09	2.27E-07	7.93E-09	0	2.25571E-10	1.72161E-10	0	0.0004	Res
582640.84_4131068.85	582640.84	4131068.85	1.14E-05	4.98E-09	2.99E-09	4.98E-09	3.68E-09	9.06E-09	2.12E-07	7.40E-09	0	2.12334E-10	1.62058E-10	0	0.0004	Res
582697.41_4131068.85	582697.41	4131068.85	1.08E-05	4.66E-09	2.79E-09	4.66E-09	3.47E-09	8.48E-09	1.98E-07	6.92E-09	0	2.00413E-10	1.5296E-10	0	0.0004	Res
582753.98_4131068.85	582753.98	4131068.85	1.03E-05	4.40E-09	2.64E-09	4.40E-09	3.30E-09	8.00E-09	1.87E-07	6.53E-09	0	1.90933E-10	1.45725E-10	0	0.0003	Res
582810.55_4131068.85	582810.55	4131068.85	9.82E-06	4.17E-09	2.50E-09	4.17E-09	3.15E-09	7.58E-09	1.77E-07	6.18E-09	0	1.82613E-10	1.39374E-10	0	0.0003	Res
582867.12_4131068.85	582867.12	4131068.85	9.35E-06	3.93E-09	2.36E-09	3.93E-09	3.00E-09	7.14E-09	1.67E-07	5.82E-09	0	1.73885E-10	1.32713E-10	0	0.0003	Res
582018.57_4131152.76	582018.57	4131152.76	3.07E-05	1.45E-08	8.72E-09	1.45E-08	1.01E-08	2.66E-08	6.24E-07	2.19E-08	0	5.7081E-10	4.35656E-10	0	0.0010	Res
582244.85_4131152.76	582244.85	4131152.76	1.87E-05	8.51E-09	5.11E-09	8.51E-09	6.08E-09	1.55E-08	3.64E-07	1.27E-08	0	3.47604E-10	2.653E-10	0	0.0006	Res
582301.42_4131152.76	582301.42	4131152.76	1.68E-05	7.61E-09	4.57E-09	7.61E-09	5.47E-09	1.39E-08	3.25E-07	1.14E-08	0	3.134E-10	2.39194E-10	0	0.0006	Res
582357.99_4131152.76	582357.99	4131152.76	1.52E-05	6.82E-09	4.09E-09	6.82E-09	4.94E-09	1.24E-08	2.91E-07	1.02E-08	0	2.83293E-10	2.16216E-10	0	0.0005	Res
582414.56_4131152.76	582414.56	4131152.76	1.39E-05	6.16E-09	3.70E-09	6.16E-09	4.50E-09	1.12E-08	2.63E-07	9.19E-09	0	2.58254E-10	1.97106E-10	0	0.0005	Res
582471.13_4131152.76	582471.13	4131152.76	1.26E-05	5.55E-09	3.33E-09	5.55E-09	4.08E-09	1.01E-08	2.37E-07	8.27E-09	0	2.34685E-10	1.79117E-10	0	0.0004	Res
582527.7_4131152.76	582527.7	4131152.76	1.16E-05	5.07E-09	3.04E-09	5.07E-09	3.75E-09	9.23E-09	2.16E-07	7.54E-09	0	2.15872E-10	1.64759E-10	0	0.0004	Res
582584.27_4131152.76	582584.27	4131152.76	1.07E-05	4.65E-09	2.79E-09	4.65E-09	3.46E-09	8.47E-09	1.98E-07	6.92E-09	0	1.9975E-10	1.52454E-10	0	0.0004	Res
582640.84_4131152.76	582640.84	4131152.76	1.00E-05	4.32E-09	2.59E-09	4.32E-09	3.23E-09	7.86E-09	1.84E-07	6.42E-09	0	1.86821E-10	1.42586E-10	0	0.0003	Res
582697.41_4131152.76	582697.41	4131152.76	9.45E-06	4.04E-09	2.43E-09	4.04E-09	3.04E-09	7.35E-09	1.72E-07	6.00E-09	0	1.75864E-10	1.34224E-10	0	0.0003	Res
582753.98_4131152.76	582753.98	4131152.76	9.02E-06	3.84E-09	2.30E-09	3.84E-09	2.90E-09	6.97E-09	1.63E-07	5.69E-09	0	1.67788E-10	1.2806E-10	0	0.0003	Res
582810.55_4131152.76	582810.55	4131152.76	8.62E-06	3.64E-09	2.19E-09	3.64E-09	2.77E-09	6.62E-09	1.55E-07	5.40E-09	0	1.60432E-10	1.22446E-10	0	0.0003	Res
582867.12_4131152.76	582867.12	4131152.76	8.20E-06	3.44E-09	2.06E-09	3.44E-09	2.63E-09	6.25E-09	1.46E-07	5.09E-09	0	1.52639E-10	1.16498E-10	0	0.0003	Res

HRA Permanente Creek Restoration Project

Construction Year 2027

Emissions Inputs

Construction Activity	Construction Year & Source	DPM Exhaust (tons/year)	PM10 Dust for speciation (tons/year)	Arsenic (tons/year)	Beryllium (tons/year)	Cadmium (tons/year)	Cobalt (tons/year)	Copper (tons/year)	Lead (tons/year)	Mercury (tons/year)	Nickel (tons/year)	Selenium (tons/year)	Chromium VI (tons/year)	Crystalline Silica (tons/year)
Concrete Channel 2024	2024_CONCRTE	0.000	0.00	2.91E-12	1.74E-12	2.91E-12	1.49E-11	3.26E-11	2.91E-12	4.65E-13	5.35E-11	5.81E-12	2.33E-13	8.63E-09
Paved road	2024_PAVED	2.07E-04	0.08	1.04E-07	6.26E-08	1.04E-07	6.68E-08	2.09E-06	1.92E-07	1.17E-08	4.51E-06	2.09E-07	1.59E-07	5.93E-04
Unpaved road	2024_CCP_UNPV	6.27E-05	0.20	2.56E-07	1.54E-07	2.56E-07	1.64E-07	5.12E-06	4.71E-07	2.87E-08	1.11E-05	5.12E-07	3.89E-07	1.46E-03
Channel Widening 2024	2024_CHAN_RCK	0.002	0.16	2.05E-07	1.23E-07	2.05E-07	1.05E-06	2.29E-06	2.05E-07	3.28E-08	3.77E-06	4.09E-07	1.64E-08	6.08E-04
Paved road	2024_PAVED	1.80E-03	2.39	2.99E-06	1.79E-06	2.99E-06	1.91E-06	5.98E-05	5.50E-06	3.35E-07	1.29E-04	5.98E-06	4.54E-06	1.70E-02
Rock Pile Area 2025	2025_CHAN_RCK	0.006	0.25	3.16E-07	1.89E-07	3.16E-07	1.62E-06	3.54E-06	3.16E-07	5.05E-08	5.81E-06	6.31E-07	2.53E-08	9.37E-04
Paved road	2025_PAVED	5.95E-03	2.44	3.05E-06	1.83E-06	3.05E-06	1.95E-06	6.10E-05	5.61E-06	3.41E-07	1.32E-04	6.10E-06	4.63E-06	1.73E-02
Rock Pile Area 2026	2026_CHAN_RCK	0.006	0.25	3.16E-07	1.89E-07	3.16E-07	1.62E-06	3.54E-06	3.16E-07	5.05E-08	5.81E-06	6.31E-07	2.53E-08	9.37E-04
Paved road	2026_PAVED	5.84E-03	2.44	3.05E-06	1.83E-06	3.05E-06	1.95E-06	6.10E-05	5.61E-06	3.41E-07	1.32E-04	6.10E-06	4.63E-06	1.73E-02
Channel Widening 2027	2027_CHAN_RCK	0.002	0.98	1.23E-06	7.36E-07	1.23E-06	6.28E-06	1.37E-05	1.23E-06	1.96E-07	2.26E-05	2.45E-06	9.82E-08	3.64E-03
Paved road	2027_PAVED	5.61E-03	2.39	2.99E-06	1.79E-06	2.99E-06	1.91E-06	5.98E-05	5.50E-06	3.35E-07	1.29E-04	5.98E-06	4.54E-06	1.70E-02
Material Removal 2028	2028_MATRMVL	0.001	0.25	3.15E-07	1.89E-07	3.15E-07	1.62E-06	3.53E-06	3.15E-07	5.05E-08	5.80E-06	6.31E-07	2.52E-08	9.37E-04
Paved road	2028_PAVED	5.57E-03	2.39	2.99E-06	1.80E-06	2.99E-06	1.92E-06	5.98E-05	5.51E-06	3.35E-07	1.29E-04	5.98E-06	4.55E-06	1.70E-02
Unpaved road	2028_UNPAVED	3.40E-03	11.84	1.48E-05	8.88E-06	1.48E-05	9.47E-06	2.96E-04	2.72E-05	1.66E-06	6.40E-04	2.96E-05	2.25E-05	8.41E-02
Material Removal 2029	2029_MATRMVL	0.001	0.25	3.15E-07	1.89E-07	3.15E-07	1.62E-06	3.53E-06	3.15E-07	5.05E-08	5.80E-06	6.31E-07	2.52E-08	9.37E-04
Paved road	2029_PAVED	5.56E-03	2.41	3.01E-06	1.81E-06	3.01E-06	1.93E-06	6.03E-05	5.55E-06	3.38E-07	1.30E-04	6.03E-06	4.58E-06	1.71E-02
Unpaved road	2029_UNPAVED	3.39E-03	11.93	1.49E-05	8.95E-06	1.49E-05	9.55E-06	2.98E-04	2.74E-05	1.67E-06	6.44E-04	2.98E-05	2.27E-05	8.47E-02

Construction Activity	Construction Year	DPM (g/s)	Arsenic (g/s)	Beryllium (g/s)	Cadmium (g/s)	Cobalt (g/s)	Copper (g/s)	Lead (g/s)	Mercury (g/s)	Nickel (g/s)	Selenium (g/s)	Chromium VI (g/s)	Crystalline Silica (g/s)
Concrete Channel 2024	2024_CONCRTE	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Paved road	2024_PAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Unpaved road	2024_CCP_UNPV	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Channel Widening 2024	2024_CHAN_RCK	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Paved road	2024_PAVED	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Rock Pile Area 2025	2025_CHAN_RCK	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Paved road	2025_PAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Rock Pile Area 2026	2026_CHAN_RCK	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Paved road	2026_PAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Channel Widening 2027	2027_CHAN_RCK	5.566E-05	3.53E-08	2.12E-08	3.53E-08	1.81E-07	3.95E-07	3.53E-08	5.65E-09	6.49E-07	7.06E-08	2.82E-09	1.05E-04
Paved road	2027_PAVED	1.614E-04	8.60E-08	5.16E-08	8.60E-08	5.50E-08	1.72E-06	1.58E-07	9.63E-09	3.71E-06	1.72E-07	1.31E-07	4.88E-04
Material Removal 2028	2028_MATRMVL	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Paved road	2028_PAVED	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Unpaved road	2028_UNPAVED	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Material Removal 2029	2029_MATRMVL	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Paved road	2029_PAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Unpaved road	2029_UNPAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

N/A = not including PM10 on-site dust in HRA calculation; it is only for speciating metals.

Exposure Duration, ED

	Exposure Start	3rd Trimester	0<2	2<16	16<30
Years	1/1/2027	0	0	1	0

Risk Factors

	Abbreviation	UOM	3rd Trimester	0<2	2<16	16<30
Daily Breathing Rate (95th %'ile)	DBR	L/kg-day	361	581	581	302
Fraction Of Time At Home [a]	FAH	unitless	0.85	0.85	0.72	0.73
Exposure Frequency	EF	days/year	0.96	0.96	0.96	0.96
Age Sensitivity Factor	ASF	unitless	10	10	3	1.7
Inhalation Absorption Factor	A	unitless	1	1	1	1
Conversion Factor	CF_1	m^3/L	0.001	0.001	0.001	0.001
Conversion Factor	CF_2	$\mu g/m^3$	0.001	0.001	0.001	0.001
Averaging Time (for residential exposure)	AT	years	70.00	70.00	70.00	70.00

[a] assume school or daycare will have cancer risk of >1 per million

Cancer Potency Factor, CPF

TAC	UOM	
DPM	$mg/kg\text{-}day^{-1}$	1.1
Arsenic	$mg/kg\text{-}day^{-1}$	12
Beryllium	$mg/kg\text{-}day^{-1}$	8.4
Cadmium	$mg/kg\text{-}day^{-1}$	15
Cobalt	$mg/kg\text{-}day^{-1}$	27
Lead	$mg/kg\text{-}day^{-1}$	0.04
Nickel	$mg/kg\text{-}day^{-1}$	0.91
Chromium VI	$mg/kg\text{-}day^{-1}$	510

Intake Factor for Inhalation, IF (m^3/kg-day)

Equation	3rd Trimester	0<2	2<16	16<30
DBR*FAH*EF*ED*ASF*A*CF/AT	0.000	0.000	0.017	0.000

Risk Calculation Part 1, R1

	TAC	3rd Trimester	0<2	2<16	16<30
IF*CPF*CF	DPM	0.00E+00	0.00E+00	1.89E-05	0.00E+00
	Arsenic	0.00E+00	0.00E+00	2.07E-04	0.00E+00
	Beryllium	0.00E+00	0.00E+00	1.45E-04	0.00E+00
	Cadmium	0.00E+00	0.00E+00	2.58E-04	0.00E+00
	Cobalt	0.00E+00	0.00E+00	4.65E-04	0.00E+00
	Lead	0.00E+00	0.00E+00	6.88E-07	0.00E+00
	Nickel	0.00E+00	0.00E+00	1.57E-05	0.00E+00
	Chromium VI	0.00E+00	0.00E+00	8.78E-03	0.00E+00

Risk Calculation Part 2, $\sum R1*C_{TAC}$

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)								3rd Trimester	0<2	2<16	16<30	Cancer Risk - 2027	Receptor Type
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Cobalt	Lead	Nickel	Chromium VI					(per million)	
581336.22_4131207.48	581336.22	4131207.48	1.86E-04	9.94E-08	5.96E-08	9.94E-08	6.70E-08	1.82E-07	4.28E-06	1.50E-07	0	0	3.5285E-09	0	0.0035	CT House
581554.22_4130688.06	581554.22	4130688.06	1.25E-04	6.68E-08	4.01E-08	6.68E-08	4.96E-08	1.22E-07	2.85E-06	9.93E-08	0	0	2.36552E-09	0	0.0024	Res
579793.36_4131503.29	579793.36	4131503.29	8.15E-06	4.54E-09	2.72E-09	4.54E-09	8.41E-09	7.31E-09	1.65E-07	5.12E-09	0	0	1.54206E-10	0	0.0002	Acute
580488.37_4131517.71	580488.37	4131517.71	1.28E-05	6.94E-09	4.17E-09	6.94E-09	7.63E-09	1.22E-08	2.82E-07	9.53E-09	0	0	2.42768E-10	0	0.0002	Acute
581678.43_4131040.03	581678.43	4131040.03	5.96E-04	3.17E-07	1.90E-07	3.17E-07	2.07E-07	5.83E-07	1.37E-05	4.81E-07	0	0	1.12741E-08	0	0.0113	Res
581635.43_4130978.54	581635.43	4130978.54	1.21E-03	6.43E-07	3.86E-07	6.43E-07	4.16E-07	1.18E-06	2.77E-05	9.76E-07	0	0	2.28423E-08	0	0.0228	Res
581830.06_4131027.55	581830.06	4131027.55	5.48E-04	2.92E-07	1.75E-07	2.92E-07	1.91E-07	5.37E-07	1.26E-05	4.43E-07	0	0	1.03839E-08	0	0.0104	Res
581727.48_4130976.54	581727.48	4130976.54	1.46E-03	7.78E-07	4.67E-07	7.78E-07	5.02E-07	1.43E-06	3.36E-05	1.18E-06	0	0	2.76567E-08	0	0.0277	Res
581789.11_4130419.65	581789.11	4130419.65	9.49E-05	5.09E-08	3.05E-08	5.09E-08	4.13E-08	9.20E-08	2.15E-06	7.45E-08	0	0	1.79688E-09	0	0.0018	Res
581700.32_4130781.89	581700.32	4130781.89	2.89E-04	1.54E-07	9.24E-08	1.54E-07	1.03E-07	2.82E-07	6.62E-06	2.32E-07	0	0	5.46631E-09	0	0.0055	Res
581426.07_4131299.01	581426.07	4131299.01	6.68E-05	3.57E-08	2.14E-08	3.57E-08	2.58E-08	6.51E-08	1.52E-06	5.33E-08	0	0	1.26416E-09	0	0.0013	Acute
582301.42_4129474.56	582301.42	4129474.56	3.05E-05	1.65E-08	9.91E-09	1.65E-08	1.86E-08	2.89E-08	6.69E-07	2.25E-08	0	0	5.77066E-10	0	0.0006	Res
582357.99_4129474.56	582357.99	4129474.56	2.85E-05	1.54E-08	9.27E-09	1.54E-08	1.75E-08	2.70E-08	6.25E-07	2.10E-08	0	0	5.39253E-10	0	0.0005	Res
582414.56_4129474.56	582414.56	4129474.56	2.67E-05	1.45E-08	8.68E-09	1.45E-08	1.65E-08	2.53E-08	5.85E-07	1.97E-08	0	0	5.05025E-10	0	0.0005	Res
582471.13_4129474.56	582471.13	4129474.56	2.50E-05	1.36E-08	8.15E-09	1.36E-08	1.56E-08	2.37E-08	5.49E-07	1.84E-08	0	0	4.74082E-10	0	0.0005	Res
582527.7_4129474.56	582527.7	4129474.56	2.36E-05	1.28E-08	7.69E-09	1.28E-08	1.48E-08	2.24E-08	5.18E-07	1.74E-08	0	0	4.47497E-10	0	0.0004	Res
582584.27_4129474.56	582584.27	4129474.56	2.22E-05	1.21E-08	7.23E-09	1.21E-08	1.39E-08	2.10E-08	4.86E-07	1.63E-08	0	0	4.20585E-10	0	0.0004	Res
582640.84_4129474.56	582640.84	4129474.56	2.07E-05	1.12E-08	6.75E-09	1.12E-08	1.31E-08	1.96E-08	4.53E-07	1.52E-08	0	0	3.9205E-10	0	0.0004	Res
582244.85_4129558.47	582244.85	4129558.47	3.11E-05	1.69E-08	1.01E-08	1.69E-08	2.01E-08	2.94E-08	6.80E-07	2.27E-08	0	0	5.89486E-10	0	0.0006	Res
582301.42_4129558.47	582301.42	4129558.47	3.07E-05	1.67E-08	9.99E-09	1.67E-08	1.91E-08	2.91E-08	6.73E-07	2.26E-08	0	0	5.81384E-10	0	0.0006	Res
582357.99_4129558.47	582357.99	4129558.47	2.91E-05	1.58E-08	9.46E-09	1.58E-08	1.79E-08	2.76E-08	6.38E-07	2.15E-08	0	0	5.50545E-10	0	0.0006	Res
582414.56_4129558.47	582414.56	4129558.47	2.73E-05	1.48E-08	8.87E-09	1.48E-08	1.68E-08	2.58E-08	5.98E-07	2.01E-08	0	0	5.16359E-10	0	0.0005	Res
582471.13_4129558.47	582471.13	4129558.47	2.55E-05	1.38E-08	8.30E-09	1.38E-08	1.57E-08	2.42E-08	5.59E-07	1.88E-08	0	0	4.82744E-10	0	0.0005	Res
582527.7_4129558.47	582527.7	4129558.47	2.39E-05	1.29E-08	7.76E-09	1.29E-08	1.48E-08	2.26E-08	5.23E-07	1.76E-08	0	0	4.51602E-10	0	0.0005	Res
582584.27_4129558.47	582584.27	4129558.47	2.23E-05	1.21E-08	7.26E-09	1.21E-08	1.40E-08	2.11E-08	4.88E-07	1.64E-08	0	0	4.22146E-10	0	0.0004	Res
582640.84_4129558.47	582640.84	4129558.47	2.10E-05	1.14E-08	6.84E-09	1.14E-08	1.32E-08	1.98E-08	4.59E-07	1.54E-08	0	0	3.97385E-10	0	0.0004	Res
582697.41_4129558.47	582697.41	4129558.47	1.97E-05	1.07E-08	6.43E-09	1.07E-08	1.26E-08	1.86E-08	4.31E-07	1.45E-08	0	0	3.73665E-10	0	0.0004	Res
582244.85_4129642.38	582244.85	4129642.38	2.77E-05	1.51E-08	9.05E-09	1.51E-08	1.94E-08	2.59E-08	5.98E-07	1.98E-08	0	0	5.23965E-10	0	0.0005	Res

Risk Calculation Part 2, $\sum R1*C_{TAC}$

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)								3rd Trimester	0<2	2<16	16<30	Cancer Risk - 2027	Receptor Type
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Cobalt	Lead	Nickel	Chromium VI					(per million)	
582301.42_4129642.38	582301.42	4129642.38	3.01E-05	1.63E-08	9.79E-09	1.63E-08	1.92E-08	2.84E-08	6.57E-07	2.20E-08	0	0	5.68979E-10	0	0.0006	Res
582357.99_4129642.38	582357.99	4129642.38	2.96E-05	1.60E-08	9.62E-09	1.60E-08	1.81E-08	2.80E-08	6.49E-07	2.18E-08	0	0	5.5961E-10	0	0.0006	Res
582414.56_4129642.38	582414.56	4129642.38	2.79E-05	1.51E-08	9.07E-09	1.51E-08	1.70E-08	2.64E-08	6.12E-07	2.06E-08	0	0	5.27804E-10	0	0.0005	Res
582471.13_4129642.38	582471.13	4129642.38	2.61E-05	1.42E-08	8.50E-09	1.42E-08	1.60E-08	2.48E-08	5.74E-07	1.93E-08	0	0	4.95002E-10	0	0.0005	Res
582527.7_4129642.38	582527.7	4129642.38	2.46E-05	1.33E-08	7.99E-09	1.33E-08	1.51E-08	2.33E-08	5.39E-07	1.81E-08	0	0	4.64935E-10	0	0.0005	Res
582584.27_4129642.38	582584.27	4129642.38	2.28E-05	1.24E-08	7.43E-09	1.24E-08	1.41E-08	2.16E-08	5.01E-07	1.68E-08	0	0	4.3242E-10	0	0.0004	Res
582640.84_4129642.38	582640.84	4129642.38	2.14E-05	1.16E-08	6.95E-09	1.16E-08	1.33E-08	2.02E-08	4.68E-07	1.57E-08	0	0	4.04273E-10	0	0.0004	Res
582697.41_4129642.38	582697.41	4129642.38	2.00E-05	1.09E-08	6.51E-09	1.09E-08	1.26E-08	1.89E-08	4.37E-07	1.47E-08	0	0	3.78557E-10	0	0.0004	Res
582753.98_4129642.38	582753.98	4129642.38	1.87E-05	1.01E-08	6.09E-09	1.01E-08	1.19E-08	1.76E-08	4.08E-07	1.37E-08	0	0	3.53651E-10	0	0.0004	Res
582810.55_4129642.38	582810.55	4129642.38	1.75E-05	9.51E-09	5.70E-09	9.51E-09	1.13E-08	1.65E-08	3.82E-07	1.28E-08	0	0	3.31308E-10	0	0.0003	Res
582867.12_4129642.38	582867.12	4129642.38	1.62E-05	8.82E-09	5.29E-09	8.82E-09	1.07E-08	1.53E-08	3.53E-07	1.18E-08	0	0	3.07101E-10	0	0.0003	Res
582244.85_4129726.29	582244.85	4129726.29	3.02E-05	1.64E-08	9.85E-09	1.64E-08	2.00E-08	2.84E-08	6.57E-07	2.19E-08	0	0	5.7145E-10	0	0.0006	Res
582301.42_4129726.29	582301.42	4129726.29	2.93E-05	1.59E-08	9.56E-09	1.59E-08	1.90E-08	2.77E-08	6.40E-07	2.14E-08	0	0	5.55076E-10	0	0.0006	Res
582357.99_4129726.29	582357.99	4129726.29	2.98E-05	1.61E-08	9.68E-09	1.61E-08	1.82E-08	2.82E-08	6.53E-07	2.20E-08	0	0	5.63286E-10	0	0.0006	Res
582414.56_4129726.29	582414.56	4129726.29	2.84E-05	1.54E-08	9.23E-09	1.54E-08	1.71E-08	2.69E-08	6.24E-07	2.10E-08	0	0	5.37415E-10	0	0.0005	Res
582471.13_4129726.29	582471.13	4129726.29	2.68E-05	1.45E-08	8.70E-09	1.45E-08	1.62E-08	2.54E-08	5.88E-07	1.98E-08	0	0	5.06712E-10	0	0.0005	Res
582527.7_4129726.29	582527.7	4129726.29	2.52E-05	1.36E-08	8.18E-09	1.36E-08	1.52E-08	2.39E-08	5.53E-07	1.86E-08	0	0	4.7622E-10	0	0.0005	Res
582584.27_4129726.29	582584.27	4129726.29	2.35E-05	1.28E-08	7.66E-09	1.28E-08	1.43E-08	2.23E-08	5.17E-07	1.74E-08	0	0	4.45844E-10	0	0.0004	Res
582640.84_4129726.29	582640.84	4129726.29	2.20E-05	1.19E-08	7.15E-09	1.19E-08	1.35E-08	2.08E-08	4.82E-07	1.62E-08	0	0	4.16068E-10	0	0.0004	Res
582697.41_4129726.29	582697.41	4129726.29	2.03E-05	1.10E-08	6.62E-09	1.10E-08	1.27E-08	1.92E-08	4.45E-07	1.50E-08	0	0	3.84942E-10	0	0.0004	Res
582753.98_4129726.29	582753.98	4129726.29	1.87E-05	1.02E-08	6.10E-09	1.02E-08	1.19E-08	1.77E-08	4.09E-07	1.37E-08	0	0	3.54268E-10	0	0.0004	Res
582810.55_4129726.29	582810.55	4129726.29	1.70E-05	9.26E-09	5.56E-09	9.26E-09	1.10E-08	1.61E-08	3.72E-07	1.24E-08	0	0	3.22647E-10	0	0.0003	Res
582244.85_4129810.2	582244.85	4129810.2	2.94E-05	1.60E-08	9.59E-09	1.60E-08	1.96E-08	2.77E-08	6.39E-07	2.13E-08	0	0	5.5645E-10	0	0.0006	Res
582301.42_4129810.2	582301.42	4129810.2	2.97E-05	1.61E-08	9.66E-09	1.61E-08	1.88E-08	2.80E-08	6.49E-07	2.17E-08	0	0	5.61626E-10	0	0.0006	Res
582357.99_4129810.2	582357.99	4129810.2	2.94E-05	1.59E-08	9.55E-09	1.59E-08	1.80E-08	2.78E-08	6.45E-07	2.17E-08	0	0	5.56033E-10	0	0.0006	Res
582414.56_4129810.2	582414.56	4129810.2	2.86E-05	1.55E-08	9.28E-09	1.55E-08	1.71E-08	2.71E-08	6.29E-07	2.12E-08	0	0	5.40761E-10	0	0.0005	Res
582471.13_4129810.2	582471.13	4129810.2	2.72E-05	1.47E-08	8.85E-09	1.47E-08	1.62E-08	2.59E-08	6.00E-07	2.03E-08	0	0	5.15547E-10	0	0.0005	Res
582527.7_4129810.2	582527.7	4129810.2	2.55E-05	1.38E-08	8.29E-09	1.38E-08	1.52E-08	2.42E-08	5.62E-07	1.90E-08	0	0	4.83182E-10	0	0.0005	Res
582584.27_4129810.2	582584.27	4129810.2	2.38E-05	1.29E-08	7.72E-09	1.29E-08	1.43E-08	2.25E-08	5.22E-07	1.76E-08	0	0	4.4975E-10	0	0.0004	Res
582640.84_4129810.2	582640.84	4129810.2	2.17E-05	1.18E-08	7.07E-09	1.18E-08	1.33E-08	2.06E-08	4.77E-07	1.61E-08	0	0	4.11282E-10	0	0.0004	Res
582697.41_4129810.2	582697.41	4129810.2	1.99E-05	1.08E-08	6.47E-09	1.08E-08	1.24E-08	1.88E-08	4.36E-07	1.46E-08	0	0	3.76591E-10	0	0.0004	Res
581905.43_4129894.11	581905.43	4129894.11	3.75E-05	2.03E-08	1.22E-08	2.03E-08	2.11E-08	3.57E-08	8.30E-07	2.82E-08	0	0	7.09768E-10	0	0.0007	Res
581962_4129894.11	581962	4129894.11	3.85E-05	2.09E-08	1.25E-08	2.09E-08	2.43E-08	3.64E-08	8.43E-07	2.83E-08	0	0	7.29322E-10	0	0.0007	Res
582131.71_4129894.11	582131.71	4129894.11	3.37E-05	1.83E-08	1.10E-08	1.83E-08	2.22E-08	3.18E-08	7.35E-07	2.45E-08	0	0	6.38946E-10	0	0.0006	Res
582188.28_4129894.11	582188.28	4129894.11	3.24E-05	1.76E-08	1.06E-08	1.76E-08	2.09E-08	3.06E-08	7.07E-07	2.37E-08	0	0	6.13422E-10	0	0.0006	Res
582244.85_4129894.11	582244.85	4129894.11	3.16E-05	1.72E-08	1.03E-08	1.72E-08	1.98E-08	2.99E-08	6.93E-07	2.33E-08	0	0	5.9888E-10	0	0.0006	Res
582301.42_4129894.11	582301.42	4129894.11	3.05E-05	1.65E-08	9.92E-09	1.65E-08	1.87E-08	2.89E-08	6.69E-07	2.25E-08	0	0	5.77156E-10	0	0.0006	Res
582357.99_4129894.11	582357.99	4129894.11	2.91E-05	1.58E-08	9.45E-09	1.58E-08	1.77E-08	2.76E-08	6.38E-07	2.15E-08	0	0	5.50188E-10	0	0.0006	Res
582414.56_4129894.11	582414.56	4129894.11	2.94E-05	1.59E-08	9.54E-09	1.59E-08	1.71E-08	2.80E-08	6.49E-07	2.20E-08	0	0	5.56581E-10	0	0.0006	Res
582471.13_4129894.11	582471.13	4129894.11	2.75E-05	1.49E-08	8.93E-09	1.49E-08	1.60E-08	2.62E-08	6.07E-07	2.06E-08	0	0	5.20936E-10	0	0.0005	Res
582527.7_4129894.11	582527.7	4129894.11	2.53E-05	1.37E-08	8.23E-09	1.37E-08	1.49E-08	2.41E-08	5.59E-07	1.89E-08	0	0	4.79702E-10	0	0.0005	Res
582584.27_4129894.11	582584.27	4129894.11	2.32E-05	1.26E-08	7.54E-09	1.26E-08	1.39E-08	2.20E-08	5.10E-07	1.72E-08	0	0	4.39078E-10	0	0.0004	Res
582640.84_4129894.11	582640.84	4129894.11	2.12E-05	1.15E-08	6.88E-09	1.15E-08	1.29E-08	2.01E-08	4.65E-07	1.56E-08	0	0	4.00486E-10	0	0.0004	Res
582697.41_4129894.11	582697.41	4129894.11	1.93E-05	1.04E-08	6.27E-09	1.04E-08	1.20E-08	1.82E-08	4.22E-07	1.42E-08	0	0	3.64617E-10	0	0.0004	Res
581962_4129978.02	581962	4129978.02	4.01E-05	2.17E-08	1.30E-08	2.17E-08	2.47E-08	3.79E-08	8.79E-07	2.95E-08	0	0	7.58445E-10	0	0.0008	Res
582018.57_4129978.02	582018.57	4129978.02	3.79E-05	2.06E-08	1.23E-08	2.06E-08	2.41E-08	3.58E-08	8.28E-07	2.78E-08	0	0	7.17504E-10	0	0.0007	Res
582075.14_4129978.02	582075.14	4129978.02	3.90E-05	2.11E-08	1.27E-08	2.11E-08	2.39E-08	3.70E-08	8.56E-07	2.88E-08	0	0	7.3822E-10	0	0.0007	Res
582131.71_4129978.02	582131.71	4129978.02	3.88E-05	2.10E-08	1.26E-08	2.10E-08	2.28E-08	3.69E-08	8.55E-07	2.89E-08	0	0	7.34012E-10	0	0.0007	Res
582188.28_4129978.02	582188.28	4129978.02	3.86E-05	2.09E-08	1.25E-08	2.09E-08	2.18E-08	3.68E-08	8.54E-07	2.90E-08	0	0	7.30621E-10	0	0.0007	Res
582244.85_4129978.02	582244.85	4129978.02	3.49E-05	1.89E-08	1.13E-08	1.89E-08	2.01E-08	3.32E-08	7.71E-07	2.61E-08	0	0	6.60432E-10	0	0.0007	Res
582301.42_4129978.02	582301.42	4129978.02	3.44E-05	1.86E-08	1.11E-08	1.86E-08	1.92E-08	3.28E-08	7.61E-07	2.59E-08	0	0	6.50434E-10	0	0.0007	Res
582357.99_4129978.02	582357.99	4129978.02	3.25E-05	1.75E-08	1.05E-08	1.75E-08	1.81E-08	3.10E-08	7.20E-07	2.45E-08	0	0	6.14439E-10	0	0.0006	Res
582414.56_4129978.02	582414.56	4129978.02	3.00E-05	1.62E-08	9.73E-09	1.62E-08	1.68E-08	2.86E-08	6.65E-07	2.26E-08	0	0	5.67969E-10	0	0.0006	Res
582471.13_4129978.02	582471.13	4129978.02	2.75E-05	1.48E-08	8.91E-09	1.48E-08	1.56E-08	2.62E-08	6.08E-07	2.06E-08	0	0	5.19991E-10	0	0.0005	Res
582527.7_4129978.02	582527.7	4129978.02	2.50E-05	1.35E-08	8.11E-09	1.35E-08	1.45E-08	2.38E-08	5.52E-07	1.87E-08	0	0	4.73111E-10	0	0.0005	Res

Risk Calculation Part 2, $\sum R1*C_{TAC}$

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)								3rd Trimester	0<2	2<16	16<30	Cancer Risk - 2027	Receptor Type
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Cobalt	Lead	Nickel	Chromium VI					(per million)	
582584.27_4129978.02	582584.27	4129978.02	2.27E-05	1.23E-08	7.37E-09	1.23E-08	1.34E-08	2.16E-08	5.00E-07	1.69E-08	0	0	4.2964E-10	0	0.0004	Res
582640.84_4129978.02	582640.84	4129978.02	2.06E-05	1.12E-08	6.71E-09	1.12E-08	1.25E-08	1.96E-08	4.53E-07	1.53E-08	0	0	3.90574E-10	0	0.0004	Res
582697.41_4129978.02	582697.41	4129978.02	1.87E-05	1.02E-08	6.10E-09	1.02E-08	1.16E-08	1.77E-08	4.11E-07	1.38E-08	0	0	3.54659E-10	0	0.0004	Res
582753.98_4129978.02	582753.98	4129978.02	1.69E-05	9.16E-09	5.50E-09	9.16E-09	1.08E-08	1.59E-08	3.69E-07	1.24E-08	0	0	3.19499E-10	0	0.0003	Res
582810.55_4129978.02	582810.55	4129978.02	1.49E-05	8.09E-09	4.85E-09	8.09E-09	9.82E-09	1.40E-08	3.24E-07	1.08E-08	0	0	2.81513E-10	0	0.0003	Res
581905.43_4130061.93	581905.43	4130061.93	5.73E-05	3.09E-08	1.85E-08	3.09E-08	3.08E-08	5.48E-08	1.27E-06	4.34E-08	0	0	1.08473E-09	0	0.0011	Res
581962_4130061.93	581962	4130061.93	5.40E-05	2.91E-08	1.75E-08	2.91E-08	2.89E-08	5.17E-08	1.20E-06	4.10E-08	0	0	1.02186E-09	0	0.0010	Res
582018.57_4130061.93	582018.57	4130061.93	4.60E-05	2.49E-08	1.49E-08	2.49E-08	2.59E-08	4.39E-08	1.02E-06	3.46E-08	0	0	8.71247E-10	0	0.0009	Res
582075.14_4130061.93	582075.14	4130061.93	4.11E-05	2.22E-08	1.33E-08	2.22E-08	2.36E-08	3.91E-08	9.08E-07	3.07E-08	0	0	7.77631E-10	0	0.0008	Res
582131.71_4130061.93	582131.71	4130061.93	4.02E-05	2.17E-08	1.30E-08	2.17E-08	2.25E-08	3.84E-08	8.91E-07	3.03E-08	0	0	7.61155E-10	0	0.0008	Res
582188.28_4130061.93	582188.28	4130061.93	3.92E-05	2.12E-08	1.27E-08	2.12E-08	2.14E-08	3.75E-08	8.70E-07	2.96E-08	0	0	7.41913E-10	0	0.0007	Res
582244.85_4130061.93	582244.85	4130061.93	3.83E-05	2.07E-08	1.24E-08	2.07E-08	2.04E-08	3.67E-08	8.53E-07	2.91E-08	0	0	7.25252E-10	0	0.0007	Res
582301.42_4130061.93	582301.42	4130061.93	3.55E-05	1.92E-08	1.15E-08	1.92E-08	1.90E-08	3.40E-08	7.91E-07	2.70E-08	0	0	6.72973E-10	0	0.0007	Res
582357.99_4130061.93	582357.99	4130061.93	3.29E-05	1.78E-08	1.07E-08	1.78E-08	1.77E-08	3.15E-08	7.33E-07	2.50E-08	0	0	6.23671E-10	0	0.0006	Res
582414.56_4130061.93	582414.56	4130061.93	3.02E-05	1.63E-08	9.77E-09	1.63E-08	1.64E-08	2.88E-08	6.70E-07	2.28E-08	0	0	5.71304E-10	0	0.0006	Res
582471.13_4130061.93	582471.13	4130061.93	2.74E-05	1.48E-08	8.87E-09	1.48E-08	1.52E-08	2.61E-08	6.07E-07	2.06E-08	0	0	5.17955E-10	0	0.0005	Res
582527.7_4130061.93	582527.7	4130061.93	2.47E-05	1.33E-08	8.00E-09	1.33E-08	1.40E-08	2.35E-08	5.46E-07	1.85E-08	0	0	4.67028E-10	0	0.0005	Res
582584.27_4130061.93	582584.27	4130061.93	2.23E-05	1.20E-08	7.23E-09	1.20E-08	1.29E-08	2.12E-08	4.91E-07	1.66E-08	0	0	4.21547E-10	0	0.0004	Res
582640.84_4130061.93	582640.84	4130061.93	2.00E-05	1.09E-08	6.51E-09	1.09E-08	1.20E-08	1.90E-08	4.41E-07	1.49E-08	0	0	3.79449E-10	0	0.0004	Res
582697.41_4130061.93	582697.41	4130061.93	1.81E-05	9.82E-09	5.89E-09	9.82E-09	1.11E-08	1.72E-08	3.97E-07	1.34E-08	0	0	3.42806E-10	0	0.0003	Res
582753.98_4130061.93	582753.98	4130061.93	1.64E-05	8.91E-09	5.34E-09	8.91E-09	1.03E-08	1.55E-08	3.59E-07	1.21E-08	0	0	3.1075E-10	0	0.0003	Res
582810.55_4130061.93	582810.55	4130061.93	1.49E-05	8.08E-09	4.85E-09	8.08E-09	9.60E-09	1.40E-08	3.25E-07	1.09E-08	0	0	2.81648E-10	0	0.0003	Res
581962_4130145.84	581962	4130145.84	6.25E-05	3.36E-08	2.02E-08	3.36E-08	3.03E-08	6.02E-08	1.40E-06	4.83E-08	0	0	1.18342E-09	0	0.0012	Res
582018.57_4130145.84	582018.57	4130145.84	5.79E-05	3.11E-08	1.87E-08	3.11E-08	2.81E-08	5.57E-08	1.30E-06	4.47E-08	0	0	1.09573E-09	0	0.0011	Res
582075.14_4130145.84	582075.14	4130145.84	4.93E-05	2.65E-08	1.59E-08	2.65E-08	2.50E-08	4.73E-08	1.10E-06	3.78E-08	0	0	9.33004E-10	0	0.0009	Res
582131.71_4130145.84	582131.71	4130145.84	4.56E-05	2.46E-08	1.47E-08	2.46E-08	2.32E-08	4.38E-08	1.02E-06	3.50E-08	0	0	8.637E-10	0	0.0009	Res
582188.28_4130145.84	582188.28	4130145.84	4.40E-05	2.37E-08	1.42E-08	2.37E-08	2.20E-08	4.23E-08	9.85E-07	3.38E-08	0	0	8.33157E-10	0	0.0008	Res
582244.85_4130145.84	582244.85	4130145.84	4.01E-05	2.16E-08	1.30E-08	2.16E-08	2.02E-08	3.85E-08	8.98E-07	3.08E-08	0	0	7.59588E-10	0	0.0008	Res
582301.42_4130145.84	582301.42	4130145.84	3.64E-05	1.96E-08	1.18E-08	1.96E-08	1.86E-08	3.49E-08	8.12E-07	2.78E-08	0	0	6.885E-10	0	0.0007	Res
582357.99_4130145.84	582357.99	4130145.84	3.31E-05	1.78E-08	1.07E-08	1.78E-08	1.72E-08	3.17E-08	7.38E-07	2.52E-08	0	0	6.26533E-10	0	0.0006	Res
582414.56_4130145.84	582414.56	4130145.84	3.00E-05	1.62E-08	9.71E-09	1.62E-08	1.59E-08	2.87E-08	6.69E-07	2.28E-08	0	0	5.68156E-10	0	0.0006	Res
582471.13_4130145.84	582471.13	4130145.84	2.70E-05	1.46E-08	8.74E-09	1.46E-08	1.46E-08	2.58E-08	6.00E-07	2.04E-08	0	0	5.10977E-10	0	0.0005	Res
582527.7_4130145.84	582527.7	4130145.84	2.41E-05	1.30E-08	7.80E-09	1.30E-08	1.34E-08	2.30E-08	5.34E-07	1.81E-08	0	0	4.55677E-10	0	0.0005	Res
582584.27_4130145.84	582584.27	4130145.84	2.14E-05	1.16E-08	6.95E-09	1.16E-08	1.22E-08	2.04E-08	4.74E-07	1.61E-08	0	0	4.05595E-10	0	0.0004	Res
582640.84_4130145.84	582640.84	4130145.84	1.91E-05	1.04E-08	6.22E-09	1.04E-08	1.12E-08	1.82E-08	4.22E-07	1.43E-08	0	0	3.62454E-10	0	0.0004	Res
582697.41_4130145.84	582697.41	4130145.84	1.72E-05	9.33E-09	5.60E-09	9.33E-09	1.04E-08	1.63E-08	3.78E-07	1.28E-08	0	0	3.25876E-10	0	0.0003	Res
582753.98_4130145.84	582753.98	4130145.84	1.56E-05	8.46E-09	5.08E-09	8.46E-09	9.68E-09	1.48E-08	3.42E-07	1.15E-08	0	0	2.95454E-10	0	0.0003	Res
582810.55_4130145.84	582810.55	4130145.84	1.43E-05	7.74E-09	4.64E-09	7.74E-09	9.06E-09	1.35E-08	3.12E-07	1.04E-08	0	0	2.69862E-10	0	0.0003	Res
582867.12_4130145.84	582867.12	4130145.84	1.25E-05	6.82E-09	4.09E-09	6.82E-09	8.27E-09	1.18E-08	2.73E-07	9.11E-09	0	0	2.37477E-10	0	0.0002	Res
581962_4130229.75	581962	4130229.75	6.38E-05	3.43E-08	2.06E-08	3.43E-08	3.03E-08	6.15E-08	1.43E-06	4.94E-08	0	0	1.20785E-09	0	0.0012	Res
582018.57_4130229.75	582018.57	4130229.75	6.08E-05	3.26E-08	1.96E-08	3.26E-08	2.85E-08	5.86E-08	1.37E-06	4.72E-08	0	0	1.15064E-09	0	0.0012	Res
582075.14_4130229.75	582075.14	4130229.75	5.65E-05	3.03E-08	1.82E-08	3.03E-08	2.65E-08	5.45E-08	1.27E-06	4.38E-08	0	0	1.06893E-09	0	0.0011	Res
582131.71_4130229.75	582131.71	4130229.75	5.08E-05	2.73E-08	1.64E-08	2.73E-08	2.41E-08	4.90E-08	1.14E-06	3.93E-08	0	0	9.61556E-10	0	0.0010	Res
582188.28_4130229.75	582188.28	4130229.75	4.53E-05	2.43E-08	1.46E-08	2.43E-08	2.18E-08	4.36E-08	1.02E-06	3.50E-08	0	0	8.56833E-10	0	0.0009	Res
582244.85_4130229.75	582244.85	4130229.75	4.04E-05	2.18E-08	1.31E-08	2.18E-08	1.99E-08	3.89E-08	9.07E-07	3.12E-08	0	0	7.65725E-10	0	0.0008	Res
582301.42_4130229.75	582301.42	4130229.75	3.64E-05	1.96E-08	1.17E-08	1.96E-08	1.82E-08	3.50E-08	8.14E-07	2.79E-08	0	0	6.88458E-10	0	0.0007	Res
582357.99_4130229.75	582357.99	4130229.75	3.28E-05	1.77E-08	1.06E-08	1.77E-08	1.66E-08	3.15E-08	7.33E-07	2.51E-08	0	0	6.20588E-10	0	0.0006	Res
582414.56_4130229.75	582414.56	4130229.75	2.92E-05	1.58E-08	9.45E-09	1.58E-08	1.52E-08	2.80E-08	6.52E-07	2.23E-08	0	0	5.53497E-10	0	0.0006	Res
582471.13_4130229.75	582471.13	4130229.75	2.58E-05	1.39E-08	8.35E-09	1.39E-08	1.38E-08	2.47E-08	5.74E-07	1.96E-08	0	0	4.88326E-10	0	0.0005	Res
582527.7_4130229.75	582527.7	4130229.75	2.28E-05	1.23E-08	7.37E-09	1.23E-08	1.25E-08	2.17E-08	5.05E-07	1.72E-08	0	0	4.3085E-10	0	0.0004	Res
582584.27_4130229.75	582584.27	4130229.75	2.02E-05	1.09E-08	6.54E-09	1.09E-08	1.14E-08	1.92E-08	4.46E-07	1.51E-08	0	0	3.81974E-10	0	0.0004	Res
582640.84_4130229.75	582640.84	4130229.75	1.80E-05	9.75E-09	5.85E-09	9.75E-09	1.05E-08	1.71E-08	3.98E-07	1.34E-08	0	0	3.41077E-10	0	0.0003	Res
582697.41_4130229.75	582697.41	4130229.75	1.63E-05	8.82E-09	5.29E-09	8.82E-09	9.74E-09	1.55E-08	3.58E-07	1.21E-08	0	0	3.08354E-10	0	0.0003	Res
582753.98_4130229.75	582753.98	4130229.75	1.48E-05	8.03E-09	4.82E-09	8.03E-09	9.08E-09	1.40E-08	3.25E-07	1.09E-08	0	0	2.80398E-10	0	0.0003	Res
582810.55_4130229.75	582810.55	4130229.75	1.36E-05	7.38E-09	4.43E-09	7.38E-09	8.52E-09	1.29E-08	2.98E-07	1.00E-08	0	0	2.57569E-10	0	0.0003	Res

Risk Calculation Part 2, $\sum R1*C_{TAC}$

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)								3rd Trimester	0<2	2<16	16<30	Cancer Risk - 2027	Receptor Type
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Cobalt	Lead	Nickel	Chromium VI					(per million)	
582867.12_4130229.75	582867.12	4130229.75	1.26E-05	6.84E-09	4.10E-09	6.84E-09	8.04E-09	1.19E-08	2.75E-07	9.22E-09	0	0	2.38411E-10	0	0.0002	Res
582018.57_4130313.66	582018.57	4130313.66	6.54E-05	3.51E-08	2.11E-08	3.51E-08	2.98E-08	6.32E-08	1.48E-06	5.10E-08	0	0	1.23879E-09	0	0.0012	Res
582075.14_4130313.66	582075.14	4130313.66	6.06E-05	3.25E-08	1.95E-08	3.25E-08	2.75E-08	5.85E-08	1.37E-06	4.72E-08	0	0	1.1466E-09	0	0.0011	Res
582131.71_4130313.66	582131.71	4130313.66	5.30E-05	2.84E-08	1.71E-08	2.84E-08	2.46E-08	5.12E-08	1.19E-06	4.12E-08	0	0	1.00303E-09	0	0.0010	Res
582188.28_4130313.66	582188.28	4130313.66	4.63E-05	2.49E-08	1.49E-08	2.49E-08	2.19E-08	4.46E-08	1.04E-06	3.59E-08	0	0	8.76289E-10	0	0.0009	Res
582244.85_4130313.66	582244.85	4130313.66	4.08E-05	2.19E-08	1.32E-08	2.19E-08	1.97E-08	3.93E-08	9.17E-07	3.15E-08	0	0	7.72819E-10	0	0.0008	Res
582301.42_4130313.66	582301.42	4130313.66	3.62E-05	1.95E-08	1.17E-08	1.95E-08	1.79E-08	3.48E-08	8.12E-07	2.79E-08	0	0	6.85704E-10	0	0.0007	Res
582357.99_4130313.66	582357.99	4130313.66	3.18E-05	1.71E-08	1.03E-08	1.71E-08	1.61E-08	3.06E-08	7.12E-07	2.44E-08	0	0	6.0223E-10	0	0.0006	Res
582414.56_4130313.66	582414.56	4130313.66	2.77E-05	1.49E-08	8.96E-09	1.49E-08	1.44E-08	2.66E-08	6.18E-07	2.11E-08	0	0	5.24445E-10	0	0.0005	Res
582471.13_4130313.66	582471.13	4130313.66	2.42E-05	1.30E-08	7.82E-09	1.30E-08	1.30E-08	2.31E-08	5.38E-07	1.83E-08	0	0	4.57665E-10	0	0.0005	Res
582527.7_4130313.66	582527.7	4130313.66	2.13E-05	1.15E-08	6.90E-09	1.15E-08	1.18E-08	2.03E-08	4.72E-07	1.61E-08	0	0	4.0298E-10	0	0.0004	Res
582584.27_4130313.66	582584.27	4130313.66	1.89E-05	1.02E-08	6.13E-09	1.02E-08	1.08E-08	1.80E-08	4.18E-07	1.42E-08	0	0	3.57823E-10	0	0.0004	Res
582640.84_4130313.66	582640.84	4130313.66	1.70E-05	9.19E-09	5.52E-09	9.19E-09	9.92E-09	1.62E-08	3.75E-07	1.27E-08	0	0	3.21602E-10	0	0.0003	Res
582697.41_4130313.66	582697.41	4130313.66	1.54E-05	8.34E-09	5.00E-09	8.34E-09	9.20E-09	1.46E-08	3.39E-07	1.14E-08	0	0	2.91445E-10	0	0.0003	Res
582753.98_4130313.66	582753.98	4130313.66	1.40E-05	7.61E-09	4.57E-09	7.61E-09	8.59E-09	1.33E-08	3.08E-07	1.04E-08	0	0	2.65884E-10	0	0.0003	Res
582810.55_4130313.66	582810.55	4130313.66	1.29E-05	6.97E-09	4.18E-09	6.97E-09	8.03E-09	1.22E-08	2.81E-07	9.45E-09	0	0	2.43301E-10	0	0.0002	Res
582867.12_4130313.66	582867.12	4130313.66	1.18E-05	6.41E-09	3.85E-09	6.41E-09	7.55E-09	1.12E-08	2.58E-07	8.64E-09	0	0	2.23603E-10	0	0.0002	Res
581848.86_4130397.57	581848.86	4130397.57	8.98E-05	4.81E-08	2.89E-08	4.81E-08	3.92E-08	8.70E-08	2.03E-06	7.04E-08	0	0	1.69975E-09	0	0.0017	Res
581905.43_4130397.57	581905.43	4130397.57	8.70E-05	4.66E-08	2.80E-08	4.66E-08	3.77E-08	8.43E-08	1.97E-06	6.83E-08	0	0	1.64687E-09	0	0.0016	Res
581962_4130397.57	581962	4130397.57	8.22E-05	4.40E-08	2.64E-08	4.40E-08	3.55E-08	7.97E-08	1.86E-06	6.46E-08	0	0	1.55607E-09	0	0.0016	Res
582018.57_4130397.57	582018.57	4130397.57	7.37E-05	3.95E-08	2.37E-08	3.95E-08	3.22E-08	7.13E-08	1.67E-06	5.78E-08	0	0	1.39438E-09	0	0.0014	Res
582075.14_4130397.57	582075.14	4130397.57	6.45E-05	3.46E-08	2.07E-08	3.46E-08	2.86E-08	6.24E-08	1.46E-06	5.05E-08	0	0	1.22045E-09	0	0.0012	Res
582131.71_4130397.57	582131.71	4130397.57	5.51E-05	2.96E-08	1.77E-08	2.96E-08	2.51E-08	5.32E-08	1.24E-06	4.30E-08	0	0	1.04285E-09	0	0.0010	Res
582188.28_4130397.57	582188.28	4130397.57	4.78E-05	2.56E-08	1.54E-08	2.56E-08	2.23E-08	4.61E-08	1.08E-06	3.71E-08	0	0	9.04144E-10	0	0.0009	Res
582244.85_4130397.57	582244.85	4130397.57	4.11E-05	2.21E-08	1.33E-08	2.21E-08	1.97E-08	3.96E-08	9.24E-07	3.18E-08	0	0	7.78384E-10	0	0.0008	Res
582301.42_4130397.57	582301.42	4130397.57	3.53E-05	1.90E-08	1.14E-08	1.90E-08	1.74E-08	3.40E-08	7.92E-07	2.72E-08	0	0	6.69087E-10	0	0.0007	Res
582357.99_4130397.57	582357.99	4130397.57	3.02E-05	1.63E-08	9.75E-09	1.63E-08	1.54E-08	2.90E-08	6.74E-07	2.31E-08	0	0	5.71244E-10	0	0.0006	Res
582414.56_4130397.57	582414.56	4130397.57	2.60E-05	1.40E-08	8.42E-09	1.40E-08	1.38E-08	2.49E-08	5.80E-07	1.98E-08	0	0	4.9294E-10	0	0.0005	Res
582471.13_4130397.57	582471.13	4130397.57	2.28E-05	1.23E-08	7.37E-09	1.23E-08	1.24E-08	2.17E-08	5.05E-07	1.72E-08	0	0	4.30714E-10	0	0.0004	Res
582527.7_4130397.57	582527.7	4130397.57	2.01E-05	1.09E-08	6.51E-09	1.09E-08	1.13E-08	1.92E-08	4.45E-07	1.51E-08	0	0	3.80195E-10	0	0.0004	Res
582584.27_4130397.57	582584.27	4130397.57	1.79E-05	9.68E-09	5.81E-09	9.68E-09	1.03E-08	1.70E-08	3.95E-07	1.34E-08	0	0	3.38776E-10	0	0.0003	Res
582640.84_4130397.57	582640.84	4130397.57	1.61E-05	8.70E-09	5.22E-09	8.70E-09	9.52E-09	1.53E-08	3.54E-07	1.20E-08	0	0	3.04389E-10	0	0.0003	Res
582697.41_4130397.57	582697.41	4130397.57	1.45E-05	7.84E-09	4.70E-09	7.84E-09	8.79E-09	1.37E-08	3.18E-07	1.07E-08	0	0	2.73904E-10	0	0.0003	Res
582753.98_4130397.57	582753.98	4130397.57	1.31E-05	7.12E-09	4.27E-09	7.12E-09	8.18E-09	1.24E-08	2.88E-07	9.66E-09	0	0	2.48445E-10	0	0.0002	Res
582810.55_4130397.57	582810.55	4130397.57	1.20E-05	6.50E-09	3.90E-09	6.50E-09	7.64E-09	1.13E-08	2.62E-07	8.76E-09	0	0	2.26615E-10	0	0.0002	Res
582867.12_4130397.57	582867.12	4130397.57	1.10E-05	5.96E-09	3.58E-09	5.96E-09	7.15E-09	1.03E-08	2.39E-07	7.99E-09	0	0	2.07588E-10	0	0.0002	Res
581848.86_4130481.48	581848.86	4130481.48	1.16E-04	6.20E-08	3.72E-08	6.20E-08	4.67E-08	1.13E-07	2.64E-06	9.19E-08	0	0	2.19338E-09	0	0.0022	Res
581905.43_4130481.48	581905.43	4130481.48	1.07E-04	5.74E-08	3.45E-08	5.74E-08	4.35E-08	1.04E-07	2.44E-06	8.51E-08	0	0	2.03222E-09	0	0.0020	Res
581962_4130481.48	581962	4130481.48	9.14E-05	4.89E-08	2.93E-08	4.89E-08	3.79E-08	8.88E-08	2.08E-06	7.22E-08	0	0	1.73013E-09	0	0.0017	Res
582018.57_4130481.48	582018.57	4130481.48	8.04E-05	4.30E-08	2.58E-08	4.30E-08	3.39E-08	7.80E-08	1.82E-06	6.34E-08	0	0	1.52175E-09	0	0.0015	Res
582075.14_4130481.48	582075.14	4130481.48	6.78E-05	3.63E-08	2.18E-08	3.63E-08	2.93E-08	6.57E-08	1.54E-06	5.33E-08	0	0	1.28388E-09	0	0.0013	Res
582131.71_4130481.48	582131.71	4130481.48	5.74E-05	3.08E-08	1.85E-08	3.08E-08	2.55E-08	5.56E-08	1.30E-06	4.49E-08	0	0	1.08714E-09	0	0.0011	Res
582188.28_4130481.48	582188.28	4130481.48	4.84E-05	2.60E-08	1.56E-08	2.60E-08	2.22E-08	4.68E-08	1.09E-06	3.77E-08	0	0	9.16206E-10	0	0.0009	Res
582244.85_4130481.48	582244.85	4130481.48	4.02E-05	2.16E-08	1.30E-08	2.16E-08	1.92E-08	3.87E-08	9.03E-07	3.11E-08	0	0	7.60819E-10	0	0.0008	Res
582301.42_4130481.48	582301.42	4130481.48	3.36E-05	1.81E-08	1.08E-08	1.81E-08	1.67E-08	3.23E-08	7.52E-07	2.58E-08	0	0	6.35451E-10	0	0.0006	Res
582357.99_4130481.48	582357.99	4130481.48	2.85E-05	1.53E-08	9.21E-09	1.53E-08	1.47E-08	2.73E-08	6.36E-07	2.17E-08	0	0	5.39073E-10	0	0.0005	Res
582414.56_4130481.48	582414.56	4130481.48	2.46E-05	1.33E-08	7.97E-09	1.33E-08	1.32E-08	2.36E-08	5.48E-07	1.87E-08	0	0	4.66042E-10	0	0.0005	Res
582471.13_4130481.48	582471.13	4130481.48	2.15E-05	1.16E-08	6.97E-09	1.16E-08	1.19E-08	2.05E-08	4.77E-07	1.62E-08	0	0	4.07296E-10	0	0.0004	Res
582527.7_4130481.48	582527.7	4130481.48	1.89E-05	1.02E-08	6.14E-09	1.02E-08	1.08E-08	1.80E-08	4.18E-07	1.42E-08	0	0	3.58289E-10	0	0.0004	Res
582584.27_4130481.48	582584.27	4130481.48	1.68E-05	9.10E-09	5.46E-09	9.10E-09	9.93E-09	1.60E-08	3.70E-07	1.25E-08	0	0	3.18125E-10	0	0.0003	Res
582640.84_4130481.48	582640.84	4130481.48	1.50E-05	8.12E-09	4.87E-09	8.12E-09	9.13E-09	1.42E-08	3.29E-07	1.11E-08	0	0	2.83656E-10	0	0.0003	Res
582697.41_4130481.48	582697.41	4130481.48	1.35E-05	7.30E-09	4.38E-09	7.30E-09	8.44E-09	1.27E-08	2.95E-07	9.89E-09	0	0	2.54854E-10	0	0.0003	Res
582753.98_4130481.48	582753.98	4130481.48	1.22E-05	6.64E-09	3.98E-09	6.64E-09	7.86E-09	1.15E-08	2.67E-07	8.92E-09	0	0	2.3125E-10	0	0.0002	Res
582810.55_4130481.48	582810.55	4130481.48	1.12E-05	6.07E-09	3.64E-09	6.07E-09	7.35E-09	1.05E-08	2.43E-07	8.11E-09	0	0	2.11304E-10	0	0.0002	Res
582867.12_4130481.48	582867.12	4130481.48	1.03E-05	5.58E-09	3.35E-09	5.58E-09	6.90E-09	9.65E-09	2.23E-07	7.41E-09	0	0	1.94161E-10	0	0.0002	Res
581735.72_4130565.39	581735.72	4130565.39	1.41E-04	7.52E-08	4.51E-08	7.52E-08	5.44E-08	1.37E-07	3.22E-06	1.12E-07	0	0	2.66623E-09	0	0.0027	Res
581792.29_4130565.39	581792.29	4130565.39	1.39E-04	7.41E-08	4.45E-08	7.41E-08	5.35E-08	1.35E-07	3.17E-06	1.11E-07	0	0	2.62626E-09	0	0.0026	Res

Risk Calculation Part 2, $\sum R1*C_{TAC}$

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)								3rd Trimester	0<2	2<16	16<30	Cancer Risk - 2027	Receptor Type
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Cobalt	Lead	Nickel	Chromium VI					(per million)	
581848.86_4130565.39	581848.86	4130565.39	1.32E-04	7.05E-08	4.23E-08	7.05E-08	5.10E-08	1.29E-07	3.01E-06	1.05E-07	0	0	2.49805E-09	0	0.0025	Res
581905.43_4130565.39	581905.43	4130565.39	1.26E-04	6.73E-08	4.04E-08	6.73E-08	4.88E-08	1.23E-07	2.88E-06	1.01E-07	0	0	2.38577E-09	0	0.0024	Res
581962_4130565.39	581962	4130565.39	1.09E-04	5.81E-08	3.48E-08	5.81E-08	4.27E-08	1.06E-07	2.48E-06	8.65E-08	0	0	2.05644E-09	0	0.0021	Res
582018.57_4130565.39	582018.57	4130565.39	8.77E-05	4.69E-08	2.81E-08	4.69E-08	3.55E-08	8.53E-08	2.00E-06	6.96E-08	0	0	1.66047E-09	0	0.0017	Res
582075.14_4130565.39	582075.14	4130565.39	7.11E-05	3.80E-08	2.28E-08	3.80E-08	2.97E-08	6.90E-08	1.61E-06	5.61E-08	0	0	1.34528E-09	0	0.0013	Res
582131.71_4130565.39	582131.71	4130565.39	5.81E-05	3.11E-08	1.87E-08	3.11E-08	2.51E-08	5.63E-08	1.32E-06	4.57E-08	0	0	1.1005E-09	0	0.0011	Res
582188.28_4130565.39	582188.28	4130565.39	4.66E-05	2.50E-08	1.50E-08	2.50E-08	2.11E-08	4.50E-08	1.05E-06	3.63E-08	0	0	8.81542E-10	0	0.0009	Res
582244.85_4130565.39	582244.85	4130565.39	3.77E-05	2.03E-08	1.22E-08	2.03E-08	1.79E-08	3.64E-08	8.48E-07	2.92E-08	0	0	7.13799E-10	0	0.0007	Res
582301.42_4130565.39	582301.42	4130565.39	3.16E-05	1.70E-08	1.02E-08	1.70E-08	1.57E-08	3.04E-08	7.09E-07	2.43E-08	0	0	5.99061E-10	0	0.0006	Res
582357.99_4130565.39	582357.99	4130565.39	2.67E-05	1.44E-08	8.63E-09	1.44E-08	1.38E-08	2.56E-08	5.96E-07	2.04E-08	0	0	5.05613E-10	0	0.0005	Res
582414.56_4130565.39	582414.56	4130565.39	2.29E-05	1.24E-08	7.41E-09	1.24E-08	1.24E-08	2.19E-08	5.09E-07	1.73E-08	0	0	4.33279E-10	0	0.0004	Res
582471.13_4130565.39	582471.13	4130565.39	1.99E-05	1.07E-08	6.44E-09	1.07E-08	1.12E-08	1.90E-08	4.40E-07	1.49E-08	0	0	3.76285E-10	0	0.0004	Res
582527.7_4130565.39	582527.7	4130565.39	1.75E-05	9.44E-09	5.67E-09	9.44E-09	1.02E-08	1.66E-08	3.85E-07	1.30E-08	0	0	3.30373E-10	0	0.0003	Res
582584.27_4130565.39	582584.27	4130565.39	1.55E-05	8.41E-09	5.05E-09	8.41E-09	9.42E-09	1.47E-08	3.41E-07	1.15E-08	0	0	2.93743E-10	0	0.0003	Res
582640.84_4130565.39	582640.84	4130565.39	1.38E-05	7.51E-09	4.50E-09	7.51E-09	8.69E-09	1.31E-08	3.03E-07	1.02E-08	0	0	2.61868E-10	0	0.0003	Res
582697.41_4130565.39	582697.41	4130565.39	1.25E-05	6.79E-09	4.08E-09	6.79E-09	8.09E-09	1.18E-08	2.73E-07	9.12E-09	0	0	2.36656E-10	0	0.0002	Res
582753.98_4130565.39	582753.98	4130565.39	1.14E-05	6.20E-09	3.72E-09	6.20E-09	7.57E-09	1.07E-08	2.48E-07	8.26E-09	0	0	2.15755E-10	0	0.0002	Res
582810.55_4130565.39	582810.55	4130565.39	1.05E-05	5.71E-09	3.43E-09	5.71E-09	7.13E-09	9.86E-09	2.27E-07	7.56E-09	0	0	1.98562E-10	0	0.0002	Res
582867.12_4130565.39	582867.12	4130565.39	9.72E-06	5.30E-09	3.18E-09	5.30E-09	6.73E-09	9.12E-09	2.10E-07	6.98E-09	0	0	1.8408E-10	0	0.0002	Res
581735.72_4130649.3	581735.72	4130649.3	1.53E-04	8.15E-08	4.89E-08	8.15E-08	5.77E-08	1.49E-07	3.49E-06	1.22E-07	0	0	2.88922E-09	0	0.0029	Res
581792.29_4130649.3	581792.29	4130649.3	1.48E-04	7.89E-08	4.73E-08	7.89E-08	5.57E-08	1.44E-07	3.38E-06	1.18E-07	0	0	2.79621E-09	0	0.0028	Res
581905.43_4130649.3	581905.43	4130649.3	1.48E-04	7.89E-08	4.73E-08	7.89E-08	5.52E-08	1.44E-07	3.38E-06	1.18E-07	0	0	2.79827E-09	0	0.0028	Res
581962_4130649.3	581962	4130649.3	1.23E-04	6.54E-08	3.93E-08	6.54E-08	4.65E-08	1.20E-07	2.80E-06	9.80E-08	0	0	2.3197E-09	0	0.0023	Res
582018.57_4130649.3	582018.57	4130649.3	9.28E-05	4.96E-08	2.98E-08	4.96E-08	3.63E-08	9.04E-08	2.12E-06	7.39E-08	0	0	1.75695E-09	0	0.0018	Res
582075.14_4130649.3	582075.14	4130649.3	7.18E-05	3.84E-08	2.31E-08	3.84E-08	2.91E-08	6.99E-08	1.64E-06	5.70E-08	0	0	1.36014E-09	0	0.0014	Res
582131.71_4130649.3	582131.71	4130649.3	5.56E-05	2.98E-08	1.79E-08	2.98E-08	2.35E-08	5.40E-08	1.26E-06	4.38E-08	0	0	1.05289E-09	0	0.0011	Res
582188.28_4130649.3	582188.28	4130649.3	4.36E-05	2.34E-08	1.40E-08	2.34E-08	1.93E-08	4.22E-08	9.85E-07	3.41E-08	0	0	8.24954E-10	0	0.0008	Res
582244.85_4130649.3	582244.85	4130649.3	3.49E-05	1.87E-08	1.12E-08	1.87E-08	1.63E-08	3.37E-08	7.86E-07	2.71E-08	0	0	6.60539E-10	0	0.0007	Res
582301.42_4130649.3	582301.42	4130649.3	2.87E-05	1.54E-08	9.26E-09	1.54E-08	1.41E-08	2.76E-08	6.43E-07	2.21E-08	0	0	5.4316E-10	0	0.0005	Res
582357.99_4130649.3	582357.99	4130649.3	2.42E-05	1.30E-08	7.82E-09	1.30E-08	1.25E-08	2.32E-08	5.40E-07	1.85E-08	0	0	4.57674E-10	0	0.0005	Res
582414.56_4130649.3	582414.56	4130649.3	2.08E-05	1.12E-08	6.73E-09	1.12E-08	1.13E-08	1.99E-08	4.62E-07	1.57E-08	0	0	3.9374E-10	0	0.0004	Res
582471.13_4130649.3	582471.13	4130649.3	1.81E-05	9.77E-09	5.86E-09	9.77E-09	1.02E-08	1.72E-08	4.00E-07	1.36E-08	0	0	3.42138E-10	0	0.0003	Res
582527.7_4130649.3	582527.7	4130649.3	1.59E-05	8.63E-09	5.18E-09	8.63E-09	9.43E-09	1.51E-08	3.51E-07	1.19E-08	0	0	3.0171E-10	0	0.0003	Res
582584.27_4130649.3	582584.27	4130649.3	1.43E-05	7.73E-09	4.64E-09	7.73E-09	8.76E-09	1.35E-08	3.13E-07	1.05E-08	0	0	2.69878E-10	0	0.0003	Res
582640.84_4130649.3	582640.84	4130649.3	1.29E-05	7.01E-09	4.21E-09	7.01E-09	8.20E-09	1.22E-08	2.82E-07	9.46E-09	0	0	2.44503E-10	0	0.0002	Res
582697.41_4130649.3	582697.41	4130649.3	1.18E-05	6.42E-09	3.85E-09	6.42E-09	7.72E-09	1.11E-08	2.57E-07	8.60E-09	0	0	2.23711E-10	0	0.0002	Res
582753.98_4130649.3	582753.98	4130649.3	1.09E-05	5.95E-09	3.57E-09	5.95E-09	7.31E-09	1.03E-08	2.38E-07	7.92E-09	0	0	2.06983E-10	0	0.0002	Res
582810.55_4130649.3	582810.55	4130649.3	1.02E-05	5.56E-09	3.34E-09	5.56E-09	6.96E-09	9.59E-09	2.21E-07	7.35E-09	0	0	1.93241E-10	0	0.0002	Res
582867.12_4130649.3	582867.12	4130649.3	9.57E-06	5.21E-09	3.13E-09	5.21E-09	6.64E-09	8.97E-09	2.07E-07	6.86E-09	0	0	1.81086E-10	0	0.0002	Res
581848.86_4130733.21	581848.86	4130733.21	2.20E-04	1.17E-07	7.05E-08	1.17E-07	7.95E-08	2.15E-07	5.05E-06	1.77E-07	0	0	4.16983E-09	0	0.0042	Res
581905.43_4130733.21	581905.43	4130733.21	1.88E-04	1.00E-07	6.01E-08	1.00E-07	6.82E-08	1.84E-07	4.31E-06	1.51E-07	0	0	3.55617E-09	0	0.0036	Res
581962_4130733.21	581962	4130733.21	1.38E-04	7.35E-08	4.41E-08	7.35E-08	5.10E-08	1.35E-07	3.15E-06	1.11E-07	0	0	2.60873E-09	0	0.0026	Res
582018.57_4130733.21	582018.57	4130733.21	9.63E-05	5.15E-08	3.09E-08	5.15E-08	3.68E-08	9.40E-08	2.20E-06	7.70E-08	0	0	1.82388E-09	0	0.0018	Res
582075.14_4130733.21	582075.14	4130733.21	6.78E-05	3.62E-08	2.17E-08	3.62E-08	2.70E-08	6.60E-08	1.54E-06	5.39E-08	0	0	1.28337E-09	0	0.0013	Res
582131.71_4130733.21	582131.71	4130733.21	4.93E-05	2.64E-08	1.58E-08	2.64E-08	2.06E-08	4.79E-08	1.12E-06	3.89E-08	0	0	9.33453E-10	0	0.0009	Res
582188.28_4130733.21	582188.28	4130733.21	3.80E-05	2.04E-08	1.22E-08	2.04E-08	1.67E-08	3.68E-08	8.60E-07	2.98E-08	0	0	7.19303E-10	0	0.0007	Res
582244.85_4130733.21	582244.85	4130733.21	3.04E-05	1.63E-08	9.78E-09	1.63E-08	1.41E-08	2.93E-08	6.84E-07	2.36E-08	0	0	5.74899E-10	0	0.0006	Res
582301.42_4130733.21	582301.42	4130733.21	2.51E-05	1.35E-08	8.10E-09	1.35E-08	1.22E-08	2.42E-08	5.63E-07	1.94E-08	0	0	4.75243E-10	0	0.0005	Res
582357.99_4130733.21	582357.99	4130733.21	2.13E-05	1.15E-08	6.89E-09	1.15E-08	1.09E-08	2.05E-08	4.76E-07	1.63E-08	0	0	4.03711E-10	0	0.0004	Res
582414.56_4130733.21	582414.56	4130733.21	1.85E-05	1.00E-08	6.00E-09	1.00E-08	9.94E-09	1.77E-08	4.12E-07	1.41E-08	0	0	3.50778E-10	0	0.0004	Res
582471.13_4130733.21	582471.13	4130733.21	1.64E-05	8.88E-09	5.33E-09	8.88E-09	9.20E-09	1.57E-08	3.64E-07	1.24E-08	0	0	3.11228E-10	0	0.0003	Res
582527.7_4130733.21	582527.7	4130733.21	1.48E-05	8.02E-09	4.81E-09	8.02E-09	8.61E-09	1.41E-08	3.27E-07	1.11E-08	0	0	2.80692E-10	0	0.0003	Res
582584.27_4130733.21	582584.27	4130733.21	1.36E-05	7.34E-09	4.41E-09	7.34E-09	8.13E-09	1.29E-08	2.98E-07	1.01E-08	0	0	2.56634E-10	0	0.0003	Res
582640.84_4130733.21	582640.84	4130733.21	1.25E-05	6.79E-09	4.07E-09	6.79E-09	7.73E-09	1.19E-08	2.75E-07	9.23E-09	0	0	2.36985E-10	0	0.0002	Res
582697.41_4130733.21	582697.41	4130733.21	1.16E-05	6.32E-09	3.79E-09	6.32E-09	7.38E-09	1.10E-08	2.55E-07	8.54E-09	0	0	2.20533E-10	0	0.0002	Res
582753.98_4130733.21	582753.98	4130733.21	1.09E-05	5.92E-09	3.55E-09	5.92E-09	7.07E-09	1.03E-08	2.38E-07	7.95E-09	0	0	2.0625E-10	0	0.0002	Res
582810.55_4130733.21	582810.55	4130733.21	1.03E-05	5.59E-09	3.35E-09	5.59E-09	6.79E-09	9.67E-09	2.23E-07	7.46E-09	0	0	1.94442E-10	0	0.0002	Res

Risk Calculation Part 2, $\sum R1*C_{TAC}$

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)								3rd Trimester	0<2	2<16	16<30	Cancer Risk - 2027	Receptor Type
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Cobalt	Lead	Nickel	Chromium VI					(per million)	
582867.12_4130733.21	582867.12	4130733.21	9.68E-06	5.27E-09	3.16E-09	5.27E-09	6.53E-09	9.10E-09	2.10E-07	7.00E-09	0	0	1.83295E-10	0	0.0002	Res
581735.72_4130817.12	581735.72	4130817.12	3.24E-04	1.73E-07	1.04E-07	1.73E-07	1.15E-07	3.17E-07	7.44E-06	2.61E-07	0	0	6.13842E-09	0	0.0061	Res
581792.29_4130817.12	581792.29	4130817.12	3.66E-04	1.95E-07	1.17E-07	1.95E-07	1.29E-07	3.58E-07	8.41E-06	2.95E-07	0	0	6.9301E-09	0	0.0069	Res
581848.86_4130817.12	581848.86	4130817.12	3.28E-04	1.75E-07	1.05E-07	1.75E-07	1.16E-07	3.21E-07	7.54E-06	2.65E-07	0	0	6.21524E-09	0	0.0062	Res
581905.43_4130817.12	581905.43	4130817.12	2.48E-04	1.32E-07	7.93E-08	1.32E-07	8.84E-08	2.43E-07	5.69E-06	2.00E-07	0	0	4.69548E-09	0	0.0047	Res
581962_4130817.12	581962	4130817.12	1.50E-04	8.01E-08	4.80E-08	8.01E-08	5.48E-08	1.47E-07	3.44E-06	1.21E-07	0	0	2.84096E-09	0	0.0028	Res
582018.57_4130817.12	582018.57	4130817.12	8.95E-05	4.78E-08	2.87E-08	4.78E-08	3.40E-08	8.73E-08	2.05E-06	7.16E-08	0	0	1.69484E-09	0	0.0017	Res
582075.14_4130817.12	582075.14	4130817.12	5.77E-05	3.08E-08	1.85E-08	3.08E-08	2.30E-08	5.61E-08	1.31E-06	4.58E-08	0	0	1.09167E-09	0	0.0011	Res
582131.71_4130817.12	582131.71	4130817.12	4.13E-05	2.21E-08	1.33E-08	2.21E-08	1.74E-08	4.01E-08	9.38E-07	3.26E-08	0	0	7.82303E-10	0	0.0008	Res
582188.28_4130817.12	582188.28	4130817.12	3.19E-05	1.71E-08	1.03E-08	1.71E-08	1.41E-08	3.09E-08	7.22E-07	2.50E-08	0	0	6.04359E-10	0	0.0006	Res
582244.85_4130817.12	582244.85	4130817.12	2.60E-05	1.40E-08	8.38E-09	1.40E-08	1.20E-08	2.51E-08	5.86E-07	2.02E-08	0	0	4.92647E-10	0	0.0005	Res
582301.42_4130817.12	582301.42	4130817.12	2.21E-05	1.19E-08	7.14E-09	1.19E-08	1.07E-08	2.13E-08	4.97E-07	1.71E-08	0	0	4.18821E-10	0	0.0004	Res
582357.99_4130817.12	582357.99	4130817.12	1.94E-05	1.04E-08	6.26E-09	1.04E-08	9.69E-09	1.86E-08	4.34E-07	1.49E-08	0	0	3.66734E-10	0	0.0004	Res
582414.56_4130817.12	582414.56	4130817.12	1.73E-05	9.32E-09	5.59E-09	9.32E-09	8.97E-09	1.66E-08	3.86E-07	1.32E-08	0	0	3.27413E-10	0	0.0003	Res
582471.13_4130817.12	582471.13	4130817.12	1.57E-05	8.47E-09	5.08E-09	8.47E-09	8.42E-09	1.50E-08	3.50E-07	1.19E-08	0	0	2.97403E-10	0	0.0003	Res
582527.7_4130817.12	582527.7	4130817.12	1.44E-05	7.76E-09	4.66E-09	7.76E-09	7.95E-09	1.37E-08	3.19E-07	1.08E-08	0	0	2.7218E-10	0	0.0003	Res
582584.27_4130817.12	582584.27	4130817.12	1.33E-05	7.19E-09	4.31E-09	7.19E-09	7.57E-09	1.27E-08	2.94E-07	9.97E-09	0	0	2.51622E-10	0	0.0003	Res
582640.84_4130817.12	582640.84	4130817.12	1.24E-05	6.69E-09	4.01E-09	6.69E-09	7.25E-09	1.18E-08	2.73E-07	9.22E-09	0	0	2.3408E-10	0	0.0002	Res
582697.41_4130817.12	582697.41	4130817.12	1.16E-05	6.26E-09	3.76E-09	6.26E-09	6.96E-09	1.10E-08	2.54E-07	8.57E-09	0	0	2.18717E-10	0	0.0002	Res
582753.98_4130817.12	582753.98	4130817.12	1.08E-05	5.86E-09	3.52E-09	5.86E-09	6.68E-09	1.02E-08	2.37E-07	7.97E-09	0	0	2.04625E-10	0	0.0002	Res
582810.55_4130817.12	582810.55	4130817.12	1.02E-05	5.52E-09	3.31E-09	5.52E-09	6.44E-09	9.60E-09	2.22E-07	7.45E-09	0	0	1.92377E-10	0	0.0002	Res
582867.12_4130817.12	582867.12	4130817.12	9.59E-06	5.21E-09	3.13E-09	5.21E-09	6.22E-09	9.05E-09	2.09E-07	6.99E-09	0	0	1.81513E-10	0	0.0002	Res
581735.72_4130901.03	581735.72	4130901.03	6.46E-04	3.44E-07	2.06E-07	3.44E-07	2.24E-07	6.32E-07	1.48E-05	5.22E-07	0	0	1.2222E-08	0	0.0122	Res
581792.29_4130901.03	581792.29	4130901.03	6.89E-04	3.67E-07	2.20E-07	3.67E-07	2.39E-07	6.75E-07	1.58E-05	5.57E-07	0	0	1.30531E-08	0	0.0131	Res
581848.86_4130901.03	581848.86	4130901.03	6.14E-04	3.27E-07	1.96E-07	3.27E-07	2.13E-07	6.02E-07	1.41E-05	4.96E-07	0	0	1.16321E-08	0	0.0116	Res
581905.43_4130901.03	581905.43	4130901.03	3.22E-04	1.72E-07	1.03E-07	1.72E-07	1.13E-07	3.15E-07	7.40E-06	2.60E-07	0	0	6.09979E-09	0	0.0061	Res
581962_4130901.03	581962	4130901.03	1.30E-04	6.95E-08	4.17E-08	6.95E-08	4.78E-08	1.27E-07	2.98E-06	1.05E-07	0	0	2.46575E-09	0	0.0025	Res
582018.57_4130901.03	582018.57	4130901.03	6.95E-05	3.71E-08	2.23E-08	3.71E-08	2.70E-08	6.77E-08	1.59E-06	5.54E-08	0	0	1.31552E-09	0	0.0013	Res
582075.14_4130901.03	582075.14	4130901.03	4.64E-05	2.48E-08	1.49E-08	2.48E-08	1.89E-08	4.51E-08	1.05E-06	3.67E-08	0	0	8.77724E-10	0	0.0009	Res
582131.71_4130901.03	582131.71	4130901.03	3.53E-05	1.89E-08	1.14E-08	1.89E-08	1.50E-08	3.43E-08	8.01E-07	2.78E-08	0	0	6.68669E-10	0	0.0007	Res
582188.28_4130901.03	582188.28	4130901.03	2.88E-05	1.55E-08	9.27E-09	1.55E-08	1.27E-08	2.79E-08	6.52E-07	2.26E-08	0	0	5.45567E-10	0	0.0005	Res
582244.85_4130901.03	582244.85	4130901.03	2.44E-05	1.31E-08	7.86E-09	1.31E-08	1.11E-08	2.36E-08	5.51E-07	1.90E-08	0	0	4.62104E-10	0	0.0005	Res
582301.42_4130901.03	582301.42	4130901.03	2.12E-05	1.14E-08	6.82E-09	1.14E-08	9.94E-09	2.04E-08	4.76E-07	1.64E-08	0	0	4.00463E-10	0	0.0004	Res
582357.99_4130901.03	582357.99	4130901.03	1.87E-05	1.00E-08	6.02E-09	1.00E-08	9.04E-09	1.80E-08	4.19E-07	1.44E-08	0	0	3.53545E-10	0	0.0004	Res
582414.56_4130901.03	582414.56	4130901.03	1.67E-05	8.98E-09	5.39E-09	8.98E-09	8.32E-09	1.60E-08	3.74E-07	1.28E-08	0	0	3.1592E-10	0	0.0003	Res
582471.13_4130901.03	582471.13	4130901.03	1.51E-05	8.13E-09	4.88E-09	8.13E-09	7.76E-09	1.45E-08	3.37E-07	1.15E-08	0	0	2.85845E-10	0	0.0003	Res
582527.7_4130901.03	582527.7	4130901.03	1.38E-05	7.43E-09	4.46E-09	7.43E-09	7.29E-09	1.32E-08	3.07E-07	1.05E-08	0	0	2.60724E-10	0	0.0003	Res
582584.27_4130901.03	582584.27	4130901.03	1.27E-05	6.85E-09	4.11E-09	6.85E-09	6.92E-09	1.21E-08	2.82E-07	9.60E-09	0	0	2.4031E-10	0	0.0002	Res
582640.84_4130901.03	582640.84	4130901.03	1.18E-05	6.37E-09	3.82E-09	6.37E-09	6.61E-09	1.12E-08	2.61E-07	8.87E-09	0	0	2.23167E-10	0	0.0002	Res
582697.41_4130901.03	582697.41	4130901.03	1.10E-05	5.95E-09	3.57E-09	5.95E-09	6.34E-09	1.05E-08	2.43E-07	8.23E-09	0	0	2.08357E-10	0	0.0002	Res
582753.98_4130901.03	582753.98	4130901.03	1.03E-05	5.59E-09	3.35E-09	5.59E-09	6.11E-09	9.80E-09	2.27E-07	7.68E-09	0	0	1.9536E-10	0	0.0002	Res
582810.55_4130901.03	582810.55	4130901.03	9.70E-06	5.26E-09	3.15E-09	5.26E-09	5.90E-09	9.19E-09	2.13E-07	7.17E-09	0	0	1.83575E-10	0	0.0002	Res
582867.12_4130901.03	582867.12	4130901.03	9.16E-06	4.97E-09	2.98E-09	4.97E-09	5.72E-09	8.67E-09	2.01E-07	6.74E-09	0	0	1.7343E-10	0	0.0002	Res
581735.72_4130984.94	581735.72	4130984.94	1.72E-03	9.18E-07	5.51E-07	9.18E-07	5.91E-07	1.69E-06	3.96E-05	1.39E-06	0	0	3.2607E-08	0	0.0326	Res
581792.29_4130984.94	581792.29	4130984.94	2.26E-03	1.20E-06	7.23E-07	1.20E-06	7.75E-07	2.22E-06	5.20E-05	1.83E-06	0	0	4.28132E-08	0	0.0428	Res
581848.86_4130984.94	581848.86	4130984.94	2.63E-03	1.40E-06	8.41E-07	1.40E-06	9.01E-07	2.58E-06	6.05E-05	2.13E-06	0	0	4.98108E-08	0	0.0498	Res
581905.43_4130984.94	581905.43	4130984.94	2.09E-04	1.11E-07	6.68E-08	1.11E-07	7.46E-08	2.04E-07	4.79E-06	1.68E-07	0	0	3.9505E-09	0	0.0040	Res
581962_4130984.94	581962	4130984.94	8.91E-05	4.76E-08	2.85E-08	4.76E-08	3.37E-08	8.69E-08	2.04E-06	7.13E-08	0	0	1.68684E-09	0	0.0017	Res
582018.57_4130984.94	582018.57	4130984.94	5.71E-05	3.05E-08	1.83E-08	3.05E-08	2.26E-08	5.56E-08	1.30E-06	4.54E-08	0	0	1.08066E-09	0	0.0011	Res
582075.14_4130984.94	582075.14	4130984.94	4.19E-05	2.24E-08	1.34E-08	2.24E-08	1.73E-08	4.07E-08	9.51E-07	3.31E-08	0	0	7.92473E-10	0	0.0008	Res
582131.71_4130984.94	582131.71	4130984.94	3.29E-05	1.76E-08	1.06E-08	1.76E-08	1.41E-08	3.19E-08	7.46E-07	2.59E-08	0	0	6.23293E-10	0	0.0006	Res
582188.28_4130984.94	582188.28	4130984.94	2.70E-05	1.45E-08	8.68E-09	1.45E-08	1.19E-08	2.61E-08	6.10E-07	2.11E-08	0	0	5.10862E-10	0	0.0005	Res
582244.85_4130984.94	582244.85	4130984.94	2.28E-05	1.22E-08	7.33E-09	1.22E-08	1.04E-08	2.20E-08	5.14E-07	1.78E-08	0	0	4.31141E-10	0	0.0004	Res
582301.42_4130984.94	582301.42	4130984.94	1.97E-05	1.06E-08	6.34E-09	1.06E-08	9.22E-09	1.90E-08	4.43E-07	1.53E-08	0	0	3.72193E-10	0	0.0004	Res
582357.99_4130984.94	582357.99	4130984.94	1.73E-05	9.29E-09	5.57E-09	9.29E-09	8.32E-09	1.67E-08	3.88E-07	1.34E-08	0	0	3.27234E-10	0	0.0003	Res
582414.56_4130984.94	582414.56	4130984.94	1.54E-05	8.29E-09	4.97E-09	8.29E-09	7.62E-09	1.48E-08	3.45E-07	1.19E-08	0	0	2.91761E-10	0	0.0003	Res
582471.13_4130984.94	582471.13	4130984.94	1.39E-05	7.48E-09	4.49E-09	7.48E-09	7.05E-09	1.33E-08	3.11E-07	1.07E-08	0	0	2.63167E-10	0	0.0003	Res

Risk Calculation Part 2, $\sum R1*C_{TAC}$

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)								3rd Trimester	0<2	2<16	16<30	Cancer Risk - 2027	Receptor Type
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Cobalt	Lead	Nickel	Chromium VI					(per million)	
582527.7_4130984.94	582527.7	4130984.94	1.27E-05	6.82E-09	4.09E-09	6.82E-09	6.58E-09	1.21E-08	2.82E-07	9.65E-09	0	0	2.39619E-10	0	0.0002	Res
582584.27_4130984.94	582584.27	4130984.94	1.17E-05	6.29E-09	3.77E-09	6.29E-09	6.22E-09	1.12E-08	2.60E-07	8.85E-09	0	0	2.20718E-10	0	0.0002	Res
582640.84_4130984.94	582640.84	4130984.94	1.09E-05	5.86E-09	3.51E-09	5.86E-09	5.93E-09	1.04E-08	2.41E-07	8.20E-09	0	0	2.05436E-10	0	0.0002	Res
582697.41_4130984.94	582697.41	4130984.94	1.01E-05	5.47E-09	3.28E-09	5.47E-09	5.67E-09	9.66E-09	2.24E-07	7.62E-09	0	0	1.91642E-10	0	0.0002	Res
582753.98_4130984.94	582753.98	4130984.94	9.53E-06	5.15E-09	3.09E-09	5.15E-09	5.47E-09	9.07E-09	2.11E-07	7.13E-09	0	0	1.80408E-10	0	0.0002	Res
582810.55_4130984.94	582810.55	4130984.94	8.99E-06	4.87E-09	2.92E-09	4.87E-09	5.29E-09	8.55E-09	1.98E-07	6.70E-09	0	0	1.70192E-10	0	0.0002	Res
582867.12_4130984.94	582867.12	4130984.94	8.51E-06	4.61E-09	2.77E-09	4.61E-09	5.13E-09	8.07E-09	1.87E-07	6.31E-09	0	0	1.61067E-10	0	0.0002	Res
581735.72_4131068.85	581735.72	4131068.85	2.81E-04	1.50E-07	8.98E-08	1.50E-07	9.96E-08	2.75E-07	6.44E-06	2.26E-07	0	0	5.31448E-09	0	0.0053	Res
581792.29_4131068.85	581792.29	4131068.85	2.24E-04	1.19E-07	7.16E-08	1.19E-07	8.00E-08	2.19E-07	5.13E-06	1.80E-07	0	0	4.23612E-09	0	0.0042	Res
581848.86_4131068.85	581848.86	4131068.85	1.20E-04	6.41E-08	3.84E-08	6.41E-08	4.45E-08	1.17E-07	2.75E-06	9.63E-08	0	0	2.27312E-09	0	0.0023	Res
581905.43_4131068.85	581905.43	4131068.85	7.62E-05	4.07E-08	2.44E-08	4.07E-08	2.93E-08	7.43E-08	1.74E-06	6.08E-08	0	0	1.44251E-09	0	0.0014	Res
581962_4131068.85	581962	4131068.85	5.50E-05	2.94E-08	1.76E-08	2.94E-08	2.20E-08	5.35E-08	1.25E-06	4.37E-08	0	0	1.04079E-09	0	0.0010	Res
582018.57_4131068.85	582018.57	4131068.85	4.15E-05	2.22E-08	1.33E-08	2.22E-08	1.72E-08	4.03E-08	9.42E-07	3.28E-08	0	0	7.85285E-10	0	0.0008	Res
582075.14_4131068.85	582075.14	4131068.85	3.27E-05	1.75E-08	1.05E-08	1.75E-08	1.41E-08	3.17E-08	7.42E-07	2.57E-08	0	0	6.19803E-10	0	0.0006	Res
582131.71_4131068.85	582131.71	4131068.85	2.68E-05	1.44E-08	8.64E-09	1.44E-08	1.20E-08	2.60E-08	6.07E-07	2.10E-08	0	0	5.08248E-10	0	0.0005	Res
582188.28_4131068.85	582188.28	4131068.85	2.26E-05	1.21E-08	7.27E-09	1.21E-08	1.04E-08	2.18E-08	5.09E-07	1.76E-08	0	0	4.27149E-10	0	0.0004	Res
582244.85_4131068.85	582244.85	4131068.85	1.94E-05	1.04E-08	6.25E-09	1.04E-08	9.16E-09	1.87E-08	4.36E-07	1.50E-08	0	0	3.6732E-10	0	0.0004	Res
582301.42_4131068.85	582301.42	4131068.85	1.70E-05	9.12E-09	5.47E-09	9.12E-09	8.22E-09	1.63E-08	3.81E-07	1.31E-08	0	0	3.21133E-10	0	0.0003	Res
582357.99_4131068.85	582357.99	4131068.85	1.50E-05	8.09E-09	4.85E-09	8.09E-09	7.45E-09	1.45E-08	3.37E-07	1.16E-08	0	0	2.84603E-10	0	0.0003	Res
582414.56_4131068.85	582414.56	4131068.85	1.35E-05	7.27E-09	4.36E-09	7.27E-09	6.84E-09	1.30E-08	3.02E-07	1.03E-08	0	0	2.55604E-10	0	0.0003	Res
582471.13_4131068.85	582471.13	4131068.85	1.22E-05	6.60E-09	3.96E-09	6.60E-09	6.33E-09	1.17E-08	2.73E-07	9.35E-09	0	0	2.31812E-10	0	0.0002	Res
582527.7_4131068.85	582527.7	4131068.85	1.12E-05	6.04E-09	3.62E-09	6.04E-09	5.90E-09	1.07E-08	2.50E-07	8.52E-09	0	0	2.11985E-10	0	0.0002	Res
582584.27_4131068.85	582584.27	4131068.85	1.03E-05	5.56E-09	3.33E-09	5.56E-09	5.54E-09	9.85E-09	2.29E-07	7.81E-09	0	0	1.94931E-10	0	0.0002	Res
582640.84_4131068.85	582640.84	4131068.85	9.64E-06	5.20E-09	3.12E-09	5.20E-09	5.27E-09	9.21E-09	2.14E-07	7.29E-09	0	0	1.82506E-10	0	0.0002	Res
582697.41_4131068.85	582697.41	4131068.85	9.04E-06	4.89E-09	2.93E-09	4.89E-09	5.04E-09	8.63E-09	2.00E-07	6.81E-09	0	0	1.71223E-10	0	0.0002	Res
582753.98_4131068.85	582753.98	4131068.85	8.57E-06	4.63E-09	2.78E-09	4.63E-09	4.86E-09	8.16E-09	1.90E-07	6.43E-09	0	0	1.62165E-10	0	0.0002	Res
582810.55_4131068.85	582810.55	4131068.85	8.14E-06	4.40E-09	2.64E-09	4.40E-09	4.71E-09	7.75E-09	1.80E-07	6.09E-09	0	0	1.54136E-10	0	0.0002	Res
582867.12_4131068.85	582867.12	4131068.85	7.70E-06	4.17E-09	2.50E-09	4.17E-09	4.55E-09	7.31E-09	1.70E-07	5.73E-09	0	0	1.45711E-10	0	0.0001	Res
582018.57_4131152.76	582018.57	4131152.76	2.75E-05	1.47E-08	8.85E-09	1.47E-08	1.23E-08	2.66E-08	6.21E-07	2.15E-08	0	0	5.20345E-10	0	0.0005	Res
582244.85_4131152.76	582244.85	4131152.76	1.63E-05	8.76E-09	5.25E-09	8.76E-09	8.05E-09	1.57E-08	3.65E-07	1.25E-08	0	0	3.08171E-10	0	0.0003	Res
582301.42_4131152.76	582301.42	4131152.76	1.46E-05	7.85E-09	4.71E-09	7.85E-09	7.37E-09	1.40E-08	3.26E-07	1.12E-08	0	0	2.76112E-10	0	0.0003	Res
582357.99_4131152.76	582357.99	4131152.76	1.31E-05	7.06E-09	4.23E-09	7.06E-09	6.76E-09	1.26E-08	2.93E-07	1.00E-08	0	0	2.48017E-10	0	0.0002	Res
582414.56_4131152.76	582414.56	4131152.76	1.19E-05	6.40E-09	3.84E-09	6.40E-09	6.24E-09	1.14E-08	2.65E-07	9.04E-09	0	0	2.24792E-10	0	0.0002	Res
582471.13_4131152.76	582471.13	4131152.76	1.07E-05	5.78E-09	3.47E-09	5.78E-09	5.75E-09	1.03E-08	2.39E-07	8.13E-09	0	0	2.02983E-10	0	0.0002	Res
582527.7_4131152.76	582527.7	4131152.76	9.81E-06	5.29E-09	3.18E-09	5.29E-09	5.35E-09	9.37E-09	2.18E-07	7.42E-09	0	0	1.85698E-10	0	0.0002	Res
582584.27_4131152.76	582584.27	4131152.76	9.03E-06	4.88E-09	2.93E-09	4.88E-09	5.01E-09	8.62E-09	2.00E-07	6.81E-09	0	0	1.70942E-10	0	0.0002	Res
582640.84_4131152.76	582640.84	4131152.76	8.40E-06	4.54E-09	2.73E-09	4.54E-09	4.73E-09	8.02E-09	1.86E-07	6.32E-09	0	0	1.59123E-10	0	0.0002	Res
582697.41_4131152.76	582697.41	4131152.76	7.88E-06	4.26E-09	2.55E-09	4.26E-09	4.49E-09	7.50E-09	1.74E-07	5.90E-09	0	0	1.49108E-10	0	0.0001	Res
582753.98_4131152.76	582753.98	4131152.76	7.49E-06	4.05E-09	2.43E-09	4.05E-09	4.32E-09	7.13E-09	1.65E-07	5.60E-09	0	0	1.41724E-10	0	0.0001	Res
582810.55_4131152.76	582810.55	4131152.76	7.13E-06	3.86E-09	2.31E-09	3.86E-09	4.17E-09	6.78E-09	1.57E-07	5.32E-09	0	0	1.34904E-10	0	0.0001	Res
582867.12_4131152.76	582867.12	4131152.76	6.74E-06	3.65E-09	2.19E-09	3.65E-09	4.01E-09	6.40E-09	1.48E-07	5.01E-09	0	0	1.27655E-10	0	0.0001	Res

HRA Permanente Creek Restoration Project

Construction Year 2028

Emissions Inputs

Construction Activity	Construction Year & Source	DPM Exhaust (tons/year)	PM10 Dust for speciation (tons/year)	Arsenic (tons/year)	Beryllium (tons/year)	Cadmium (tons/year)	Cobalt (tons/year)	Copper (tons/year)	Lead (tons/year)	Mercury (tons/year)	Nickel (tons/year)	Selenium (tons/year)	Chromium VI (tons/year)	Crystalline Silica (tons/year)
Concrete Channel 2024	2024_CONCRTE	0.000	0.00	2.91E-12	1.74E-12	2.91E-12	1.49E-11	3.26E-11	2.91E-12	4.65E-13	5.35E-11	5.81E-12	2.33E-13	8.63E-09
Paved road	2024_PAVED	2.07E-04	0.08	1.04E-07	6.26E-08	1.04E-07	6.68E-08	2.09E-06	1.92E-07	1.17E-08	4.51E-06	2.09E-07	1.59E-07	5.93E-04
Unpaved road	2024_CCP_UNPV	6.27E-05	0.20	2.56E-07	1.54E-07	2.56E-07	1.64E-07	5.12E-06	4.71E-07	2.87E-08	1.11E-05	5.12E-07	3.89E-07	1.46E-03
Channel Widening 2024	2024_CHAN_RCK	0.002	0.16	2.05E-07	1.23E-07	2.05E-07	1.05E-06	2.29E-06	2.05E-07	3.28E-08	3.77E-06	4.09E-07	1.64E-08	6.08E-04
Paved road	2024_PAVED	1.80E-03	2.39	2.99E-06	1.79E-06	2.99E-06	1.91E-06	5.98E-05	5.50E-06	3.35E-07	1.29E-04	5.98E-06	4.54E-06	1.70E-02
Rock Pile Area 2025	2025_CHAN_RCK	0.006	0.25	3.16E-07	1.89E-07	3.16E-07	1.62E-06	3.54E-06	3.16E-07	5.05E-08	5.81E-06	6.31E-07	2.53E-08	9.37E-04
Paved road	2025_PAVED	5.95E-03	2.44	3.05E-06	1.83E-06	3.05E-06	1.95E-06	6.10E-05	5.61E-06	3.41E-07	1.32E-04	6.10E-06	4.63E-06	1.73E-02
Rock Pile Area 2026	2026_CHAN_RCK	0.006	0.25	3.16E-07	1.89E-07	3.16E-07	1.62E-06	3.54E-06	3.16E-07	5.05E-08	5.81E-06	6.31E-07	2.53E-08	9.37E-04
Paved road	2026_PAVED	5.84E-03	2.44	3.05E-06	1.83E-06	3.05E-06	1.95E-06	6.10E-05	5.61E-06	3.41E-07	1.32E-04	6.10E-06	4.63E-06	1.73E-02
Channel Widening 2027	2027_CHAN_RCK	0.002	0.98	1.23E-06	7.36E-07	1.23E-06	6.28E-06	1.37E-05	1.23E-06	1.96E-07	2.26E-05	2.45E-06	9.82E-08	3.64E-03
Paved road	2027_PAVED	5.61E-03	2.39	2.99E-06	1.79E-06	2.99E-06	1.91E-06	5.98E-05	5.50E-06	3.35E-07	1.29E-04	5.98E-06	4.54E-06	1.70E-02
Material Removal 2028	2028_MATRMVL	0.001	0.25	3.15E-07	1.89E-07	3.15E-07	1.62E-06	3.53E-06	3.15E-07	5.05E-08	5.80E-06	6.31E-07	2.52E-08	9.37E-04
Paved road	2028_PAVED	5.57E-03	2.39	2.99E-06	1.80E-06	2.99E-06	1.92E-06	5.98E-05	5.51E-06	3.35E-07	1.29E-04	5.98E-06	4.55E-06	1.70E-02
Unpaved road	2028_UNPAVED	3.40E-03	11.84	1.48E-05	8.88E-06	1.48E-05	9.47E-06	2.96E-04	2.72E-05	1.66E-06	6.40E-04	2.96E-05	2.25E-05	8.41E-02
Material Removal 2029	2029_MATRMVL	0.001	0.25	3.15E-07	1.89E-07	3.15E-07	1.62E-06	3.53E-06	3.15E-07	5.05E-08	5.80E-06	6.31E-07	2.52E-08	9.37E-04
Paved road	2029_PAVED	5.56E-03	2.41	3.01E-06	1.81E-06	3.01E-06	1.93E-06	6.03E-05	5.55E-06	3.38E-07	1.30E-04	6.03E-06	4.58E-06	1.71E-02
Unpaved road	2029_UNPAVED	3.39E-03	11.93	1.49E-05	8.95E-06	1.49E-05	9.55E-06	2.98E-04	2.74E-05	1.67E-06	6.44E-04	2.98E-05	2.27E-05	8.47E-02

Construction Activity	Construction Year	DPM (g/s)	Arsenic (g/s)	Beryllium (g/s)	Cadmium (g/s)	Cobalt (g/s)	Copper (g/s)	Lead (g/s)	Mercury (g/s)	Nickel (g/s)	Selenium (g/s)	Chromium VI (g/s)	Crystalline Silica (g/s)
Concrete Channel 2024	2024_CONCRTE	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Paved road	2024_PAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Unpaved road	2024_CCP_UNPV	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Channel Widening 2024	2024_CHAN_RCK	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Paved road	2024_PAVED	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Rock Pile Area 2025	2025_CHAN_RCK	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Paved road	2025_PAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Rock Pile Area 2026	2026_CHAN_RCK	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Paved road	2026_PAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Channel Widening 2027	2027_CHAN_RCK	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Paved road	2027_PAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Material Removal 2028	2028_MATRMVL	3.324E-05	9.075E-09	5.445E-09	9.075E-09	4.647E-08	1.016E-07	9.075E-09	1.452E-09	1.670E-07	1.815E-08	7.260E-10	2.696E-05
Paved road	2028_PAVED	1.603E-04	8.608E-08	5.165E-08	8.608E-08	5.509E-08	1.722E-06	1.584E-07	9.641E-09	3.719E-06	1.722E-07	1.308E-07	4.889E-04
Unpaved road	2028_UNPAVED	9.795E-05	4.259E-07	2.555E-07	4.259E-07	2.726E-07	8.517E-06	7.836E-07	4.770E-08	1.840E-05	8.517E-07	6.473E-07	2.419E-03
Material Removal 2029	2029_MATRMVL	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Paved road	2029_PAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Unpaved road	2029_UNPAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

N/A = not including PM10 on-site dust in HRA calculation; it is only for speciating metals.

Exposure Duration, ED

	Exposure Start	3rd Trimester	0<2	2<16	16<30
Years	1/1/2028	0	0	1	0

Risk Factors

	Abbreviation	UOM	3rd Trimester	0<2	2<16	16<30
Daily Breathing Rate (95th %'ile)	DBR	L/kg-day	361	581	581	302
Fraction Of Time At Home [a]	FAH	unitless	0.85	0.85	0.72	0.73
Exposure Frequency	EF	days/year	0.96	0.96	0.96	0.96
Age Sensitivity Factor	ASF	unitless	10	10	3	1.7
Inhalation Absorption Factor	A	unitless	1	1	1	1
Conversion Factor	CF_1	m^3/L	0.001	0.001	0.001	0.001
Conversion Factor	CF_2	$\mu g/m^3$	0.001	0.001	0.001	0.001
Averaging Time (for residential exposure)	AT	years	70.00	70.00	70.00	70.00

[a] assume school or daycare will have cancer risk of >1 per million

Cancer Potency Factor, CPF

TAC	UOM	
DPM	$mg/kg\text{-}day^{-1}$	1.1
Arsenic	$mg/kg\text{-}day^{-1}$	12
Beryllium	$mg/kg\text{-}day^{-1}$	8.4
Cadmium	$mg/kg\text{-}day^{-1}$	15
Cobalt	$mg/kg\text{-}day^{-1}$	27
Lead	$mg/kg\text{-}day^{-1}$	0.04
Nickel	$mg/kg\text{-}day^{-1}$	0.91
Chromium VI	$mg/kg\text{-}day^{-1}$	510

Intake Factor for Inhalation, IF (m^3/kg-day)

Equation	3rd Trimester	0<2	2<16	16<30
DBR*FAH*EF*ED*ASF*A*CF/AT	0.000	0.000	0.017	0.000

Risk Calculation Part 1, R1

	TAC	3rd Trimester	0<2	2<16	16<30
IF*CPF*CF	DPM	0.00E+00	0.00E+00	1.89E-05	0.00E+00
	Arsenic	0.00E+00	0.00E+00	2.07E-04	0.00E+00
	Beryllium	0.00E+00	0.00E+00	1.45E-04	0.00E+00
	Cadmium	0.00E+00	0.00E+00	2.58E-04	0.00E+00
	Cobalt	0.00E+00	0.00E+00	4.65E-04	0.00E+00
	Lead	0.00E+00	0.00E+00	6.88E-07	0.00E+00
	Nickel	0.00E+00	0.00E+00	1.57E-05	0.00E+00
	Chromium VI	0.00E+00	0.00E+00	8.78E-03	0.00E+00

Risk Calculation Part 2, $\sum R1*C_{TAC}$

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)								3rd Trimester	0<2	2<16	16<30	Cancer Risk - 2028	Receptor Type
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Cobalt	Lead	Nickel	Chromium VI					(per million)	
581336.22_4131207.48	581336.22	4131207.48	1.87E-04	1.10E-07	6.58E-08	1.10E-07	7.08E-08	2.02E-07	4.73E-06	1.66E-07	0	0	3.53956E-09	0	0.0035	CT House
581554.22_4130688.06	581554.22	4130688.06	1.25E-04	7.92E-08	4.75E-08	7.92E-08	5.13E-08	1.46E-07	3.42E-06	1.20E-07	0	0	2.37473E-09	0	0.0024	Res
579793.36_4131503.29	579793.36	4131503.29	1.11E-05	2.14E-08	1.29E-08	2.14E-08	1.47E-08	3.92E-08	9.20E-07	3.22E-08	0	0	2.10303E-10	0	0.0002	Acute
580488.37_4131517.71	580488.37	4131517.71	1.46E-05	1.75E-08	1.05E-08	1.75E-08	1.17E-08	3.21E-08	7.53E-07	2.64E-08	0	0	2.771E-10	0	0.0003	Acute
581678.43_4131040.03	581678.43	4131040.03	5.93E-04	3.26E-07	1.96E-07	3.26E-07	2.09E-07	6.00E-07	1.41E-05	4.96E-07	0	0	1.12208E-08	0	0.0112	Res
581635.43_4130978.54	581635.43	4130978.54	1.20E-03	6.53E-07	3.92E-07	6.53E-07	4.18E-07	1.20E-06	2.82E-05	9.92E-07	0	0	2.2713E-08	0	0.0227	Res
581830.06_4131027.55	581830.06	4131027.55	5.46E-04	3.00E-07	1.80E-07	3.00E-07	1.93E-07	5.53E-07	1.30E-05	4.56E-07	0	0	1.03356E-08	0	0.0103	Res
581727.48_4130976.54	581727.48	4130976.54	1.45E-03	7.88E-07	4.73E-07	7.88E-07	5.05E-07	1.45E-06	3.40E-05	1.20E-06	0	0	2.74954E-08	0	0.0275	Res
581789.11_4130419.65	581789.11	4130419.65	9.48E-05	6.23E-08	3.74E-08	6.23E-08	4.06E-08	1.15E-07	2.69E-06	9.45E-08	0	0	1.79514E-09	0	0.0018	Res
581700.32_4130781.89	581700.32	4130781.89	2.88E-04	1.64E-07	9.85E-08	1.64E-07	1.06E-07	3.02E-07	7.09E-06	2.49E-07	0	0	5.45481E-09	0	0.0055	Res
581426.07_4131299.01	581426.07	4131299.01	6.79E-05	4.44E-08	2.67E-08	4.44E-08	2.90E-08	8.17E-08	1.92E-06	6.74E-08	0	0	1.28579E-09	0	0.0013	Acute
582301.42_4129474.56	582301.42	4129474.56	3.02E-05	2.48E-08	1.49E-08	2.48E-08	1.64E-08	4.55E-08	1.07E-06	3.75E-08	0	0	5.72076E-10	0	0.0006	Res
582357.99_4129474.56	582357.99	4129474.56	2.83E-05	2.34E-08	1.40E-08	2.34E-08	1.55E-08	4.29E-08	1.01E-06	3.53E-08	0	0	5.35213E-10	0	0.0005	Res
582414.56_4129474.56	582414.56	4129474.56	2.65E-05	2.21E-08	1.32E-08	2.21E-08	1.47E-08	4.05E-08	9.50E-07	3.34E-08	0	0	5.01813E-10	0	0.0005	Res
582471.13_4129474.56	582471.13	4129474.56	2.49E-05	2.09E-08	1.25E-08	2.09E-08	1.39E-08	3.83E-08	8.99E-07	3.16E-08	0	0	4.71652E-10	0	0.0005	Res
582527.7_4129474.56	582527.7	4129474.56	2.35E-05	1.99E-08	1.19E-08	1.99E-08	1.32E-08	3.64E-08	8.55E-07	3.00E-08	0	0	4.45726E-10	0	0.0004	Res
582584.27_4129474.56	582584.27	4129474.56	2.22E-05	1.88E-08	1.13E-08	1.88E-08	1.26E-08	3.45E-08	8.10E-07	2.85E-08	0	0	4.19533E-10	0	0.0004	Res
582640.84_4129474.56	582640.84	4129474.56	2.07E-05	1.78E-08	1.07E-08	1.78E-08	1.19E-08	3.26E-08	7.65E-07	2.69E-08	0	0	3.91691E-10	0	0.0004	Res
582244.85_4129558.47	582244.85	4129558.47	3.05E-05	2.52E-08	1.51E-08	2.52E-08	1.67E-08	4.62E-08	1.08E-06	3.80E-08	0	0	5.77921E-10	0	0.0006	Res
582301.42_4129558.47	582301.42	4129558.47	3.03E-05	2.46E-08	1.48E-08	2.46E-08	1.63E-08	4.51E-08	1.06E-06	3.72E-08	0	0	5.73084E-10	0	0.0006	Res
582357.99_4129558.47	582357.99	4129558.47	2.88E-05	2.34E-08	1.40E-08	2.34E-08	1.55E-08	4.30E-08	1.01E-06	3.54E-08	0	0	5.44458E-10	0	0.0005	Res
582414.56_4129558.47	582414.56	4129558.47	2.70E-05	2.22E-08	1.33E-08	2.22E-08	1.47E-08	4.07E-08	9.54E-07	3.35E-08	0	0	5.11517E-10	0	0.0005	Res
582471.13_4129558.47	582471.13	4129558.47	2.53E-05	2.09E-08	1.26E-08	2.09E-08	1.39E-08	3.84E-08	9.01E-07	3.16E-08	0	0	4.79388E-10	0	0.0005	Res
582527.7_4129558.47	582527.7	4129558.47	2.37E-05	1.98E-08	1.19E-08	1.98E-08	1.32E-08	3.63E-08	8.53E-07	2.99E-08	0	0	4.49201E-10	0	0.0004	Res
582584.27_4129558.47	582584.27	4129558.47	2.22E-05	1.88E-08	1.13E-08	1.88E-08	1.25E-08	3.44E-08	8.07E-07	2.83E-08	0	0	4.20601E-10	0	0.0004	Res
582640.84_4129558.47	582640.84	4129558.47	2.09E-05	1.79E-08	1.07E-08	1.79E-08	1.19E-08	3.28E-08	7.69E-07	2.70E-08	0	0	3.96571E-10	0	0.0004	Res
582697.41_4129558.47	582697.41	4129558.47	1.97E-05	1.70E-08	1.02E-08	1.70E-08	1.14E-08	3.12E-08	7.32E-07	2.57E-08	0	0	3.73555E-10	0	0.0004	Res
582244.85_4129642.38	582244.85	4129642.38	2.69E-05	2.31E-08	1.39E-08	2.31E-08	1.54E-08	4.24E-08	9.94E-07	3.49E-08	0	0	5.08971E-10	0	0.0005	Res
582301.42_4129642.38	582301.42	4129642.38	2.95E-05	2.41E-08	1.45E-08	2.41E-08	1.60E-08	4.42E-08	1.04E-06	3.64E-08	0	0	5.58297E-10	0	0.0006	Res

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)								Risk Calculation Part 2, $\sum R1*C_{TAC}$					
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Cobalt	Lead	Nickel	Chromium VI	3rd Trimester	0<2	2<16	16<30	Cancer Risk - 2028 (per million)	Receptor Type
582357.99_4129642.38	582357.99	4129642.38	2.92E-05	2.36E-08	1.41E-08	2.36E-08	1.56E-08	4.32E-08	1.01E-06	3.56E-08	0	0	5.52585E-10	0	0.0006	Res
582414.56_4129642.38	582414.56	4129642.38	2.76E-05	2.24E-08	1.34E-08	2.24E-08	1.49E-08	4.11E-08	9.65E-07	3.39E-08	0	0	5.22764E-10	0	0.0005	Res
582471.13_4129642.38	582471.13	4129642.38	2.60E-05	2.13E-08	1.28E-08	2.13E-08	1.41E-08	3.90E-08	9.15E-07	3.21E-08	0	0	4.91447E-10	0	0.0005	Res
582527.7_4129642.38	582527.7	4129642.38	2.44E-05	2.02E-08	1.21E-08	2.02E-08	1.35E-08	3.71E-08	8.70E-07	3.05E-08	0	0	4.62562E-10	0	0.0005	Res
582584.27_4129642.38	582584.27	4129642.38	2.28E-05	1.91E-08	1.15E-08	1.91E-08	1.27E-08	3.50E-08	8.22E-07	2.88E-08	0	0	4.31146E-10	0	0.0004	Res
582640.84_4129642.38	582640.84	4129642.38	2.13E-05	1.81E-08	1.09E-08	1.81E-08	1.21E-08	3.32E-08	7.80E-07	2.74E-08	0	0	4.03954E-10	0	0.0004	Res
582697.41_4129642.38	582697.41	4129642.38	2.00E-05	1.72E-08	1.03E-08	1.72E-08	1.15E-08	3.16E-08	7.42E-07	2.60E-08	0	0	3.79051E-10	0	0.0004	Res
582753.98_4129642.38	582753.98	4129642.38	1.87E-05	1.64E-08	9.83E-09	1.64E-08	1.10E-08	3.00E-08	7.05E-07	2.47E-08	0	0	3.54861E-10	0	0.0004	Res
582810.55_4129642.38	582810.55	4129642.38	1.76E-05	1.56E-08	9.37E-09	1.56E-08	1.05E-08	2.86E-08	6.72E-07	2.36E-08	0	0	3.33118E-10	0	0.0003	Res
582867.12_4129642.38	582867.12	4129642.38	1.64E-05	1.48E-08	8.88E-09	1.48E-08	9.94E-09	2.71E-08	6.37E-07	2.23E-08	0	0	3.09561E-10	0	0.0003	Res
582244.85_4129726.29	582244.85	4129726.29	2.95E-05	2.44E-08	1.46E-08	2.44E-08	1.62E-08	4.48E-08	1.05E-06	3.69E-08	0	0	5.57743E-10	0	0.0006	Res
582301.42_4129726.29	582301.42	4129726.29	2.88E-05	2.37E-08	1.42E-08	2.37E-08	1.58E-08	4.35E-08	1.02E-06	3.59E-08	0	0	5.44343E-10	0	0.0005	Res
582357.99_4129726.29	582357.99	4129726.29	2.94E-05	2.37E-08	1.42E-08	2.37E-08	1.58E-08	4.35E-08	1.02E-06	3.59E-08	0	0	5.56623E-10	0	0.0006	Res
582414.56_4129726.29	582414.56	4129726.29	2.81E-05	2.28E-08	1.37E-08	2.28E-08	1.51E-08	4.18E-08	9.81E-07	3.44E-08	0	0	5.32918E-10	0	0.0005	Res
582471.13_4129726.29	582471.13	4129726.29	2.66E-05	2.17E-08	1.30E-08	2.17E-08	1.44E-08	3.98E-08	9.35E-07	3.28E-08	0	0	5.03771E-10	0	0.0005	Res
582527.7_4129726.29	582527.7	4129726.29	2.51E-05	2.07E-08	1.24E-08	2.07E-08	1.38E-08	3.79E-08	8.89E-07	3.12E-08	0	0	4.74728E-10	0	0.0005	Res
582584.27_4129726.29	582584.27	4129726.29	2.35E-05	1.96E-08	1.18E-08	1.96E-08	1.31E-08	3.60E-08	8.45E-07	2.97E-08	0	0	4.45475E-10	0	0.0004	Res
582640.84_4129726.29	582640.84	4129726.29	2.20E-05	1.86E-08	1.12E-08	1.86E-08	1.24E-08	3.42E-08	8.01E-07	2.81E-08	0	0	4.16667E-10	0	0.0004	Res
582697.41_4129726.29	582697.41	4129726.29	2.04E-05	1.76E-08	1.05E-08	1.76E-08	1.18E-08	3.23E-08	7.57E-07	2.66E-08	0	0	3.86416E-10	0	0.0004	Res
582753.98_4129726.29	582753.98	4129726.29	1.88E-05	1.66E-08	9.94E-09	1.66E-08	1.11E-08	3.04E-08	7.13E-07	2.50E-08	0	0	3.56548E-10	0	0.0004	Res
582810.55_4129726.29	582810.55	4129726.29	1.72E-05	1.55E-08	9.31E-09	1.55E-08	1.04E-08	2.85E-08	6.68E-07	2.34E-08	0	0	3.2572E-10	0	0.0003	Res
582244.85_4129810.2	582244.85	4129810.2	2.87E-05	2.41E-08	1.45E-08	2.41E-08	1.61E-08	4.43E-08	1.04E-06	3.65E-08	0	0	5.43936E-10	0	0.0005	Res
582301.42_4129810.2	582301.42	4129810.2	2.92E-05	2.41E-08	1.44E-08	2.41E-08	1.60E-08	4.42E-08	1.04E-06	3.64E-08	0	0	5.52882E-10	0	0.0006	Res
582357.99_4129810.2	582357.99	4129810.2	2.91E-05	2.37E-08	1.42E-08	2.37E-08	1.57E-08	4.35E-08	1.02E-06	3.58E-08	0	0	5.50479E-10	0	0.0006	Res
582414.56_4129810.2	582414.56	4129810.2	2.84E-05	2.31E-08	1.38E-08	2.31E-08	1.53E-08	4.23E-08	9.93E-07	3.49E-08	0	0	5.37684E-10	0	0.0005	Res
582471.13_4129810.2	582471.13	4129810.2	2.72E-05	2.21E-08	1.33E-08	2.21E-08	1.47E-08	4.06E-08	9.54E-07	3.35E-08	0	0	5.14284E-10	0	0.0005	Res
582527.7_4129810.2	582527.7	4129810.2	2.55E-05	2.10E-08	1.26E-08	2.10E-08	1.40E-08	3.86E-08	9.06E-07	3.18E-08	0	0	4.83081E-10	0	0.0005	Res
582584.27_4129810.2	582584.27	4129810.2	2.38E-05	1.99E-08	1.19E-08	1.99E-08	1.33E-08	3.65E-08	8.57E-07	3.01E-08	0	0	4.50749E-10	0	0.0005	Res
582640.84_4129810.2	582640.84	4129810.2	2.18E-05	1.86E-08	1.12E-08	1.86E-08	1.24E-08	3.42E-08	8.03E-07	2.82E-08	0	0	4.13324E-10	0	0.0004	Res
582697.41_4129810.2	582697.41	4129810.2	2.00E-05	1.75E-08	1.05E-08	1.75E-08	1.17E-08	3.21E-08	7.53E-07	2.64E-08	0	0	3.79471E-10	0	0.0004	Res
581905.43_4129894.11	581905.43	4129894.11	3.80E-05	3.17E-08	1.90E-08	3.17E-08	2.10E-08	5.82E-08	1.37E-06	4.80E-08	0	0	7.19291E-10	0	0.0007	Res
581962_4129894.11	581962	4129894.11	3.79E-05	3.11E-08	1.86E-08	3.11E-08	2.06E-08	5.70E-08	1.34E-06	4.70E-08	0	0	7.17221E-10	0	0.0007	Res
582131.71_4129894.11	582131.71	4129894.11	3.29E-05	2.72E-08	1.63E-08	2.72E-08	1.80E-08	4.99E-08	1.17E-06	4.11E-08	0	0	6.23667E-10	0	0.0006	Res
582188.28_4129894.11	582188.28	4129894.11	3.18E-05	2.62E-08	1.57E-08	2.62E-08	1.74E-08	4.81E-08	1.13E-06	3.97E-08	0	0	6.01343E-10	0	0.0006	Res
582244.85_4129894.11	582244.85	4129894.11	3.12E-05	2.56E-08	1.53E-08	2.56E-08	1.70E-08	4.69E-08	1.10E-06	3.87E-08	0	0	5.90296E-10	0	0.0006	Res
582301.42_4129894.11	582301.42	4129894.11	3.02E-05	2.47E-08	1.48E-08	2.47E-08	1.64E-08	4.54E-08	1.07E-06	3.74E-08	0	0	5.71427E-10	0	0.0006	Res
582357.99_4129894.11	582357.99	4129894.11	2.89E-05	2.37E-08	1.42E-08	2.37E-08	1.58E-08	4.36E-08	1.02E-06	3.59E-08	0	0	5.46761E-10	0	0.0005	Res
582414.56_4129894.11	582414.56	4129894.11	2.94E-05	2.37E-08	1.42E-08	2.37E-08	1.57E-08	4.35E-08	1.02E-06	3.58E-08	0	0	5.55934E-10	0	0.0006	Res
582471.13_4129894.11	582471.13	4129894.11	2.76E-05	2.25E-08	1.35E-08	2.25E-08	1.49E-08	4.12E-08	9.67E-07	3.40E-08	0	0	5.21805E-10	0	0.0005	Res
582527.7_4129894.11	582527.7	4129894.11	2.54E-05	2.11E-08	1.27E-08	2.11E-08	1.40E-08	3.87E-08	9.08E-07	3.19E-08	0	0	4.81621E-10	0	0.0005	Res
582584.27_4129894.11	582584.27	4129894.11	2.33E-05	1.97E-08	1.18E-08	1.97E-08	1.31E-08	3.62E-08	8.50E-07	2.98E-08	0	0	4.4187E-10	0	0.0004	Res
582640.84_4129894.11	582640.84	4129894.11	2.13E-05	1.85E-08	1.11E-08	1.85E-08	1.23E-08	3.39E-08	7.95E-07	2.79E-08	0	0	4.04069E-10	0	0.0004	Res
582697.41_4129894.11	582697.41	4129894.11	1.95E-05	1.73E-08	1.04E-08	1.73E-08	1.15E-08	3.17E-08	7.43E-07	2.61E-08	0	0	3.68873E-10	0	0.0004	Res
581962_4129978.02	581962	4129978.02	3.95E-05	3.21E-08	1.93E-08	3.21E-08	2.12E-08	5.89E-08	1.38E-06	4.86E-08	0	0	7.47461E-10	0	0.0007	Res
582018.57_4129978.02	582018.57	4129978.02	3.71E-05	3.04E-08	1.82E-08	3.04E-08	2.01E-08	5.58E-08	1.31E-06	4.60E-08	0	0	7.032E-10	0	0.0007	Res
582075.14_4129978.02	582075.14	4129978.02	3.83E-05	3.05E-08	1.83E-08	3.05E-08	2.02E-08	5.61E-08	1.32E-06	4.62E-08	0	0	7.25001E-10	0	0.0007	Res
582131.71_4129978.02	582131.71	4129978.02	3.83E-05	3.01E-08	1.81E-08	3.01E-08	1.99E-08	5.53E-08	1.30E-06	4.56E-08	0	0	7.24899E-10	0	0.0007	Res
582188.28_4129978.02	582188.28	4129978.02	3.83E-05	2.98E-08	1.79E-08	2.98E-08	1.97E-08	5.47E-08	1.28E-06	4.51E-08	0	0	7.25365E-10	0	0.0007	Res
582244.85_4129978.02	582244.85	4129978.02	3.47E-05	2.75E-08	1.65E-08	2.75E-08	1.82E-08	5.05E-08	1.19E-06	4.16E-08	0	0	6.56826E-10	0	0.0007	Res
582301.42_4129978.02	582301.42	4129978.02	3.43E-05	2.70E-08	1.62E-08	2.70E-08	1.78E-08	4.95E-08	1.16E-06	4.08E-08	0	0	6.49584E-10	0	0.0006	Res
582357.99_4129978.02	582357.99	4129978.02	3.25E-05	2.57E-08	1.54E-08	2.57E-08	1.70E-08	4.72E-08	1.11E-06	3.89E-08	0	0	6.15293E-10	0	0.0006	Res
582414.56_4129978.02	582414.56	4129978.02	3.01E-05	2.41E-08	1.45E-08	2.41E-08	1.60E-08	4.43E-08	1.04E-06	3.65E-08	0	0	5.69999E-10	0	0.0006	Res
582471.13_4129978.02	582471.13	4129978.02	2.76E-05	2.25E-08	1.35E-08	2.25E-08	1.50E-08	4.14E-08	9.71E-07	3.41E-08	0	0	5.23018E-10	0	0.0005	Res
582527.7_4129978.02	582527.7	4129978.02	2.52E-05	2.10E-08	1.26E-08	2.10E-08	1.39E-08	3.85E-08	9.04E-07	3.17E-08	0	0	4.76932E-10	0	0.0005	Res
582584.27_4129978.02	582584.27	4129978.02	2.29E-05	1.95E-08	1.17E-08	1.95E-08	1.30E-08	3.59E-08	8.42E-07	2.95E-08	0	0	4.34143E-10	0	0.0004	Res
582640.84_4129978.02	582640.84	4129978.02	2.09E-05	1.82E-08	1.09E-08	1.82E-08	1.22E-08	3.35E-08	7.85E-07	2.76E-08	0	0	3.95631E-10	0	0.0004	Res

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)								Risk Calculation Part 2, $\sum R1*C_{TAC}$					
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Cobalt	Lead	Nickel	Chromium VI	3rd Trimester	0<2	2<16	16<30	Cancer Risk - 2028 (per million)	Receptor Type
582697.41_4129978.02	582697.41	4129978.02	1.90E-05	1.70E-08	1.02E-08	1.70E-08	1.14E-08	3.12E-08	7.33E-07	2.57E-08	0	0	3.60241E-10	0	0.0004	Res
582753.98_4129978.02	582753.98	4129978.02	1.72E-05	1.58E-08	9.50E-09	1.58E-08	1.06E-08	2.90E-08	6.81E-07	2.39E-08	0	0	3.25554E-10	0	0.0003	Res
582810.55_4129978.02	582810.55	4129978.02	1.52E-05	1.46E-08	8.73E-09	1.46E-08	9.77E-09	2.67E-08	6.26E-07	2.20E-08	0	0	2.88141E-10	0	0.0003	Res
581905.43_4130061.93	581905.43	4130061.93	5.66E-05	4.16E-08	2.50E-08	4.16E-08	2.73E-08	7.64E-08	1.79E-06	6.30E-08	0	0	1.07181E-09	0	0.0011	Res
581962_4130061.93	581962	4130061.93	5.35E-05	3.95E-08	2.37E-08	3.95E-08	2.59E-08	7.25E-08	1.70E-06	5.98E-08	0	0	1.01194E-09	0	0.0010	Res
582018.57_4130061.93	582018.57	4130061.93	4.55E-05	3.49E-08	2.09E-08	3.49E-08	2.30E-08	6.40E-08	1.50E-06	5.28E-08	0	0	8.62176E-10	0	0.0009	Res
582075.14_4130061.93	582075.14	4130061.93	4.07E-05	3.19E-08	1.91E-08	3.19E-08	2.10E-08	5.86E-08	1.37E-06	4.83E-08	0	0	7.70552E-10	0	0.0008	Res
582131.71_4130061.93	582131.71	4130061.93	4.00E-05	3.11E-08	1.87E-08	3.11E-08	2.05E-08	5.71E-08	1.34E-06	4.71E-08	0	0	7.57402E-10	0	0.0008	Res
582188.28_4130061.93	582188.28	4130061.93	3.91E-05	3.02E-08	1.81E-08	3.02E-08	1.99E-08	5.55E-08	1.30E-06	4.58E-08	0	0	7.40916E-10	0	0.0007	Res
582244.85_4130061.93	582244.85	4130061.93	3.84E-05	2.95E-08	1.77E-08	2.95E-08	1.94E-08	5.41E-08	1.27E-06	4.46E-08	0	0	7.2666E-10	0	0.0007	Res
582301.42_4130061.93	582301.42	4130061.93	3.57E-05	2.77E-08	1.66E-08	2.77E-08	1.83E-08	5.08E-08	1.19E-06	4.19E-08	0	0	6.75683E-10	0	0.0007	Res
582357.99_4130061.93	582357.99	4130061.93	3.31E-05	2.60E-08	1.56E-08	2.60E-08	1.72E-08	4.78E-08	1.12E-06	3.94E-08	0	0	6.27453E-10	0	0.0006	Res
582414.56_4130061.93	582414.56	4130061.93	3.04E-05	2.43E-08	1.46E-08	2.43E-08	1.61E-08	4.45E-08	1.05E-06	3.67E-08	0	0	5.75916E-10	0	0.0006	Res
582471.13_4130061.93	582471.13	4130061.93	2.76E-05	2.25E-08	1.35E-08	2.25E-08	1.49E-08	4.13E-08	9.69E-07	3.40E-08	0	0	5.23325E-10	0	0.0005	Res
582527.7_4130061.93	582527.7	4130061.93	2.50E-05	2.08E-08	1.25E-08	2.08E-08	1.38E-08	3.82E-08	8.97E-07	3.15E-08	0	0	4.72976E-10	0	0.0005	Res
582584.27_4130061.93	582584.27	4130061.93	2.26E-05	1.93E-08	1.16E-08	1.93E-08	1.29E-08	3.54E-08	8.31E-07	2.92E-08	0	0	4.27971E-10	0	0.0004	Res
582640.84_4130061.93	582640.84	4130061.93	2.04E-05	1.79E-08	1.07E-08	1.79E-08	1.19E-08	3.28E-08	7.70E-07	2.70E-08	0	0	3.86295E-10	0	0.0004	Res
582697.41_4130061.93	582697.41	4130061.93	1.85E-05	1.66E-08	9.99E-09	1.66E-08	1.11E-08	3.05E-08	7.17E-07	2.52E-08	0	0	3.49969E-10	0	0.0003	Res
582753.98_4130061.93	582753.98	4130061.93	1.68E-05	1.55E-08	9.32E-09	1.55E-08	1.04E-08	2.85E-08	6.69E-07	2.35E-08	0	0	3.18173E-10	0	0.0003	Res
582810.55_4130061.93	582810.55	4130061.93	1.53E-05	1.45E-08	8.71E-09	1.45E-08	9.75E-09	2.66E-08	6.25E-07	2.19E-08	0	0	2.89316E-10	0	0.0003	Res
581962_4130145.84	581962	4130145.84	6.24E-05	4.42E-08	2.65E-08	4.42E-08	2.89E-08	8.11E-08	1.90E-06	6.69E-08	0	0	1.18124E-09	0	0.0012	Res
582018.57_4130145.84	582018.57	4130145.84	5.79E-05	4.13E-08	2.48E-08	4.13E-08	2.71E-08	7.59E-08	1.78E-06	6.26E-08	0	0	1.09549E-09	0	0.0011	Res
582075.14_4130145.84	582075.14	4130145.84	4.93E-05	3.63E-08	2.18E-08	3.63E-08	2.39E-08	6.68E-08	1.57E-06	5.50E-08	0	0	9.33407E-10	0	0.0009	Res
582131.71_4130145.84	582131.71	4130145.84	4.57E-05	3.40E-08	2.04E-08	3.40E-08	2.24E-08	6.25E-08	1.47E-06	5.15E-08	0	0	8.65885E-10	0	0.0009	Res
582188.28_4130145.84	582188.28	4130145.84	4.42E-05	3.28E-08	1.97E-08	3.28E-08	2.16E-08	6.03E-08	1.41E-06	4.97E-08	0	0	8.3729E-10	0	0.0008	Res
582244.85_4130145.84	582244.85	4130145.84	4.04E-05	3.04E-08	1.82E-08	3.04E-08	2.00E-08	5.58E-08	1.31E-06	4.60E-08	0	0	7.64813E-10	0	0.0008	Res
582301.42_4130145.84	582301.42	4130145.84	3.67E-05	2.81E-08	1.69E-08	2.81E-08	1.85E-08	5.16E-08	1.21E-06	4.25E-08	0	0	6.94513E-10	0	0.0007	Res
582357.99_4130145.84	582357.99	4130145.84	3.34E-05	2.61E-08	1.56E-08	2.61E-08	1.72E-08	4.78E-08	1.12E-06	3.94E-08	0	0	6.33212E-10	0	0.0006	Res
582414.56_4130145.84	582414.56	4130145.84	3.04E-05	2.41E-08	1.45E-08	2.41E-08	1.60E-08	4.43E-08	1.04E-06	3.65E-08	0	0	5.75416E-10	0	0.0006	Res
582471.13_4130145.84	582471.13	4130145.84	2.74E-05	2.23E-08	1.34E-08	2.23E-08	1.48E-08	4.09E-08	9.59E-07	3.37E-08	0	0	5.18739E-10	0	0.0005	Res
582527.7_4130145.84	582527.7	4130145.84	2.45E-05	2.04E-08	1.23E-08	2.04E-08	1.36E-08	3.75E-08	8.80E-07	3.09E-08	0	0	4.63848E-10	0	0.0005	Res
582584.27_4130145.84	582584.27	4130145.84	2.19E-05	1.88E-08	1.13E-08	1.88E-08	1.25E-08	3.45E-08	8.09E-07	2.84E-08	0	0	4.14132E-10	0	0.0004	Res
582640.84_4130145.84	582640.84	4130145.84	1.96E-05	1.73E-08	1.04E-08	1.73E-08	1.16E-08	3.18E-08	7.47E-07	2.62E-08	0	0	3.71253E-10	0	0.0004	Res
582697.41_4130145.84	582697.41	4130145.84	1.77E-05	1.61E-08	9.66E-09	1.61E-08	1.08E-08	2.95E-08	6.93E-07	2.43E-08	0	0	3.34866E-10	0	0.0003	Res
582753.98_4130145.84	582753.98	4130145.84	1.61E-05	1.50E-08	9.02E-09	1.50E-08	1.01E-08	2.76E-08	6.47E-07	2.27E-08	0	0	3.04577E-10	0	0.0003	Res
582810.55_4130145.84	582810.55	4130145.84	1.47E-05	1.41E-08	8.47E-09	1.41E-08	9.48E-09	2.59E-08	6.07E-07	2.13E-08	0	0	2.79066E-10	0	0.0003	Res
582867.12_4130145.84	582867.12	4130145.84	1.30E-05	1.30E-08	7.79E-09	1.30E-08	8.74E-09	2.38E-08	5.58E-07	1.96E-08	0	0	2.46954E-10	0	0.0002	Res
581962_4130229.75	581962	4130229.75	6.38E-05	4.48E-08	2.69E-08	4.48E-08	2.93E-08	8.23E-08	1.93E-06	6.79E-08	0	0	1.20785E-09	0	0.0012	Res
582018.57_4130229.75	582018.57	4130229.75	6.09E-05	4.28E-08	2.57E-08	4.28E-08	2.80E-08	7.86E-08	1.84E-06	6.48E-08	0	0	1.15292E-09	0	0.0012	Res
582075.14_4130229.75	582075.14	4130229.75	5.67E-05	4.01E-08	2.40E-08	4.01E-08	2.62E-08	7.36E-08	1.73E-06	6.07E-08	0	0	1.07297E-09	0	0.0011	Res
582131.71_4130229.75	582131.71	4130229.75	5.11E-05	3.67E-08	2.20E-08	3.67E-08	2.41E-08	6.74E-08	1.58E-06	5.55E-08	0	0	9.66953E-10	0	0.0010	Res
582188.28_4130229.75	582188.28	4130229.75	4.56E-05	3.34E-08	2.00E-08	3.34E-08	2.19E-08	6.13E-08	1.44E-06	5.05E-08	0	0	8.63341E-10	0	0.0009	Res
582244.85_4130229.75	582244.85	4130229.75	4.08E-05	3.05E-08	1.83E-08	3.05E-08	2.01E-08	5.60E-08	1.31E-06	4.61E-08	0	0	7.73149E-10	0	0.0008	Res
582301.42_4130229.75	582301.42	4130229.75	3.68E-05	2.80E-08	1.68E-08	2.80E-08	1.85E-08	5.14E-08	1.21E-06	4.24E-08	0	0	6.96613E-10	0	0.0007	Res
582357.99_4130229.75	582357.99	4130229.75	3.32E-05	2.58E-08	1.55E-08	2.58E-08	1.70E-08	4.73E-08	1.11E-06	3.90E-08	0	0	6.29327E-10	0	0.0006	Res
582414.56_4130229.75	582414.56	4130229.75	2.97E-05	2.36E-08	1.42E-08	2.36E-08	1.56E-08	4.34E-08	1.02E-06	3.57E-08	0	0	5.62752E-10	0	0.0006	Res
582471.13_4130229.75	582471.13	4130229.75	2.63E-05	2.15E-08	1.29E-08	2.15E-08	1.43E-08	3.95E-08	9.26E-07	3.25E-08	0	0	4.98025E-10	0	0.0005	Res
582527.7_4130229.75	582527.7	4130229.75	2.33E-05	1.96E-08	1.18E-08	1.96E-08	1.31E-08	3.60E-08	8.46E-07	2.97E-08	0	0	4.40901E-10	0	0.0004	Res
582584.27_4130229.75	582584.27	4130229.75	2.07E-05	1.80E-08	1.08E-08	1.80E-08	1.20E-08	3.31E-08	7.76E-07	2.72E-08	0	0	3.92302E-10	0	0.0004	Res
582640.84_4130229.75	582640.84	4130229.75	1.86E-05	1.66E-08	9.99E-09	1.66E-08	1.11E-08	3.05E-08	7.17E-07	2.52E-08	0	0	3.51598E-10	0	0.0004	Res
582697.41_4130229.75	582697.41	4130229.75	1.68E-05	1.55E-08	9.31E-09	1.55E-08	1.04E-08	2.85E-08	6.68E-07	2.34E-08	0	0	3.18958E-10	0	0.0003	Res
582753.98_4130229.75	582753.98	4130229.75	1.54E-05	1.45E-08	8.71E-09	1.45E-08	9.74E-09	2.66E-08	6.25E-07	2.19E-08	0	0	2.91061E-10	0	0.0003	Res
582810.55_4130229.75	582810.55	4130229.75	1.42E-05	1.37E-08	8.21E-09	1.37E-08	9.20E-09	2.51E-08	5.88E-07	2.06E-08	0	0	2.6824E-10	0	0.0003	Res
582867.12_4130229.75	582867.12	4130229.75	1.32E-05	1.30E-08	7.77E-09	1.30E-08	8.72E-09	2.38E-08	5.57E-07	1.95E-08	0	0	2.49033E-10	0	0.0002	Res
582018.57_4130313.66	582018.57	4130313.66	6.56E-05	4.50E-08	2.70E-08	4.50E-08	2.94E-08	8.28E-08	1.94E-06	6.83E-08	0	0	1.24147E-09	0	0.0012	Res
582075.14_4130313.66	582075.14	4130313.66	6.08E-05	4.20E-08	2.52E-08	4.20E-08	2.75E-08	7.72E-08	1.81E-06	6.37E-08	0	0	1.15107E-09	0	0.0012	Res

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)								Risk Calculation Part 2, $\sum R1*C_{TAC}$					
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Cobalt	Lead	Nickel	Chromium VI	3rd Trimester	0<2	2<16	16<30	Cancer Risk - 2028 (per million)	Receptor Type
582131.71_4130313.66	582131.71	4130313.66	5.33E-05	3.76E-08	2.26E-08	3.76E-08	2.47E-08	6.92E-08	1.62E-06	5.70E-08	0	0	1.00893E-09	0	0.0010	Res
582188.28_4130313.66	582188.28	4130313.66	4.67E-05	3.37E-08	2.02E-08	3.37E-08	2.22E-08	6.20E-08	1.45E-06	5.11E-08	0	0	8.83398E-10	0	0.0009	Res
582244.85_4130313.66	582244.85	4130313.66	4.12E-05	3.05E-08	1.83E-08	3.05E-08	2.01E-08	5.60E-08	1.31E-06	4.62E-08	0	0	7.80876E-10	0	0.0008	Res
582301.42_4130313.66	582301.42	4130313.66	3.67E-05	2.78E-08	1.67E-08	2.78E-08	1.83E-08	5.10E-08	1.20E-06	4.20E-08	0	0	6.94567E-10	0	0.0007	Res
582357.99_4130313.66	582357.99	4130313.66	3.23E-05	2.51E-08	1.51E-08	2.51E-08	1.66E-08	4.61E-08	1.08E-06	3.80E-08	0	0	6.118E-10	0	0.0006	Res
582414.56_4130313.66	582414.56	4130313.66	2.82E-05	2.27E-08	1.36E-08	2.27E-08	1.50E-08	4.16E-08	9.76E-07	3.43E-08	0	0	5.34632E-10	0	0.0005	Res
582471.13_4130313.66	582471.13	4130313.66	2.47E-05	2.05E-08	1.23E-08	2.05E-08	1.36E-08	3.77E-08	8.84E-07	3.10E-08	0	0	4.68333E-10	0	0.0005	Res
582527.7_4130313.66	582527.7	4130313.66	2.19E-05	1.87E-08	1.12E-08	1.87E-08	1.25E-08	3.44E-08	8.07E-07	2.83E-08	0	0	4.14033E-10	0	0.0004	Res
582584.27_4130313.66	582584.27	4130313.66	1.95E-05	1.72E-08	1.03E-08	1.72E-08	1.15E-08	3.16E-08	7.42E-07	2.61E-08	0	0	3.69151E-10	0	0.0004	Res
582640.84_4130313.66	582640.84	4130313.66	1.76E-05	1.60E-08	9.60E-09	1.60E-08	1.07E-08	2.94E-08	6.89E-07	2.42E-08	0	0	3.33105E-10	0	0.0003	Res
582697.41_4130313.66	582697.41	4130313.66	1.60E-05	1.49E-08	8.97E-09	1.49E-08	1.00E-08	2.74E-08	6.43E-07	2.26E-08	0	0	3.03063E-10	0	0.0003	Res
582753.98_4130313.66	582753.98	4130313.66	1.47E-05	1.40E-08	8.42E-09	1.40E-08	9.43E-09	2.57E-08	6.04E-07	2.12E-08	0	0	2.77565E-10	0	0.0003	Res
582810.55_4130313.66	582810.55	4130313.66	1.35E-05	1.32E-08	7.92E-09	1.32E-08	8.89E-09	2.42E-08	5.68E-07	1.99E-08	0	0	2.55001E-10	0	0.0003	Res
582867.12_4130313.66	582867.12	4130313.66	1.24E-05	1.25E-08	7.48E-09	1.25E-08	8.41E-09	2.29E-08	5.36E-07	1.88E-08	0	0	2.35285E-10	0	0.0002	Res
581848.86_4130397.57	581848.86	4130397.57	8.97E-05	5.91E-08	3.55E-08	5.91E-08	3.85E-08	1.09E-07	2.55E-06	8.96E-08	0	0	1.69802E-09	0	0.0017	Res
581905.43_4130397.57	581905.43	4130397.57	8.70E-05	5.71E-08	3.43E-08	5.71E-08	3.72E-08	1.05E-07	2.46E-06	8.66E-08	0	0	1.64657E-09	0	0.0016	Res
581962_4130397.57	581962	4130397.57	8.23E-05	5.41E-08	3.25E-08	5.41E-08	3.53E-08	9.95E-08	2.34E-06	8.21E-08	0	0	1.55729E-09	0	0.0016	Res
582018.57_4130397.57	582018.57	4130397.57	7.38E-05	4.92E-08	2.95E-08	4.92E-08	3.21E-08	9.04E-08	2.12E-06	7.46E-08	0	0	1.39715E-09	0	0.0014	Res
582075.14_4130397.57	582075.14	4130397.57	6.47E-05	4.39E-08	2.63E-08	4.39E-08	2.87E-08	8.07E-08	1.89E-06	6.65E-08	0	0	1.22475E-09	0	0.0012	Res
582131.71_4130397.57	582131.71	4130397.57	5.54E-05	3.86E-08	2.31E-08	3.86E-08	2.53E-08	7.08E-08	1.66E-06	5.84E-08	0	0	1.04856E-09	0	0.0010	Res
582188.28_4130397.57	582188.28	4130397.57	4.81E-05	3.43E-08	2.06E-08	3.43E-08	2.25E-08	6.31E-08	1.48E-06	5.20E-08	0	0	9.10983E-10	0	0.0009	Res
582244.85_4130397.57	582244.85	4130397.57	4.15E-05	3.05E-08	1.83E-08	3.05E-08	2.01E-08	5.60E-08	1.31E-06	4.62E-08	0	0	7.8623E-10	0	0.0008	Res
582301.42_4130397.57	582301.42	4130397.57	3.58E-05	2.71E-08	1.63E-08	2.71E-08	1.79E-08	4.98E-08	1.17E-06	4.10E-08	0	0	6.77841E-10	0	0.0007	Res
582357.99_4130397.57	582357.99	4130397.57	3.07E-05	2.41E-08	1.45E-08	2.41E-08	1.59E-08	4.42E-08	1.04E-06	3.65E-08	0	0	5.80795E-10	0	0.0006	Res
582414.56_4130397.57	582414.56	4130397.57	2.66E-05	2.16E-08	1.30E-08	2.16E-08	1.44E-08	3.97E-08	9.32E-07	3.27E-08	0	0	5.03148E-10	0	0.0005	Res
582471.13_4130397.57	582471.13	4130397.57	2.33E-05	1.96E-08	1.18E-08	1.96E-08	1.31E-08	3.60E-08	8.46E-07	2.97E-08	0	0	4.41423E-10	0	0.0004	Res
582527.7_4130397.57	582527.7	4130397.57	2.07E-05	1.80E-08	1.08E-08	1.80E-08	1.20E-08	3.30E-08	7.74E-07	2.72E-08	0	0	3.91313E-10	0	0.0004	Res
582584.27_4130397.57	582584.27	4130397.57	1.85E-05	1.66E-08	9.96E-09	1.66E-08	1.11E-08	3.05E-08	7.15E-07	2.51E-08	0	0	3.50221E-10	0	0.0004	Res
582640.84_4130397.57	582640.84	4130397.57	1.67E-05	1.54E-08	9.26E-09	1.54E-08	1.03E-08	2.83E-08	6.64E-07	2.33E-08	0	0	3.16058E-10	0	0.0003	Res
582697.41_4130397.57	582697.41	4130397.57	1.51E-05	1.44E-08	8.62E-09	1.44E-08	9.65E-09	2.64E-08	6.18E-07	2.17E-08	0	0	2.85756E-10	0	0.0003	Res
582753.98_4130397.57	582753.98	4130397.57	1.38E-05	1.35E-08	8.08E-09	1.35E-08	9.06E-09	2.47E-08	5.79E-07	2.03E-08	0	0	2.60423E-10	0	0.0003	Res
582810.55_4130397.57	582810.55	4130397.57	1.26E-05	1.27E-08	7.60E-09	1.27E-08	8.55E-09	2.32E-08	5.45E-07	1.91E-08	0	0	2.38654E-10	0	0.0002	Res
582867.12_4130397.57	582867.12	4130397.57	1.16E-05	1.20E-08	7.18E-09	1.20E-08	8.09E-09	2.19E-08	5.15E-07	1.81E-08	0	0	2.19674E-10	0	0.0002	Res
581848.86_4130481.48	581848.86	4130481.48	1.16E-04	7.27E-08	4.36E-08	7.27E-08	4.72E-08	1.34E-07	3.14E-06	1.10E-07	0	0	2.1951E-09	0	0.0022	Res
581905.43_4130481.48	581905.43	4130481.48	1.07E-04	6.77E-08	4.06E-08	6.77E-08	4.40E-08	1.25E-07	2.92E-06	1.03E-07	0	0	2.03419E-09	0	0.0020	Res
581962_4130481.48	581962	4130481.48	9.15E-05	5.88E-08	3.53E-08	5.88E-08	3.83E-08	1.08E-07	2.54E-06	8.92E-08	0	0	1.73317E-09	0	0.0017	Res
582018.57_4130481.48	582018.57	4130481.48	8.06E-05	5.25E-08	3.15E-08	5.25E-08	3.42E-08	9.66E-08	2.27E-06	7.97E-08	0	0	1.52587E-09	0	0.0015	Res
582075.14_4130481.48	582075.14	4130481.48	6.81E-05	4.55E-08	2.73E-08	4.55E-08	2.97E-08	8.36E-08	1.96E-06	6.89E-08	0	0	1.2892E-09	0	0.0013	Res
582131.71_4130481.48	582131.71	4130481.48	5.78E-05	3.96E-08	2.38E-08	3.96E-08	2.59E-08	7.27E-08	1.71E-06	6.00E-08	0	0	1.09348E-09	0	0.0011	Res
582188.28_4130481.48	582188.28	4130481.48	4.88E-05	3.45E-08	2.07E-08	3.45E-08	2.26E-08	6.33E-08	1.49E-06	5.22E-08	0	0	9.23458E-10	0	0.0009	Res
582244.85_4130481.48	582244.85	4130481.48	4.06E-05	2.98E-08	1.79E-08	2.98E-08	1.96E-08	5.47E-08	1.28E-06	4.51E-08	0	0	7.68933E-10	0	0.0008	Res
582301.42_4130481.48	582301.42	4130481.48	3.40E-05	2.60E-08	1.56E-08	2.60E-08	1.72E-08	4.77E-08	1.12E-06	3.93E-08	0	0	6.44323E-10	0	0.0006	Res
582357.99_4130481.48	582357.99	4130481.48	2.90E-05	2.30E-08	1.38E-08	2.30E-08	1.52E-08	4.22E-08	9.91E-07	3.48E-08	0	0	5.48547E-10	0	0.0005	Res
582414.56_4130481.48	582414.56	4130481.48	2.51E-05	2.07E-08	1.24E-08	2.07E-08	1.38E-08	3.80E-08	8.92E-07	3.13E-08	0	0	4.76015E-10	0	0.0005	Res
582471.13_4130481.48	582471.13	4130481.48	2.21E-05	1.88E-08	1.13E-08	1.88E-08	1.25E-08	3.45E-08	8.11E-07	2.85E-08	0	0	4.17648E-10	0	0.0004	Res
582527.7_4130481.48	582527.7	4130481.48	1.95E-05	1.72E-08	1.03E-08	1.72E-08	1.15E-08	3.16E-08	7.41E-07	2.60E-08	0	0	3.68979E-10	0	0.0004	Res
582584.27_4130481.48	582584.27	4130481.48	1.74E-05	1.59E-08	9.53E-09	1.59E-08	1.06E-08	2.91E-08	6.84E-07	2.40E-08	0	0	3.29108E-10	0	0.0003	Res
582640.84_4130481.48	582640.84	4130481.48	1.56E-05	1.47E-08	8.83E-09	1.47E-08	9.88E-09	2.70E-08	6.33E-07	2.22E-08	0	0	2.94884E-10	0	0.0003	Res
582697.41_4130481.48	582697.41	4130481.48	1.41E-05	1.37E-08	8.23E-09	1.37E-08	9.23E-09	2.52E-08	5.90E-07	2.07E-08	0	0	2.66284E-10	0	0.0003	Res
582753.98_4130481.48	582753.98	4130481.48	1.28E-05	1.29E-08	7.73E-09	1.29E-08	8.68E-09	2.36E-08	5.54E-07	1.94E-08	0	0	2.42816E-10	0	0.0002	Res
582810.55_4130481.48	582810.55	4130481.48	1.18E-05	1.21E-08	7.29E-09	1.21E-08	8.20E-09	2.23E-08	5.22E-07	1.83E-08	0	0	2.22991E-10	0	0.0002	Res
582867.12_4130481.48	582867.12	4130481.48	1.09E-05	1.15E-08	6.90E-09	1.15E-08	7.78E-09	2.11E-08	4.95E-07	1.73E-08	0	0	2.05924E-10	0	0.0002	Res
581735.72_4130565.39	581735.72	4130565.39	1.41E-04	8.68E-08	5.21E-08	8.68E-08	5.62E-08	1.60E-07	3.74E-06	1.32E-07	0	0	2.67259E-09	0	0.0027	Res
581792.29_4130565.39	581792.29	4130565.39	1.39E-04	8.51E-08	5.11E-08	8.51E-08	5.51E-08	1.57E-07	3.67E-06	1.29E-07	0	0	2.63155E-09	0	0.0026	Res
581848.86_4130565.39	581848.86	4130565.39	1.32E-04	8.10E-08	4.86E-08	8.10E-08	5.25E-08	1.49E-07	3.50E-06	1.23E-07	0	0	2.50281E-09	0	0.0025	Res
581905.43_4130565.39	581905.43	4130565.39	1.26E-04	7.74E-08	4.64E-08	7.74E-08	5.01E-08	1.42E-07	3.34E-06	1.17E-07	0	0	2.39018E-09	0	0.0024	Res
581962_4130565.39	581962	4130565.39	1.09E-04	6.77E-08	4.06E-08	6.77E-08	4.39E-08	1.24E-07	2.92E-06	1.03E-07	0	0	2.06177E-09	0	0.0021	Res

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)								Risk Calculation Part 2, $\sum R1*C_{TAC}$					
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Cobalt	Lead	Nickel	Chromium VI	3rd Trimester	0<2	2<16	16<30	Cancer Risk - 2028 (per million)	Receptor Type
582018.57_4130565.39	582018.57	4130565.39	8.81E-05	5.62E-08	3.37E-08	5.62E-08	3.65E-08	1.03E-07	2.42E-06	8.52E-08	0	0	1.66718E-09	0	0.0017	Res
582075.14_4130565.39	582075.14	4130565.39	7.15E-05	4.69E-08	2.82E-08	4.69E-08	3.06E-08	8.63E-08	2.02E-06	7.12E-08	0	0	1.353E-09	0	0.0014	Res
582131.71_4130565.39	582131.71	4130565.39	5.86E-05	3.97E-08	2.38E-08	3.97E-08	2.60E-08	7.30E-08	1.71E-06	6.02E-08	0	0	1.10895E-09	0	0.0011	Res
582188.28_4130565.39	582188.28	4130565.39	4.70E-05	3.32E-08	1.99E-08	3.32E-08	2.18E-08	6.11E-08	1.43E-06	5.04E-08	0	0	8.90655E-10	0	0.0009	Res
582244.85_4130565.39	582244.85	4130565.39	3.82E-05	2.82E-08	1.69E-08	2.82E-08	1.86E-08	5.18E-08	1.22E-06	4.27E-08	0	0	7.23364E-10	0	0.0007	Res
582301.42_4130565.39	582301.42	4130565.39	3.22E-05	2.47E-08	1.48E-08	2.47E-08	1.63E-08	4.54E-08	1.07E-06	3.74E-08	0	0	6.08888E-10	0	0.0006	Res
582357.99_4130565.39	582357.99	4130565.39	2.72E-05	2.18E-08	1.31E-08	2.18E-08	1.45E-08	4.01E-08	9.41E-07	3.30E-08	0	0	5.15641E-10	0	0.0005	Res
582414.56_4130565.39	582414.56	4130565.39	2.34E-05	1.96E-08	1.17E-08	1.96E-08	1.30E-08	3.59E-08	8.42E-07	2.96E-08	0	0	4.43468E-10	0	0.0004	Res
582471.13_4130565.39	582471.13	4130565.39	2.04E-05	1.77E-08	1.06E-08	1.77E-08	1.18E-08	3.25E-08	7.63E-07	2.68E-08	0	0	3.86596E-10	0	0.0004	Res
582527.7_4130565.39	582527.7	4130565.39	1.80E-05	1.62E-08	9.74E-09	1.62E-08	1.09E-08	2.98E-08	6.99E-07	2.45E-08	0	0	3.40819E-10	0	0.0003	Res
582584.27_4130565.39	582584.27	4130565.39	1.61E-05	1.50E-08	9.00E-09	1.50E-08	1.01E-08	2.75E-08	6.46E-07	2.27E-08	0	0	3.04277E-10	0	0.0003	Res
582640.84_4130565.39	582640.84	4130565.39	1.44E-05	1.39E-08	8.35E-09	1.39E-08	9.35E-09	2.55E-08	5.99E-07	2.10E-08	0	0	2.7252E-10	0	0.0003	Res
582697.41_4130565.39	582697.41	4130565.39	1.31E-05	1.30E-08	7.81E-09	1.30E-08	8.77E-09	2.39E-08	5.60E-07	1.97E-08	0	0	2.47381E-10	0	0.0002	Res
582753.98_4130565.39	582753.98	4130565.39	1.20E-05	1.23E-08	7.36E-09	1.23E-08	8.28E-09	2.25E-08	5.28E-07	1.85E-08	0	0	2.26561E-10	0	0.0002	Res
582810.55_4130565.39	582810.55	4130565.39	1.11E-05	1.16E-08	6.97E-09	1.16E-08	7.86E-09	2.13E-08	5.00E-07	1.75E-08	0	0	2.09421E-10	0	0.0002	Res
582867.12_4130565.39	582867.12	4130565.39	1.03E-05	1.11E-08	6.64E-09	1.11E-08	7.49E-09	2.03E-08	4.76E-07	1.67E-08	0	0	1.94996E-10	0	0.0002	Res
581735.72_4130649.3	581735.72	4130649.3	1.53E-04	9.25E-08	5.55E-08	9.25E-08	5.98E-08	1.70E-07	3.99E-06	1.40E-07	0	0	2.89575E-09	0	0.0029	Res
581792.29_4130649.3	581792.29	4130649.3	1.48E-04	8.94E-08	5.37E-08	8.94E-08	5.78E-08	1.64E-07	3.86E-06	1.36E-07	0	0	2.80247E-09	0	0.0028	Res
581905.43_4130649.3	581905.43	4130649.3	1.48E-04	8.86E-08	5.31E-08	8.86E-08	5.73E-08	1.63E-07	3.82E-06	1.34E-07	0	0	2.80317E-09	0	0.0028	Res
581962_4130649.3	581962	4130649.3	1.23E-04	7.47E-08	4.48E-08	7.47E-08	4.84E-08	1.37E-07	3.22E-06	1.13E-07	0	0	2.32651E-09	0	0.0023	Res
582018.57_4130649.3	582018.57	4130649.3	9.33E-05	5.85E-08	3.51E-08	5.85E-08	3.80E-08	1.08E-07	2.52E-06	8.87E-08	0	0	1.76613E-09	0	0.0018	Res
582075.14_4130649.3	582075.14	4130649.3	7.24E-05	4.70E-08	2.82E-08	4.70E-08	3.06E-08	8.64E-08	2.03E-06	7.12E-08	0	0	1.37067E-09	0	0.0014	Res
582131.71_4130649.3	582131.71	4130649.3	5.62E-05	3.80E-08	2.28E-08	3.80E-08	2.48E-08	6.99E-08	1.64E-06	5.76E-08	0	0	1.06423E-09	0	0.0011	Res
582188.28_4130649.3	582188.28	4130649.3	4.42E-05	3.13E-08	1.88E-08	3.13E-08	2.05E-08	5.75E-08	1.35E-06	4.74E-08	0	0	8.36666E-10	0	0.0008	Res
582244.85_4130649.3	582244.85	4130649.3	3.55E-05	2.64E-08	1.58E-08	2.64E-08	1.74E-08	4.85E-08	1.14E-06	4.00E-08	0	0	6.72291E-10	0	0.0007	Res
582301.42_4130649.3	582301.42	4130649.3	2.93E-05	2.28E-08	1.37E-08	2.28E-08	1.51E-08	4.19E-08	9.83E-07	3.45E-08	0	0	5.54789E-10	0	0.0006	Res
582357.99_4130649.3	582357.99	4130649.3	2.48E-05	2.02E-08	1.21E-08	2.02E-08	1.34E-08	3.70E-08	8.69E-07	3.05E-08	0	0	4.6906E-10	0	0.0005	Res
582414.56_4130649.3	582414.56	4130649.3	2.14E-05	1.81E-08	1.09E-08	1.81E-08	1.21E-08	3.33E-08	7.81E-07	2.74E-08	0	0	4.04843E-10	0	0.0004	Res
582471.13_4130649.3	582471.13	4130649.3	1.86E-05	1.65E-08	9.88E-09	1.65E-08	1.10E-08	3.02E-08	7.09E-07	2.49E-08	0	0	3.53007E-10	0	0.0004	Res
582527.7_4130649.3	582527.7	4130649.3	1.65E-05	1.51E-08	9.08E-09	1.51E-08	1.01E-08	2.77E-08	6.51E-07	2.28E-08	0	0	3.12355E-10	0	0.0003	Res
582584.27_4130649.3	582584.27	4130649.3	1.48E-05	1.40E-08	8.42E-09	1.40E-08	9.42E-09	2.58E-08	6.04E-07	2.12E-08	0	0	2.80332E-10	0	0.0003	Res
582640.84_4130649.3	582640.84	4130649.3	1.35E-05	1.31E-08	7.89E-09	1.31E-08	8.84E-09	2.41E-08	5.66E-07	1.98E-08	0	0	2.54782E-10	0	0.0003	Res
582697.41_4130649.3	582697.41	4130649.3	1.24E-05	1.24E-08	7.43E-09	1.24E-08	8.34E-09	2.27E-08	5.33E-07	1.87E-08	0	0	2.3384E-10	0	0.0002	Res
582753.98_4130649.3	582753.98	4130649.3	1.15E-05	1.18E-08	7.05E-09	1.18E-08	7.93E-09	2.16E-08	5.06E-07	1.77E-08	0	0	2.17017E-10	0	0.0002	Res
582810.55_4130649.3	582810.55	4130649.3	1.07E-05	1.12E-08	6.73E-09	1.12E-08	7.58E-09	2.06E-08	4.82E-07	1.69E-08	0	0	2.03163E-10	0	0.0002	Res
582867.12_4130649.3	582867.12	4130649.3	1.01E-05	1.07E-08	6.44E-09	1.07E-08	7.26E-09	1.97E-08	4.61E-07	1.62E-08	0	0	1.90955E-10	0	0.0002	Res
581848.86_4130733.21	581848.86	4130733.21	2.20E-04	1.27E-07	7.62E-08	1.27E-07	8.18E-08	2.34E-07	5.48E-06	1.93E-07	0	0	4.16699E-09	0	0.0042	Res
581905.43_4130733.21	581905.43	4130733.21	1.88E-04	1.09E-07	6.56E-08	1.09E-07	7.05E-08	2.01E-07	4.72E-06	1.66E-07	0	0	3.5567E-09	0	0.0036	Res
581962_4130733.21	581962	4130733.21	1.38E-04	8.23E-08	4.94E-08	8.23E-08	5.32E-08	1.51E-07	3.55E-06	1.25E-07	0	0	2.61461E-09	0	0.0026	Res
582018.57_4130733.21	582018.57	4130733.21	9.69E-05	5.98E-08	3.59E-08	5.98E-08	3.88E-08	1.10E-07	2.58E-06	9.08E-08	0	0	1.83392E-09	0	0.0018	Res
582075.14_4130733.21	582075.14	4130733.21	6.85E-05	4.43E-08	2.66E-08	4.43E-08	2.89E-08	8.15E-08	1.91E-06	6.72E-08	0	0	1.29591E-09	0	0.0013	Res
582131.71_4130733.21	582131.71	4130733.21	5.00E-05	3.42E-08	2.05E-08	3.42E-08	2.24E-08	6.28E-08	1.47E-06	5.18E-08	0	0	9.4718E-10	0	0.0009	Res
582188.28_4130733.21	582188.28	4130733.21	3.87E-05	2.79E-08	1.67E-08	2.79E-08	1.83E-08	5.12E-08	1.20E-06	4.22E-08	0	0	7.33343E-10	0	0.0007	Res
582244.85_4130733.21	582244.85	4130733.21	3.11E-05	2.35E-08	1.41E-08	2.35E-08	1.55E-08	4.32E-08	1.01E-06	3.56E-08	0	0	5.88806E-10	0	0.0006	Res
582301.42_4130733.21	582301.42	4130733.21	2.58E-05	2.05E-08	1.23E-08	2.05E-08	1.36E-08	3.76E-08	8.83E-07	3.10E-08	0	0	4.88761E-10	0	0.0005	Res
582357.99_4130733.21	582357.99	4130733.21	2.20E-05	1.82E-08	1.09E-08	1.82E-08	1.21E-08	3.35E-08	7.86E-07	2.76E-08	0	0	4.16732E-10	0	0.0004	Res
582414.56_4130733.21	582414.56	4130733.21	1.92E-05	1.65E-08	9.92E-09	1.65E-08	1.10E-08	3.03E-08	7.12E-07	2.50E-08	0	0	3.63208E-10	0	0.0004	Res
582471.13_4130733.21	582471.13	4130733.21	1.71E-05	1.52E-08	9.13E-09	1.52E-08	1.02E-08	2.79E-08	6.55E-07	2.30E-08	0	0	3.23073E-10	0	0.0003	Res
582527.7_4130733.21	582527.7	4130733.21	1.54E-05	1.42E-08	8.49E-09	1.42E-08	9.48E-09	2.60E-08	6.09E-07	2.14E-08	0	0	2.9198E-10	0	0.0003	Res
582584.27_4130733.21	582584.27	4130733.21	1.41E-05	1.33E-08	7.98E-09	1.33E-08	8.92E-09	2.44E-08	5.72E-07	2.01E-08	0	0	2.6742E-10	0	0.0003	Res
582640.84_4130733.21	582640.84	4130733.21	1.31E-05	1.26E-08	7.54E-09	1.26E-08	8.45E-09	2.31E-08	5.41E-07	1.90E-08	0	0	2.473E-10	0	0.0002	Res
582697.41_4130733.21	582697.41	4130733.21	1.22E-05	1.20E-08	7.17E-09	1.20E-08	8.04E-09	2.19E-08	5.14E-07	1.80E-08	0	0	2.30465E-10	0	0.0002	Res
582753.98_4130733.21	582753.98	4130733.21	1.14E-05	1.14E-08	6.84E-09	1.14E-08	7.68E-09	2.09E-08	4.90E-07	1.72E-08	0	0	2.15829E-10	0	0.0002	Res
582810.55_4130733.21	582810.55	4130733.21	1.08E-05	1.09E-08	6.55E-09	1.09E-08	7.37E-09	2.00E-08	4.70E-07	1.65E-08	0	0	2.03701E-10	0	0.0002	Res
582867.12_4130733.21	582867.12	4130733.21	1.02E-05	1.05E-08	6.28E-09	1.05E-08	7.08E-09	1.92E-08	4.50E-07	1.58E-08	0	0	1.92308E-10	0	0.0002	Res
581735.72_4130817.12	581735.72	4130817.12	3.23E-04	1.82E-07	1.09E-07	1.82E-07	1.17E-07	3.36E-07	7.88E-06	2.77E-07	0	0	6.12125E-09	0	0.0061	Res
581792.29_4130817.12	581792.29	4130817.12	3.65E-04	2.04E-07	1.23E-07	2.04E-07	1.31E-07	3.76E-07	8.83E-06	3.10E-07	0	0	6.90773E-09	0	0.0069	Res

Risk Calculation Part 2, $\sum R1*C_{TAC}$

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)								3rd Trimester	0<2	2<16	16<30	Cancer Risk - 2028	Receptor Type
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Cobalt	Lead	Nickel	Chromium VI					(per million)	
581848.86_4130817.12	581848.86	4130817.12	3.27E-04	1.84E-07	1.10E-07	1.84E-07	1.18E-07	3.38E-07	7.94E-06	2.79E-07	0	0	6.19725E-09	0	0.0062	Res
581905.43_4130817.12	581905.43	4130817.12	2.48E-04	1.41E-07	8.44E-08	1.41E-07	9.06E-08	2.59E-07	6.08E-06	2.14E-07	0	0	4.68713E-09	0	0.0047	Res
581962_4130817.12	581962	4130817.12	1.50E-04	8.82E-08	5.29E-08	8.82E-08	5.69E-08	1.62E-07	3.81E-06	1.34E-07	0	0	2.84433E-09	0	0.0028	Res
582018.57_4130817.12	582018.57	4130817.12	9.01E-05	5.56E-08	3.34E-08	5.56E-08	3.61E-08	1.02E-07	2.40E-06	8.44E-08	0	0	1.7052E-09	0	0.0017	Res
582075.14_4130817.12	582075.14	4130817.12	5.84E-05	3.84E-08	2.30E-08	3.84E-08	2.50E-08	7.05E-08	1.66E-06	5.82E-08	0	0	1.10532E-09	0	0.0011	Res
582131.71_4130817.12	582131.71	4130817.12	4.21E-05	2.94E-08	1.76E-08	2.94E-08	1.93E-08	5.40E-08	1.27E-06	4.45E-08	0	0	7.97245E-10	0	0.0008	Res
582188.28_4130817.12	582188.28	4130817.12	3.27E-05	2.41E-08	1.45E-08	2.41E-08	1.59E-08	4.43E-08	1.04E-06	3.66E-08	0	0	6.1965E-10	0	0.0006	Res
582244.85_4130817.12	582244.85	4130817.12	2.68E-05	2.08E-08	1.25E-08	2.08E-08	1.37E-08	3.81E-08	8.94E-07	3.14E-08	0	0	5.07827E-10	0	0.0005	Res
582301.42_4130817.12	582301.42	4130817.12	2.29E-05	1.85E-08	1.11E-08	1.85E-08	1.22E-08	3.39E-08	7.95E-07	2.79E-08	0	0	4.33582E-10	0	0.0004	Res
582357.99_4130817.12	582357.99	4130817.12	2.01E-05	1.68E-08	1.01E-08	1.68E-08	1.12E-08	3.08E-08	7.22E-07	2.54E-08	0	0	3.80921E-10	0	0.0004	Res
582414.56_4130817.12	582414.56	4130817.12	1.80E-05	1.55E-08	9.27E-09	1.55E-08	1.03E-08	2.84E-08	6.66E-07	2.34E-08	0	0	3.40933E-10	0	0.0003	Res
582471.13_4130817.12	582471.13	4130817.12	1.64E-05	1.44E-08	8.65E-09	1.44E-08	9.63E-09	2.65E-08	6.21E-07	2.18E-08	0	0	3.10222E-10	0	0.0003	Res
582527.7_4130817.12	582527.7	4130817.12	1.50E-05	1.35E-08	8.12E-09	1.35E-08	9.05E-09	2.48E-08	5.82E-07	2.04E-08	0	0	2.84322E-10	0	0.0003	Res
582584.27_4130817.12	582584.27	4130817.12	1.39E-05	1.28E-08	7.67E-09	1.28E-08	8.56E-09	2.34E-08	5.50E-07	1.93E-08	0	0	2.63097E-10	0	0.0003	Res
582640.84_4130817.12	582640.84	4130817.12	1.29E-05	1.21E-08	7.27E-09	1.21E-08	8.13E-09	2.22E-08	5.21E-07	1.83E-08	0	0	2.44897E-10	0	0.0002	Res
582697.41_4130817.12	582697.41	4130817.12	1.21E-05	1.15E-08	6.92E-09	1.15E-08	7.75E-09	2.12E-08	4.96E-07	1.74E-08	0	0	2.28944E-10	0	0.0002	Res
582753.98_4130817.12	582753.98	4130817.12	1.13E-05	1.10E-08	6.59E-09	1.10E-08	7.40E-09	2.02E-08	4.73E-07	1.66E-08	0	0	2.14315E-10	0	0.0002	Res
582810.55_4130817.12	582810.55	4130817.12	1.06E-05	1.05E-08	6.31E-09	1.05E-08	7.09E-09	1.93E-08	4.52E-07	1.59E-08	0	0	2.01605E-10	0	0.0002	Res
582867.12_4130817.12	582867.12	4130817.12	1.01E-05	1.01E-08	6.04E-09	1.01E-08	6.80E-09	1.85E-08	4.33E-07	1.52E-08	0	0	1.90287E-10	0	0.0002	Res
581735.72_4130901.03	581735.72	4130901.03	6.42E-04	3.53E-07	2.12E-07	3.53E-07	2.27E-07	6.50E-07	1.53E-05	5.37E-07	0	0	1.21631E-08	0	0.0122	Res
581792.29_4130901.03	581792.29	4130901.03	6.86E-04	3.76E-07	2.26E-07	3.76E-07	2.41E-07	6.92E-07	1.63E-05	5.72E-07	0	0	1.29886E-08	0	0.0130	Res
581848.86_4130901.03	581848.86	4130901.03	6.11E-04	3.36E-07	2.02E-07	3.36E-07	2.15E-07	6.18E-07	1.45E-05	5.10E-07	0	0	1.15766E-08	0	0.0116	Res
581905.43_4130901.03	581905.43	4130901.03	3.21E-04	1.80E-07	1.08E-07	1.80E-07	1.16E-07	3.31E-07	7.76E-06	2.73E-07	0	0	6.08044E-09	0	0.0061	Res
581962_4130901.03	581962	4130901.03	1.30E-04	7.71E-08	4.63E-08	7.71E-08	4.98E-08	1.42E-07	3.33E-06	1.17E-07	0	0	2.47003E-09	0	0.0025	Res
582018.57_4130901.03	582018.57	4130901.03	7.01E-05	4.45E-08	2.67E-08	4.45E-08	2.89E-08	8.17E-08	1.92E-06	6.74E-08	0	0	1.32703E-09	0	0.0013	Res
582075.14_4130901.03	582075.14	4130901.03	4.71E-05	3.19E-08	1.91E-08	3.19E-08	2.08E-08	5.86E-08	1.37E-06	4.83E-08	0	0	8.91719E-10	0	0.0009	Res
582131.71_4130901.03	582131.71	4130901.03	3.61E-05	2.58E-08	1.55E-08	2.58E-08	1.69E-08	4.73E-08	1.11E-06	3.90E-08	0	0	6.83615E-10	0	0.0007	Res
582188.28_4130901.03	582188.28	4130901.03	2.96E-05	2.21E-08	1.32E-08	2.21E-08	1.45E-08	4.05E-08	9.51E-07	3.34E-08	0	0	5.6084E-10	0	0.0006	Res
582244.85_4130901.03	582244.85	4130901.03	2.52E-05	1.95E-08	1.17E-08	1.95E-08	1.29E-08	3.58E-08	8.40E-07	2.95E-08	0	0	4.77354E-10	0	0.0005	Res
582301.42_4130901.03	582301.42	4130901.03	2.19E-05	1.75E-08	1.05E-08	1.75E-08	1.16E-08	3.22E-08	7.56E-07	2.65E-08	0	0	4.15476E-10	0	0.0004	Res
582357.99_4130901.03	582357.99	4130901.03	1.94E-05	1.60E-08	9.62E-09	1.60E-08	1.07E-08	2.94E-08	6.90E-07	2.42E-08	0	0	3.68196E-10	0	0.0004	Res
582414.56_4130901.03	582414.56	4130901.03	1.74E-05	1.48E-08	8.87E-09	1.48E-08	9.84E-09	2.71E-08	6.36E-07	2.23E-08	0	0	3.30091E-10	0	0.0003	Res
582471.13_4130901.03	582471.13	4130901.03	1.58E-05	1.37E-08	8.25E-09	1.37E-08	9.18E-09	2.52E-08	5.92E-07	2.08E-08	0	0	2.99443E-10	0	0.0003	Res
582527.7_4130901.03	582527.7	4130901.03	1.45E-05	1.29E-08	7.72E-09	1.29E-08	8.60E-09	2.36E-08	5.54E-07	1.94E-08	0	0	2.73707E-10	0	0.0003	Res
582584.27_4130901.03	582584.27	4130901.03	1.33E-05	1.21E-08	7.28E-09	1.21E-08	8.13E-09	2.22E-08	5.22E-07	1.83E-08	0	0	2.52647E-10	0	0.0003	Res
582640.84_4130901.03	582640.84	4130901.03	1.24E-05	1.15E-08	6.89E-09	1.15E-08	7.71E-09	2.11E-08	4.94E-07	1.73E-08	0	0	2.34824E-10	0	0.0002	Res
582697.41_4130901.03	582697.41	4130901.03	1.16E-05	1.09E-08	6.55E-09	1.09E-08	7.34E-09	2.00E-08	4.70E-07	1.65E-08	0	0	2.19369E-10	0	0.0002	Res
582753.98_4130901.03	582753.98	4130901.03	1.09E-05	1.04E-08	6.25E-09	1.04E-08	7.01E-09	1.91E-08	4.48E-07	1.57E-08	0	0	2.05731E-10	0	0.0002	Res
582810.55_4130901.03	582810.55	4130901.03	1.02E-05	9.95E-09	5.97E-09	9.95E-09	6.70E-09	1.82E-08	4.28E-07	1.50E-08	0	0	1.93344E-10	0	0.0002	Res
582867.12_4130901.03	582867.12	4130901.03	9.65E-06	9.53E-09	5.72E-09	9.53E-09	6.43E-09	1.75E-08	4.10E-07	1.44E-08	0	0	1.82621E-10	0	0.0002	Res
581735.72_4130984.94	581735.72	4130984.94	1.71E-03	9.27E-07	5.56E-07	9.27E-07	5.94E-07	1.71E-06	4.00E-05	1.41E-06	0	0	3.2413E-08	0	0.0324	Res
581792.29_4130984.94	581792.29	4130984.94	2.25E-03	1.21E-06	7.28E-07	1.21E-06	7.78E-07	2.23E-06	5.24E-05	1.85E-06	0	0	4.25519E-08	0	0.0426	Res
581848.86_4130984.94	581848.86	4130984.94	2.61E-03	1.41E-06	8.47E-07	1.41E-06	9.03E-07	2.60E-06	6.10E-05	2.14E-06	0	0	4.95031E-08	0	0.0495	Res
581905.43_4130984.94	581905.43	4130984.94	2.08E-04	1.19E-07	7.13E-08	1.19E-07	7.65E-08	2.19E-07	5.13E-06	1.81E-07	0	0	3.94425E-09	0	0.0039	Res
581962_4130984.94	581962	4130984.94	8.95E-05	5.49E-08	3.29E-08	5.49E-08	3.56E-08	1.01E-07	2.37E-06	8.33E-08	0	0	1.6952E-09	0	0.0017	Res
582018.57_4130984.94	582018.57	4130984.94	5.77E-05	3.75E-08	2.25E-08	3.75E-08	2.45E-08	6.90E-08	1.62E-06	5.69E-08	0	0	1.09271E-09	0	0.0011	Res
582075.14_4130984.94	582075.14	4130984.94	4.26E-05	2.92E-08	1.75E-08	2.92E-08	1.91E-08	5.36E-08	1.26E-06	4.42E-08	0	0	8.06108E-10	0	0.0008	Res
582131.71_4130984.94	582131.71	4130984.94	3.37E-05	2.42E-08	1.45E-08	2.42E-08	1.59E-08	4.44E-08	1.04E-06	3.66E-08	0	0	6.37736E-10	0	0.0006	Res
582188.28_4130984.94	582188.28	4130984.94	2.78E-05	2.08E-08	1.25E-08	2.08E-08	1.37E-08	3.82E-08	8.97E-07	3.15E-08	0	0	5.2572E-10	0	0.0005	Res
582244.85_4130984.94	582244.85	4130984.94	2.36E-05	1.84E-08	1.10E-08	1.84E-08	1.21E-08	3.37E-08	7.91E-07	2.78E-08	0	0	4.46156E-10	0	0.0004	Res
582301.42_4130984.94	582301.42	4130984.94	2.05E-05	1.65E-08	9.90E-09	1.65E-08	1.09E-08	3.03E-08	7.10E-07	2.50E-08	0	0	3.87188E-10	0	0.0004	Res
582357.99_4130984.94	582357.99	4130984.94	1.81E-05	1.50E-08	9.03E-09	1.50E-08	1.00E-08	2.76E-08	6.48E-07	2.27E-08	0	0	3.42076E-10	0	0.0003	Res
582414.56_4130984.94	582414.56	4130984.94	1.62E-05	1.39E-08	8.32E-09	1.39E-08	9.24E-09	2.54E-08	5.97E-07	2.09E-08	0	0	3.06314E-10	0	0.0003	Res
582471.13_4130984.94	582471.13	4130984.94	1.47E-05	1.29E-08	7.73E-09	1.29E-08	8.60E-09	2.36E-08	5.54E-07	1.95E-08	0	0	2.77354E-10	0	0.0003	Res
582527.7_4130984.94	582527.7	4130984.94	1.34E-05	1.20E-08	7.23E-09	1.20E-08	8.06E-09	2.21E-08	5.18E-07	1.82E-08	0	0	2.53348E-10	0	0.0003	Res
582584.27_4130984.94	582584.27	4130984.94	1.24E-05	1.14E-08	6.81E-09	1.14E-08	7.61E-09	2.08E-08	4.89E-07	1.71E-08	0	0	2.33928E-10	0	0.0002	Res
582640.84_4130984.94	582640.84	4130984.94	1.15E-05	1.08E-08	6.46E-09	1.08E-08	7.23E-09	1.98E-08	4.64E-07	1.63E-08	0	0	2.18072E-10	0	0.0002	Res

Risk Calculation Part 2, $\sum R1*C_{TAC}$

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)								3rd Trimester	0<2	2<16	16<30	Cancer Risk - 2028	Receptor Type
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Cobalt	Lead	Nickel	Chromium VI					(per million)	
582697.41_4130984.94	582697.41	4130984.94	1.08E-05	1.02E-08	6.14E-09	1.02E-08	6.89E-09	1.88E-08	4.40E-07	1.55E-08	0	0	2.0368E-10	0	0.0002	Res
582753.98_4130984.94	582753.98	4130984.94	1.01E-05	9.78E-09	5.87E-09	9.78E-09	6.59E-09	1.79E-08	4.21E-07	1.48E-08	0	0	1.91809E-10	0	0.0002	Res
582810.55_4130984.94	582810.55	4130984.94	9.56E-06	9.36E-09	5.62E-09	9.36E-09	6.31E-09	1.72E-08	4.03E-07	1.41E-08	0	0	1.8097E-10	0	0.0002	Res
582867.12_4130984.94	582867.12	4130984.94	9.04E-06	8.98E-09	5.39E-09	8.98E-09	6.06E-09	1.65E-08	3.86E-07	1.35E-08	0	0	1.71237E-10	0	0.0002	Res
581735.72_4131068.85	581735.72	4131068.85	2.80E-04	1.58E-07	9.47E-08	1.58E-07	1.02E-07	2.90E-07	6.82E-06	2.40E-07	0	0	5.30003E-09	0	0.0053	Res
581792.29_4131068.85	581792.29	4131068.85	2.23E-04	1.27E-07	7.63E-08	1.27E-07	8.19E-08	2.34E-07	5.49E-06	1.93E-07	0	0	4.22843E-09	0	0.0042	Res
581848.86_4131068.85	581848.86	4131068.85	1.20E-04	7.17E-08	4.30E-08	7.17E-08	4.63E-08	1.32E-07	3.09E-06	1.09E-07	0	0	2.27802E-09	0	0.0023	Res
581905.43_4131068.85	581905.43	4131068.85	7.67E-05	4.80E-08	2.88E-08	4.80E-08	3.12E-08	8.83E-08	2.07E-06	7.29E-08	0	0	1.45255E-09	0	0.0015	Res
581962_4131068.85	581962	4131068.85	5.56E-05	3.65E-08	2.19E-08	3.65E-08	2.38E-08	6.70E-08	1.57E-06	5.53E-08	0	0	1.05312E-09	0	0.0011	Res
582018.57_4131068.85	582018.57	4131068.85	4.22E-05	2.90E-08	1.74E-08	2.90E-08	1.90E-08	5.34E-08	1.25E-06	4.40E-08	0	0	7.98939E-10	0	0.0008	Res
582075.14_4131068.85	582075.14	4131068.85	3.35E-05	2.42E-08	1.45E-08	2.42E-08	1.59E-08	4.44E-08	1.04E-06	3.66E-08	0	0	6.34222E-10	0	0.0006	Res
582131.71_4131068.85	582131.71	4131068.85	2.76E-05	2.08E-08	1.25E-08	2.08E-08	1.37E-08	3.82E-08	8.97E-07	3.15E-08	0	0	5.23092E-10	0	0.0005	Res
582188.28_4131068.85	582188.28	4131068.85	2.34E-05	1.83E-08	1.10E-08	1.83E-08	1.21E-08	3.36E-08	7.89E-07	2.77E-08	0	0	4.42222E-10	0	0.0004	Res
582244.85_4131068.85	582244.85	4131068.85	2.02E-05	1.64E-08	9.86E-09	1.64E-08	1.09E-08	3.02E-08	7.08E-07	2.48E-08	0	0	3.82463E-10	0	0.0004	Res
582301.42_4131068.85	582301.42	4131068.85	1.78E-05	1.49E-08	8.96E-09	1.49E-08	9.93E-09	2.74E-08	6.43E-07	2.26E-08	0	0	3.36276E-10	0	0.0003	Res
582357.99_4131068.85	582357.99	4131068.85	1.58E-05	1.37E-08	8.23E-09	1.37E-08	9.15E-09	2.52E-08	5.91E-07	2.07E-08	0	0	2.99645E-10	0	0.0003	Res
582414.56_4131068.85	582414.56	4131068.85	1.43E-05	1.27E-08	7.64E-09	1.27E-08	8.51E-09	2.34E-08	5.48E-07	1.92E-08	0	0	2.70501E-10	0	0.0003	Res
582471.13_4131068.85	582471.13	4131068.85	1.30E-05	1.19E-08	7.13E-09	1.19E-08	7.96E-09	2.18E-08	5.12E-07	1.80E-08	0	0	2.46464E-10	0	0.0002	Res
582527.7_4131068.85	582527.7	4131068.85	1.20E-05	1.12E-08	6.70E-09	1.12E-08	7.49E-09	2.05E-08	4.81E-07	1.69E-08	0	0	2.26338E-10	0	0.0002	Res
582584.27_4131068.85	582584.27	4131068.85	1.10E-05	1.05E-08	6.32E-09	1.05E-08	7.07E-09	1.93E-08	4.53E-07	1.59E-08	0	0	2.08927E-10	0	0.0002	Res
582640.84_4131068.85	582640.84	4131068.85	1.04E-05	1.00E-08	6.02E-09	1.00E-08	6.74E-09	1.84E-08	4.31E-07	1.51E-08	0	0	1.96058E-10	0	0.0002	Res
582697.41_4131068.85	582697.41	4131068.85	9.73E-06	9.56E-09	5.74E-09	9.56E-09	6.44E-09	1.75E-08	4.11E-07	1.44E-08	0	0	1.8427E-10	0	0.0002	Res
582753.98_4131068.85	582753.98	4131068.85	9.23E-06	9.17E-09	5.50E-09	9.17E-09	6.18E-09	1.68E-08	3.94E-07	1.38E-08	0	0	1.74688E-10	0	0.0002	Res
582810.55_4131068.85	582810.55	4131068.85	8.77E-06	8.81E-09	5.29E-09	8.81E-09	5.95E-09	1.62E-08	3.79E-07	1.33E-08	0	0	1.66102E-10	0	0.0002	Res
582867.12_4131068.85	582867.12	4131068.85	8.30E-06	8.44E-09	5.07E-09	8.44E-09	5.71E-09	1.55E-08	3.63E-07	1.27E-08	0	0	1.57115E-10	0	0.0002	Res
582018.57_4131152.76	582018.57	4131152.76	2.83E-05	2.15E-08	1.29E-08	2.15E-08	1.42E-08	3.94E-08	9.25E-07	3.25E-08	0	0	5.35875E-10	0	0.0005	Res
582244.85_4131152.76	582244.85	4131152.76	1.71E-05	1.47E-08	8.83E-09	1.47E-08	9.80E-09	2.70E-08	6.34E-07	2.22E-08	0	0	3.2373E-10	0	0.0003	Res
582301.42_4131152.76	582301.42	4131152.76	1.54E-05	1.36E-08	8.18E-09	1.36E-08	9.09E-09	2.50E-08	5.87E-07	2.06E-08	0	0	2.91561E-10	0	0.0003	Res
582357.99_4131152.76	582357.99	4131152.76	1.39E-05	1.27E-08	7.60E-09	1.27E-08	8.47E-09	2.32E-08	5.45E-07	1.91E-08	0	0	2.63358E-10	0	0.0003	Res
582414.56_4131152.76	582414.56	4131152.76	1.27E-05	1.18E-08	7.11E-09	1.18E-08	7.93E-09	2.17E-08	5.10E-07	1.79E-08	0	0	2.39995E-10	0	0.0002	Res
582471.13_4131152.76	582471.13	4131152.76	1.15E-05	1.11E-08	6.64E-09	1.11E-08	7.42E-09	2.03E-08	4.76E-07	1.67E-08	0	0	2.18028E-10	0	0.0002	Res
582527.7_4131152.76	582527.7	4131152.76	1.06E-05	1.04E-08	6.25E-09	1.04E-08	7.00E-09	1.91E-08	4.48E-07	1.57E-08	0	0	2.00537E-10	0	0.0002	Res
582584.27_4131152.76	582584.27	4131152.76	9.80E-06	9.84E-09	5.90E-09	9.84E-09	6.63E-09	1.80E-08	4.23E-07	1.49E-08	0	0	1.85529E-10	0	0.0002	Res
582640.84_4131152.76	582640.84	4131152.76	9.16E-06	9.36E-09	5.62E-09	9.36E-09	6.31E-09	1.72E-08	4.03E-07	1.41E-08	0	0	1.73406E-10	0	0.0002	Res
582697.41_4131152.76	582697.41	4131152.76	8.61E-06	8.93E-09	5.36E-09	8.93E-09	6.03E-09	1.64E-08	3.84E-07	1.35E-08	0	0	1.63039E-10	0	0.0002	Res
582753.98_4131152.76	582753.98	4131152.76	8.20E-06	8.59E-09	5.15E-09	8.59E-09	5.80E-09	1.57E-08	3.69E-07	1.30E-08	0	0	1.55241E-10	0	0.0002	Res
582810.55_4131152.76	582810.55	4131152.76	7.82E-06	8.27E-09	4.96E-09	8.27E-09	5.59E-09	1.52E-08	3.55E-07	1.25E-08	0	0	1.47984E-10	0	0.0001	Res
582867.12_4131152.76	582867.12	4131152.76	7.41E-06	7.93E-09	4.76E-09	7.93E-09	5.37E-09	1.45E-08	3.41E-07	1.20E-08	0	0	1.40284E-10	0	0.0001	Res

HRA Permanente Creek Restoration Project

Construction Year 2029

Emissions Inputs

Construction Activity	Construction Year & Source	DPM Exhaust (tons/year)	PM10 Dust for speciation (tons/year)	Arsenic (tons/year)	Beryllium (tons/year)	Cadmium (tons/year)	Cobalt (tons/year)	Copper (tons/year)	Lead (tons/year)	Mercury (tons/year)	Nickel (tons/year)	Selenium (tons/year)	Chromium VI (tons/year)	Crystalline Silica (tons/year)
Concrete Channel 2024	2024_CONCRTE	0.000	0.00	2.91E-12	1.74E-12	2.91E-12	1.49E-11	3.26E-11	2.91E-12	4.65E-13	5.35E-11	5.81E-12	2.33E-13	8.63E-09
Paved road	2024_PAVED	2.07E-04	0.08	1.04E-07	6.26E-08	1.04E-07	6.68E-08	2.09E-06	1.92E-07	1.17E-08	4.51E-06	2.09E-07	1.59E-07	5.93E-04
Unpaved road	2024_CCP_UNPV	6.27E-05	0.20	2.56E-07	1.54E-07	2.56E-07	1.64E-07	5.12E-06	4.71E-07	2.87E-08	1.11E-05	5.12E-07	3.89E-07	1.46E-03
Channel Widening 2024	2024_CHAN_RCK	0.002	0.16	2.05E-07	1.23E-07	2.05E-07	1.05E-06	2.29E-06	2.05E-07	3.28E-08	3.77E-06	4.09E-07	1.64E-08	6.08E-04
Paved road	2024_PAVED	1.80E-03	2.39	2.99E-06	1.79E-06	2.99E-06	1.91E-06	5.98E-05	5.50E-06	3.35E-07	1.29E-04	5.98E-06	4.54E-06	1.70E-02
Rock Pile Area 2025	2025_CHAN_RCK	0.006	0.25	3.16E-07	1.89E-07	3.16E-07	1.62E-06	3.54E-06	3.16E-07	5.05E-08	5.81E-06	6.31E-07	2.53E-08	9.37E-04
Paved road	2025_PAVED	5.95E-03	2.44	3.05E-06	1.83E-06	3.05E-06	1.95E-06	6.10E-05	5.61E-06	3.41E-07	1.32E-04	6.10E-06	4.63E-06	1.73E-02
Rock Pile Area 2026	2026_CHAN_RCK	0.006	0.25	3.16E-07	1.89E-07	3.16E-07	1.62E-06	3.54E-06	3.16E-07	5.05E-08	5.81E-06	6.31E-07	2.53E-08	9.37E-04
Paved road	2026_PAVED	5.84E-03	2.44	3.05E-06	1.83E-06	3.05E-06	1.95E-06	6.10E-05	5.61E-06	3.41E-07	1.32E-04	6.10E-06	4.63E-06	1.73E-02
Channel Widening 2027	2027_CHAN_RCK	0.002	0.98	1.23E-06	7.36E-07	1.23E-06	6.28E-06	1.37E-05	1.23E-06	1.96E-07	2.26E-05	2.45E-06	9.82E-08	3.64E-03
Paved road	2027_PAVED	5.61E-03	2.39	2.99E-06	1.79E-06	2.99E-06	1.91E-06	5.98E-05	5.50E-06	3.35E-07	1.29E-04	5.98E-06	4.54E-06	1.70E-02
Material Removal 2028	2028_MATRMVL	0.001	0.25	3.15E-07	1.89E-07	3.15E-07	1.62E-06	3.53E-06	3.15E-07	5.05E-08	5.80E-06	6.31E-07	2.52E-08	9.37E-04
Paved road	2028_PAVED	5.57E-03	2.39	2.99E-06	1.80E-06	2.99E-06	1.92E-06	5.98E-05	5.51E-06	3.35E-07	1.29E-04	5.98E-06	4.55E-06	1.70E-02
Unpaved road	2028_UNPAVED	3.40E-03	11.84	1.48E-05	8.88E-06	1.48E-05	9.47E-06	2.96E-04	2.72E-05	1.66E-06	6.40E-04	2.96E-05	2.25E-05	8.41E-02
Material Removal 2029	2029_MATRMVL	0.001	0.25	3.15E-07	1.89E-07	3.15E-07	1.62E-06	3.53E-06	3.15E-07	5.05E-08	5.80E-06	6.31E-07	2.52E-08	9.37E-04
Paved road	2029_PAVED	5.56E-03	2.41	3.01E-06	1.81E-06	3.01E-06	1.93E-06	6.03E-05	5.55E-06	3.38E-07	1.30E-04	6.03E-06	4.58E-06	1.71E-02
Unpaved road	2029_UNPAVED	3.39E-03	11.93	1.49E-05	8.95E-06	1.49E-05	9.55E-06	2.98E-04	2.74E-05	1.67E-06	6.44E-04	2.98E-05	2.27E-05	8.47E-02

Construction Activity	Construction Year	DPM (g/s)	Arsenic (g/s)	Beryllium (g/s)	Cadmium (g/s)	Cobalt (g/s)	Copper (g/s)	Lead (g/s)	Mercury (g/s)	Nickel (g/s)	Selenium (g/s)	Chromium VI (g/s)	Crystalline Silica (g/s)
Concrete Channel 2024	2024_CONCRTE	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Paved road	2024_PAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Unpaved road	2024_CCP_UNPV	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Channel Widening 2024	2024_CHAN_RCK	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Paved road	2024_PAVED	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Rock Pile Area 2025	2025_CHAN_RCK	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Paved road	2025_PAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Rock Pile Area 2026	2026_CHAN_RCK	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Paved road	2026_PAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Channel Widening 2027	2027_CHAN_RCK	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Paved road	2027_PAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Material Removal 2028	2028_MATRMVL	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Paved road	2028_PAVED	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Unpaved road	2028_UNPAVED	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Material Removal 2029	2029_MATRMVL	3.324E-05	9.08E-09	5.45E-09	9.08E-09	4.65E-08	1.02E-07	9.08E-09	1.45E-09	1.67E-07	1.82E-08	7.26E-10	2.70E-05
Paved road	2029_PAVED	1.598E-04	8.67E-08	5.20E-08	8.67E-08	5.55E-08	1.73E-06	1.60E-07	9.71E-09	3.75E-06	1.73E-07	1.32E-07	4.93E-04
Unpaved road	2029_UNPAVED	9.761E-05	4.29E-07	2.57E-07	4.29E-07	2.75E-07	8.58E-06	7.89E-07	4.81E-08	1.85E-05	8.58E-07	6.52E-07	2.44E-03

N/A = not including PM10 on-site dust in HRA calculation; it is only for speciating metals.

Exposure Duration, ED

	Exposure Start	3rd Trimester	0<2	2<16	16<30
Years	1/1/2029	0	0	1	0

Risk Factors

	Abbreviation	UOM	3rd Trimester	0<2	2<16	16<30
Daily Breathing Rate (95th %'ile)	DBR	L/kg-day	361	581	581	302
Fraction Of Time At Home [a]	FAH	unitless	0.85	0.85	0.72	0.73
Exposure Frequency	EF	days/year	0.96	0.96	0.96	0.96
Age Sensitivity Factor	ASF	unitless	10	10	3	1.7
Inhalation Absorption Factor	A	unitless	1	1	1	1
Conversion Factor	CF_1	m^3/L	0.001	0.001	0.001	0.001
Conversion Factor	CF_2	$\mu g/m^3$	0.001	0.001	0.001	0.001
Averaging Time (for residential exposure)	AT	years	70.00	70.00	70.00	70.00

[a] assume school or daycare will have cancer risk of >1 per million

Cancer Potency Factor, CPF

TAC	UOM	
DPM	$mg/kg\text{-}day^{-1}$	1.1
Arsenic	$mg/kg\text{-}day^{-1}$	12
Beryllium	$mg/kg\text{-}day^{-1}$	8.4
Cadmium	$mg/kg\text{-}day^{-1}$	15
Cobalt	$mg/kg\text{-}day^{-1}$	27
Lead	$mg/kg\text{-}day^{-1}$	0.04
Nickel	$mg/kg\text{-}day^{-1}$	0.91
Chromium VI	$mg/kg\text{-}day^{-1}$	510

Intake Factor for Inhalation, IF (m^3/kg-day)

Equation	3rd Trimester	0<2	2<16	16<30
DBR*FAH*EF*ED*ASF*A*CF/AT	0.000	0.000	0.017	0.000

Risk Calculation Part 1, R1

	TAC	3rd Trimester	0<2	2<16	16<30
IF*CPF*CF	DPM	0.00E+00	0.00E+00	1.89E-05	0.00E+00
	Arsenic	0.00E+00	0.00E+00	2.07E-04	0.00E+00
	Beryllium	0.00E+00	0.00E+00	1.45E-04	0.00E+00
	Cadmium	0.00E+00	0.00E+00	2.58E-04	0.00E+00
	Cobalt	0.00E+00	0.00E+00	4.65E-04	0.00E+00
	Lead	0.00E+00	0.00E+00	6.88E-07	0.00E+00
	Nickel	0.00E+00	0.00E+00	1.57E-05	0.00E+00
	Chromium VI	0.00E+00	0.00E+00	8.78E-03	0.00E+00

Risk Calculation Part 2, $\sum R1*C_{TAC}$

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)								3rd Trimester	0<2	2<16	16<30	Cancer Risk - 2029	Receptor Type
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Cobalt	Lead	Nickel	Chromium VI					(per million)	
581336.22_4131207.48	581336.22	4131207.48	1.86E-04	1.10E-07	6.63E-08	1.10E-07	7.13E-08	2.03E-07	4.77E-06	1.68E-07	0	0	3.52755E-09	0	0.0035	CT House
581554.22_4130688.06	581554.22	4130688.06	1.25E-04	7.98E-08	4.79E-08	7.98E-08	5.17E-08	1.47E-07	3.44E-06	1.21E-07	0	0	2.36669E-09	0	0.0024	Res
579793.36_4131503.29	579793.36	4131503.29	1.11E-05	2.16E-08	1.29E-08	2.16E-08	1.48E-08	3.95E-08	9.27E-07	3.25E-08	0	0	2.09641E-10	0	0.0002	Acute
580488.37_4131517.71	580488.37	4131517.71	1.46E-05	1.76E-08	1.06E-08	1.76E-08	1.18E-08	3.23E-08	7.58E-07	2.66E-08	0	0	2.76187E-10	0	0.0003	Acute
581678.43_4131040.03	581678.43	4131040.03	5.91E-04	3.29E-07	1.97E-07	3.29E-07	2.11E-07	6.05E-07	1.42E-05	4.99E-07	0	0	1.11827E-08	0	0.0112	Res
581635.43_4130978.54	581635.43	4130978.54	1.20E-03	6.57E-07	3.94E-07	6.57E-07	4.21E-07	1.21E-06	2.84E-05	9.99E-07	0	0	2.26358E-08	0	0.0226	Res
581830.06_4131027.55	581830.06	4131027.55	5.44E-04	3.03E-07	1.82E-07	3.03E-07	1.94E-07	5.57E-07	1.31E-05	4.60E-07	0	0	1.03005E-08	0	0.0103	Res
581727.48_4130976.54	581727.48	4130976.54	1.45E-03	7.94E-07	4.76E-07	7.94E-07	5.08E-07	1.46E-06	3.43E-05	1.21E-06	0	0	2.7402E-08	0	0.0274	Res
581789.11_4130419.65	581789.11	4130419.65	9.45E-05	6.28E-08	3.77E-08	6.28E-08	4.09E-08	1.15E-07	2.71E-06	9.52E-08	0	0	1.78907E-09	0	0.0018	Res
581700.32_4130781.89	581700.32	4130781.89	2.87E-04	1.65E-07	9.92E-08	1.65E-07	1.06E-07	3.04E-07	7.14E-06	2.51E-07	0	0	5.43629E-09	0	0.0054	Res
581426.07_4131299.01	581426.07	4131299.01	6.77E-05	4.48E-08	2.69E-08	4.48E-08	2.92E-08	8.23E-08	1.93E-06	6.79E-08	0	0	1.28145E-09	0	0.0013	Acute
582301.42_4129474.56	582301.42	4129474.56	3.01E-05	2.50E-08	1.50E-08	2.50E-08	1.65E-08	4.58E-08	1.08E-06	3.78E-08	0	0	5.70161E-10	0	0.0006	Res
582357.99_4129474.56	582357.99	4129474.56	2.82E-05	2.35E-08	1.41E-08	2.35E-08	1.56E-08	4.32E-08	1.01E-06	3.56E-08	0	0	5.33422E-10	0	0.0005	Res
582414.56_4129474.56	582414.56	4129474.56	2.64E-05	2.22E-08	1.33E-08	2.22E-08	1.48E-08	4.08E-08	9.57E-07	3.36E-08	0	0	5.00136E-10	0	0.0005	Res
582471.13_4129474.56	582471.13	4129474.56	2.48E-05	2.10E-08	1.26E-08	2.10E-08	1.40E-08	3.86E-08	9.06E-07	3.18E-08	0	0	4.70076E-10	0	0.0005	Res
582527.7_4129474.56	582527.7	4129474.56	2.35E-05	2.00E-08	1.20E-08	2.00E-08	1.33E-08	3.67E-08	8.61E-07	3.02E-08	0	0	4.44238E-10	0	0.0004	Res
582584.27_4129474.56	582584.27	4129474.56	2.21E-05	1.90E-08	1.14E-08	1.90E-08	1.27E-08	3.48E-08	8.17E-07	2.87E-08	0	0	4.18133E-10	0	0.0004	Res
582640.84_4129474.56	582640.84	4129474.56	2.06E-05	1.79E-08	1.07E-08	1.79E-08	1.20E-08	3.29E-08	7.71E-07	2.71E-08	0	0	3.90386E-10	0	0.0004	Res
582244.85_4129558.47	582244.85	4129558.47	3.04E-05	2.53E-08	1.52E-08	2.53E-08	1.68E-08	4.65E-08	1.09E-06	3.83E-08	0	0	5.75987E-10	0	0.0006	Res
582301.42_4129558.47	582301.42	4129558.47	3.02E-05	2.48E-08	1.49E-08	2.48E-08	1.64E-08	4.55E-08	1.07E-06	3.75E-08	0	0	5.71166E-10	0	0.0006	Res
582357.99_4129558.47	582357.99	4129558.47	2.87E-05	2.36E-08	1.41E-08	2.36E-08	1.57E-08	4.33E-08	1.02E-06	3.57E-08	0	0	5.42637E-10	0	0.0005	Res
582414.56_4129558.47	582414.56	4129558.47	2.69E-05	2.23E-08	1.34E-08	2.23E-08	1.48E-08	4.10E-08	9.61E-07	3.38E-08	0	0	5.09806E-10	0	0.0005	Res
582471.13_4129558.47	582471.13	4129558.47	2.52E-05	2.11E-08	1.27E-08	2.11E-08	1.40E-08	3.87E-08	9.08E-07	3.19E-08	0	0	4.77786E-10	0	0.0005	Res
582527.7_4129558.47	582527.7	4129558.47	2.36E-05	2.00E-08	1.20E-08	2.00E-08	1.33E-08	3.66E-08	8.59E-07	3.02E-08	0	0	4.47702E-10	0	0.0004	Res
582584.27_4129558.47	582584.27	4129558.47	2.21E-05	1.89E-08	1.13E-08	1.89E-08	1.26E-08	3.47E-08	8.13E-07	2.86E-08	0	0	4.19199E-10	0	0.0004	Res
582640.84_4129558.47	582640.84	4129558.47	2.09E-05	1.80E-08	1.08E-08	1.80E-08	1.20E-08	3.30E-08	7.74E-07	2.72E-08	0	0	3.95249E-10	0	0.0004	Res
582697.41_4129558.47	582697.41	4129558.47	1.97E-05	1.71E-08	1.03E-08	1.71E-08	1.15E-08	3.14E-08	7.37E-07	2.59E-08	0	0	3.72311E-10	0	0.0004	Res
582244.85_4129642.38	582244.85	4129642.38	2.68E-05	2.33E-08	1.40E-08	2.33E-08	1.55E-08	4.27E-08	1.00E-06	3.52E-08	0	0	5.07272E-10	0	0.0005	Res
582301.42_4129642.38	582301.42	4129642.38	2.94E-05	2.43E-08	1.46E-08	2.43E-08	1.61E-08	4.45E-08	1.04E-06	3.67E-08	0	0	5.5643E-10	0	0.0006	Res

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)								Risk Calculation Part 2, $\sum R1*C_{TAC}$					
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Cobalt	Lead	Nickel	Chromium VI	3rd Trimester	0<2	2<16	16<30	Cancer Risk - 2029 (per million)	Receptor Type
582357.99_4129642.38	582357.99	4129642.38	2.91E-05	2.37E-08	1.42E-08	2.37E-08	1.58E-08	4.36E-08	1.02E-06	3.59E-08	0	0	5.50736E-10	0	0.0006	Res
582414.56_4129642.38	582414.56	4129642.38	2.75E-05	2.26E-08	1.35E-08	2.26E-08	1.50E-08	4.14E-08	9.72E-07	3.41E-08	0	0	5.21015E-10	0	0.0005	Res
582471.13_4129642.38	582471.13	4129642.38	2.59E-05	2.14E-08	1.28E-08	2.14E-08	1.42E-08	3.93E-08	9.22E-07	3.24E-08	0	0	4.89805E-10	0	0.0005	Res
582527.7_4129642.38	582527.7	4129642.38	2.44E-05	2.03E-08	1.22E-08	2.03E-08	1.36E-08	3.73E-08	8.76E-07	3.08E-08	0	0	4.61017E-10	0	0.0005	Res
582584.27_4129642.38	582584.27	4129642.38	2.27E-05	1.92E-08	1.15E-08	1.92E-08	1.28E-08	3.53E-08	8.28E-07	2.91E-08	0	0	4.29708E-10	0	0.0004	Res
582640.84_4129642.38	582640.84	4129642.38	2.13E-05	1.83E-08	1.10E-08	1.83E-08	1.22E-08	3.35E-08	7.86E-07	2.76E-08	0	0	4.02607E-10	0	0.0004	Res
582697.41_4129642.38	582697.41	4129642.38	2.00E-05	1.74E-08	1.04E-08	1.74E-08	1.16E-08	3.19E-08	7.47E-07	2.62E-08	0	0	3.77789E-10	0	0.0004	Res
582753.98_4129642.38	582753.98	4129642.38	1.87E-05	1.65E-08	9.90E-09	1.65E-08	1.11E-08	3.03E-08	7.10E-07	2.49E-08	0	0	3.5368E-10	0	0.0004	Res
582810.55_4129642.38	582810.55	4129642.38	1.75E-05	1.57E-08	9.44E-09	1.57E-08	1.05E-08	2.89E-08	6.77E-07	2.38E-08	0	0	3.32011E-10	0	0.0003	Res
582867.12_4129642.38	582867.12	4129642.38	1.63E-05	1.49E-08	8.95E-09	1.49E-08	1.00E-08	2.73E-08	6.41E-07	2.25E-08	0	0	3.08533E-10	0	0.0003	Res
582244.85_4129726.29	582244.85	4129726.29	2.94E-05	2.46E-08	1.48E-08	2.46E-08	1.63E-08	4.51E-08	1.06E-06	3.72E-08	0	0	5.55879E-10	0	0.0006	Res
582301.42_4129726.29	582301.42	4129726.29	2.87E-05	2.39E-08	1.43E-08	2.39E-08	1.59E-08	4.38E-08	1.03E-06	3.61E-08	0	0	5.42524E-10	0	0.0005	Res
582357.99_4129726.29	582357.99	4129726.29	2.93E-05	2.39E-08	1.43E-08	2.39E-08	1.59E-08	4.39E-08	1.03E-06	3.61E-08	0	0	5.54761E-10	0	0.0006	Res
582414.56_4129726.29	582414.56	4129726.29	2.81E-05	2.30E-08	1.38E-08	2.30E-08	1.52E-08	4.21E-08	9.88E-07	3.47E-08	0	0	5.31135E-10	0	0.0005	Res
582471.13_4129726.29	582471.13	4129726.29	2.65E-05	2.19E-08	1.31E-08	2.19E-08	1.45E-08	4.01E-08	9.42E-07	3.31E-08	0	0	5.02087E-10	0	0.0005	Res
582527.7_4129726.29	582527.7	4129726.29	2.50E-05	2.08E-08	1.25E-08	2.08E-08	1.39E-08	3.82E-08	8.96E-07	3.15E-08	0	0	4.73142E-10	0	0.0005	Res
582584.27_4129726.29	582584.27	4129726.29	2.35E-05	1.98E-08	1.19E-08	1.98E-08	1.32E-08	3.63E-08	8.51E-07	2.99E-08	0	0	4.43988E-10	0	0.0004	Res
582640.84_4129726.29	582640.84	4129726.29	2.19E-05	1.88E-08	1.13E-08	1.88E-08	1.25E-08	3.44E-08	8.07E-07	2.83E-08	0	0	4.15278E-10	0	0.0004	Res
582697.41_4129726.29	582697.41	4129726.29	2.03E-05	1.77E-08	1.06E-08	1.77E-08	1.18E-08	3.25E-08	7.62E-07	2.68E-08	0	0	3.85128E-10	0	0.0004	Res
582753.98_4129726.29	582753.98	4129726.29	1.88E-05	1.67E-08	1.00E-08	1.67E-08	1.12E-08	3.06E-08	7.18E-07	2.52E-08	0	0	3.55361E-10	0	0.0004	Res
582810.55_4129726.29	582810.55	4129726.29	1.71E-05	1.56E-08	9.38E-09	1.56E-08	1.05E-08	2.87E-08	6.73E-07	2.36E-08	0	0	3.24637E-10	0	0.0003	Res
582244.85_4129810.2	582244.85	4129810.2	2.86E-05	2.43E-08	1.46E-08	2.43E-08	1.62E-08	4.46E-08	1.05E-06	3.68E-08	0	0	5.42118E-10	0	0.0005	Res
582301.42_4129810.2	582301.42	4129810.2	2.91E-05	2.42E-08	1.45E-08	2.42E-08	1.61E-08	4.45E-08	1.04E-06	3.67E-08	0	0	5.51034E-10	0	0.0006	Res
582357.99_4129810.2	582357.99	4129810.2	2.90E-05	2.39E-08	1.43E-08	2.39E-08	1.59E-08	4.38E-08	1.03E-06	3.61E-08	0	0	5.48638E-10	0	0.0005	Res
582414.56_4129810.2	582414.56	4129810.2	2.83E-05	2.32E-08	1.39E-08	2.32E-08	1.54E-08	4.26E-08	1.00E-06	3.51E-08	0	0	5.35885E-10	0	0.0005	Res
582471.13_4129810.2	582471.13	4129810.2	2.71E-05	2.23E-08	1.34E-08	2.23E-08	1.48E-08	4.09E-08	9.61E-07	3.37E-08	0	0	5.12564E-10	0	0.0005	Res
582527.7_4129810.2	582527.7	4129810.2	2.54E-05	2.12E-08	1.27E-08	2.12E-08	1.41E-08	3.89E-08	9.13E-07	3.21E-08	0	0	4.81466E-10	0	0.0005	Res
582584.27_4129810.2	582584.27	4129810.2	2.37E-05	2.01E-08	1.20E-08	2.01E-08	1.34E-08	3.68E-08	8.64E-07	3.03E-08	0	0	4.49244E-10	0	0.0004	Res
582640.84_4129810.2	582640.84	4129810.2	2.18E-05	1.88E-08	1.13E-08	1.88E-08	1.25E-08	3.45E-08	8.09E-07	2.84E-08	0	0	4.11946E-10	0	0.0004	Res
582697.41_4129810.2	582697.41	4129810.2	2.00E-05	1.76E-08	1.06E-08	1.76E-08	1.18E-08	3.23E-08	7.59E-07	2.66E-08	0	0	3.78207E-10	0	0.0004	Res
581905.43_4129894.11	581905.43	4129894.11	3.79E-05	3.19E-08	1.92E-08	3.19E-08	2.12E-08	5.86E-08	1.38E-06	4.83E-08	0	0	7.16884E-10	0	0.0007	Res
581962_4129894.11	581962	4129894.11	3.78E-05	3.13E-08	1.88E-08	3.13E-08	2.07E-08	5.75E-08	1.35E-06	4.74E-08	0	0	7.14819E-10	0	0.0007	Res
582131.71_4129894.11	582131.71	4129894.11	3.28E-05	2.74E-08	1.64E-08	2.74E-08	1.82E-08	5.03E-08	1.18E-06	4.15E-08	0	0	6.2158E-10	0	0.0006	Res
582188.28_4129894.11	582188.28	4129894.11	3.17E-05	2.64E-08	1.58E-08	2.64E-08	1.75E-08	4.85E-08	1.14E-06	4.00E-08	0	0	5.99331E-10	0	0.0006	Res
582244.85_4129894.11	582244.85	4129894.11	3.11E-05	2.58E-08	1.55E-08	2.58E-08	1.71E-08	4.73E-08	1.11E-06	3.90E-08	0	0	5.88321E-10	0	0.0006	Res
582301.42_4129894.11	582301.42	4129894.11	3.01E-05	2.49E-08	1.50E-08	2.49E-08	1.65E-08	4.57E-08	1.07E-06	3.77E-08	0	0	5.69514E-10	0	0.0006	Res
582357.99_4129894.11	582357.99	4129894.11	2.88E-05	2.39E-08	1.44E-08	2.39E-08	1.59E-08	4.39E-08	1.03E-06	3.62E-08	0	0	5.44932E-10	0	0.0005	Res
582414.56_4129894.11	582414.56	4129894.11	2.93E-05	2.39E-08	1.43E-08	2.39E-08	1.58E-08	4.38E-08	1.03E-06	3.61E-08	0	0	5.54073E-10	0	0.0006	Res
582471.13_4129894.11	582471.13	4129894.11	2.75E-05	2.26E-08	1.36E-08	2.26E-08	1.50E-08	4.15E-08	9.74E-07	3.42E-08	0	0	5.20059E-10	0	0.0005	Res
582527.7_4129894.11	582527.7	4129894.11	2.54E-05	2.12E-08	1.27E-08	2.12E-08	1.41E-08	3.90E-08	9.15E-07	3.21E-08	0	0	4.80011E-10	0	0.0005	Res
582584.27_4129894.11	582584.27	4129894.11	2.33E-05	1.99E-08	1.19E-08	1.99E-08	1.32E-08	3.65E-08	8.56E-07	3.01E-08	0	0	4.40394E-10	0	0.0004	Res
582640.84_4129894.11	582640.84	4129894.11	2.13E-05	1.86E-08	1.12E-08	1.86E-08	1.24E-08	3.41E-08	8.01E-07	2.81E-08	0	0	4.02721E-10	0	0.0004	Res
582697.41_4129894.11	582697.41	4129894.11	1.94E-05	1.74E-08	1.04E-08	1.74E-08	1.16E-08	3.19E-08	7.49E-07	2.63E-08	0	0	3.67644E-10	0	0.0004	Res
581962_4129978.02	581962	4129978.02	3.93E-05	3.23E-08	1.94E-08	3.23E-08	2.14E-08	5.94E-08	1.39E-06	4.89E-08	0	0	7.44956E-10	0	0.0007	Res
582018.57_4129978.02	582018.57	4129978.02	3.70E-05	3.06E-08	1.84E-08	3.06E-08	2.03E-08	5.63E-08	1.32E-06	4.64E-08	0	0	7.00844E-10	0	0.0007	Res
582075.14_4129978.02	582075.14	4129978.02	3.82E-05	3.08E-08	1.85E-08	3.08E-08	2.03E-08	5.65E-08	1.33E-06	4.66E-08	0	0	7.2257E-10	0	0.0007	Res
582131.71_4129978.02	582131.71	4129978.02	3.82E-05	3.04E-08	1.82E-08	3.04E-08	2.01E-08	5.58E-08	1.31E-06	4.60E-08	0	0	7.22467E-10	0	0.0007	Res
582188.28_4129978.02	582188.28	4129978.02	3.82E-05	3.00E-08	1.80E-08	3.00E-08	1.98E-08	5.51E-08	1.29E-06	4.54E-08	0	0	7.22931E-10	0	0.0007	Res
582244.85_4129978.02	582244.85	4129978.02	3.46E-05	2.77E-08	1.66E-08	2.77E-08	1.83E-08	5.09E-08	1.19E-06	4.20E-08	0	0	6.54623E-10	0	0.0007	Res
582301.42_4129978.02	582301.42	4129978.02	3.42E-05	2.72E-08	1.63E-08	2.72E-08	1.80E-08	4.99E-08	1.17E-06	4.11E-08	0	0	6.47406E-10	0	0.0006	Res
582357.99_4129978.02	582357.99	4129978.02	3.24E-05	2.59E-08	1.55E-08	2.59E-08	1.71E-08	4.75E-08	1.11E-06	3.92E-08	0	0	6.1323E-10	0	0.0006	Res
582414.56_4129978.02	582414.56	4129978.02	3.00E-05	2.43E-08	1.46E-08	2.43E-08	1.61E-08	4.46E-08	1.05E-06	3.68E-08	0	0	5.68089E-10	0	0.0006	Res
582471.13_4129978.02	582471.13	4129978.02	2.75E-05	2.27E-08	1.36E-08	2.27E-08	1.51E-08	4.17E-08	9.78E-07	3.43E-08	0	0	5.21268E-10	0	0.0005	Res
582527.7_4129978.02	582527.7	4129978.02	2.51E-05	2.11E-08	1.27E-08	2.11E-08	1.40E-08	3.88E-08	9.11E-07	3.20E-08	0	0	4.75337E-10	0	0.0005	Res
582584.27_4129978.02	582584.27	4129978.02	2.29E-05	1.97E-08	1.18E-08	1.97E-08	1.31E-08	3.61E-08	8.48E-07	2.98E-08	0	0	4.32694E-10	0	0.0004	Res
582640.84_4129978.02	582640.84	4129978.02	2.08E-05	1.84E-08	1.10E-08	1.84E-08	1.22E-08	3.37E-08	7.91E-07	2.78E-08	0	0	3.94311E-10	0	0.0004	Res

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)								Risk Calculation Part 2, $\sum R1*C_{TAC}$					
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Cobalt	Lead	Nickel	Chromium VI	3rd Trimester	0<2	2<16	16<30	Cancer Risk - 2029 (per million)	Receptor Type
582697.41_4129978.02	582697.41	4129978.02	1.90E-05	1.71E-08	1.03E-08	1.71E-08	1.15E-08	3.15E-08	7.38E-07	2.59E-08	0	0	3.59041E-10	0	0.0004	Res
582753.98_4129978.02	582753.98	4129978.02	1.71E-05	1.59E-08	9.57E-09	1.59E-08	1.07E-08	2.93E-08	6.86E-07	2.41E-08	0	0	3.24472E-10	0	0.0003	Res
582810.55_4129978.02	582810.55	4129978.02	1.52E-05	1.47E-08	8.80E-09	1.47E-08	9.84E-09	2.69E-08	6.31E-07	2.21E-08	0	0	2.87185E-10	0	0.0003	Res
581905.43_4130061.93	581905.43	4130061.93	5.64E-05	4.19E-08	2.52E-08	4.19E-08	2.75E-08	7.70E-08	1.81E-06	6.35E-08	0	0	1.0682E-09	0	0.0011	Res
581962_4130061.93	581962	4130061.93	5.33E-05	3.98E-08	2.39E-08	3.98E-08	2.61E-08	7.30E-08	1.71E-06	6.02E-08	0	0	1.00854E-09	0	0.0010	Res
582018.57_4130061.93	582018.57	4130061.93	4.54E-05	3.51E-08	2.11E-08	3.51E-08	2.31E-08	6.45E-08	1.51E-06	5.32E-08	0	0	8.59279E-10	0	0.0009	Res
582075.14_4130061.93	582075.14	4130061.93	4.06E-05	3.21E-08	1.93E-08	3.21E-08	2.12E-08	5.90E-08	1.38E-06	4.86E-08	0	0	7.67966E-10	0	0.0008	Res
582131.71_4130061.93	582131.71	4130061.93	3.99E-05	3.13E-08	1.88E-08	3.13E-08	2.07E-08	5.75E-08	1.35E-06	4.74E-08	0	0	7.54859E-10	0	0.0008	Res
582188.28_4130061.93	582188.28	4130061.93	3.90E-05	3.05E-08	1.83E-08	3.05E-08	2.01E-08	5.59E-08	1.31E-06	4.61E-08	0	0	7.38428E-10	0	0.0007	Res
582244.85_4130061.93	582244.85	4130061.93	3.83E-05	2.97E-08	1.78E-08	2.97E-08	1.96E-08	5.45E-08	1.28E-06	4.49E-08	0	0	7.24219E-10	0	0.0007	Res
582301.42_4130061.93	582301.42	4130061.93	3.56E-05	2.79E-08	1.67E-08	2.79E-08	1.84E-08	5.12E-08	1.20E-06	4.22E-08	0	0	6.73415E-10	0	0.0007	Res
582357.99_4130061.93	582357.99	4130061.93	3.30E-05	2.62E-08	1.57E-08	2.62E-08	1.73E-08	4.81E-08	1.13E-06	3.97E-08	0	0	6.25348E-10	0	0.0006	Res
582414.56_4130061.93	582414.56	4130061.93	3.03E-05	2.44E-08	1.47E-08	2.44E-08	1.62E-08	4.49E-08	1.05E-06	3.70E-08	0	0	5.73986E-10	0	0.0006	Res
582471.13_4130061.93	582471.13	4130061.93	2.75E-05	2.27E-08	1.36E-08	2.27E-08	1.50E-08	4.16E-08	9.77E-07	3.43E-08	0	0	5.21573E-10	0	0.0005	Res
582527.7_4130061.93	582527.7	4130061.93	2.49E-05	2.10E-08	1.26E-08	2.10E-08	1.39E-08	3.85E-08	9.03E-07	3.17E-08	0	0	4.71394E-10	0	0.0005	Res
582584.27_4130061.93	582584.27	4130061.93	2.25E-05	1.95E-08	1.17E-08	1.95E-08	1.29E-08	3.57E-08	8.38E-07	2.94E-08	0	0	4.26542E-10	0	0.0004	Res
582640.84_4130061.93	582640.84	4130061.93	2.03E-05	1.80E-08	1.08E-08	1.80E-08	1.20E-08	3.31E-08	7.76E-07	2.73E-08	0	0	3.85007E-10	0	0.0004	Res
582697.41_4130061.93	582697.41	4130061.93	1.84E-05	1.68E-08	1.01E-08	1.68E-08	1.12E-08	3.08E-08	7.22E-07	2.53E-08	0	0	3.48803E-10	0	0.0003	Res
582753.98_4130061.93	582753.98	4130061.93	1.68E-05	1.57E-08	9.39E-09	1.57E-08	1.05E-08	2.87E-08	6.74E-07	2.37E-08	0	0	3.17115E-10	0	0.0003	Res
582810.55_4130061.93	582810.55	4130061.93	1.52E-05	1.46E-08	8.78E-09	1.46E-08	9.81E-09	2.68E-08	6.30E-07	2.21E-08	0	0	2.88356E-10	0	0.0003	Res
581962_4130145.84	581962	4130145.84	6.22E-05	4.45E-08	2.67E-08	4.45E-08	2.91E-08	8.17E-08	1.92E-06	6.74E-08	0	0	1.17726E-09	0	0.0012	Res
582018.57_4130145.84	582018.57	4130145.84	5.77E-05	4.16E-08	2.50E-08	4.16E-08	2.73E-08	7.64E-08	1.79E-06	6.30E-08	0	0	1.0918E-09	0	0.0011	Res
582075.14_4130145.84	582075.14	4130145.84	4.91E-05	3.66E-08	2.20E-08	3.66E-08	2.41E-08	6.73E-08	1.58E-06	5.55E-08	0	0	9.30266E-10	0	0.0009	Res
582131.71_4130145.84	582131.71	4130145.84	4.56E-05	3.43E-08	2.06E-08	3.43E-08	2.25E-08	6.30E-08	1.48E-06	5.19E-08	0	0	8.62972E-10	0	0.0009	Res
582188.28_4130145.84	582188.28	4130145.84	4.41E-05	3.31E-08	1.98E-08	3.31E-08	2.17E-08	6.07E-08	1.42E-06	5.01E-08	0	0	8.34474E-10	0	0.0008	Res
582244.85_4130145.84	582244.85	4130145.84	4.03E-05	3.06E-08	1.84E-08	3.06E-08	2.02E-08	5.63E-08	1.32E-06	4.64E-08	0	0	7.62242E-10	0	0.0008	Res
582301.42_4130145.84	582301.42	4130145.84	3.66E-05	2.83E-08	1.70E-08	2.83E-08	1.87E-08	5.20E-08	1.22E-06	4.28E-08	0	0	6.9218E-10	0	0.0007	Res
582357.99_4130145.84	582357.99	4130145.84	3.33E-05	2.62E-08	1.57E-08	2.62E-08	1.73E-08	4.82E-08	1.13E-06	3.97E-08	0	0	6.31087E-10	0	0.0006	Res
582414.56_4130145.84	582414.56	4130145.84	3.03E-05	2.43E-08	1.46E-08	2.43E-08	1.61E-08	4.46E-08	1.05E-06	3.68E-08	0	0	5.73487E-10	0	0.0006	Res
582471.13_4130145.84	582471.13	4130145.84	2.73E-05	2.24E-08	1.35E-08	2.24E-08	1.49E-08	4.12E-08	9.66E-07	3.39E-08	0	0	5.17002E-10	0	0.0005	Res
582527.7_4130145.84	582527.7	4130145.84	2.44E-05	2.06E-08	1.24E-08	2.06E-08	1.37E-08	3.78E-08	8.87E-07	3.11E-08	0	0	4.62297E-10	0	0.0005	Res
582584.27_4130145.84	582584.27	4130145.84	2.18E-05	1.89E-08	1.14E-08	1.89E-08	1.26E-08	3.47E-08	8.15E-07	2.86E-08	0	0	4.1275E-10	0	0.0004	Res
582640.84_4130145.84	582640.84	4130145.84	1.95E-05	1.75E-08	1.05E-08	1.75E-08	1.17E-08	3.21E-08	7.52E-07	2.64E-08	0	0	3.70016E-10	0	0.0004	Res
582697.41_4130145.84	582697.41	4130145.84	1.76E-05	1.62E-08	9.73E-09	1.62E-08	1.08E-08	2.97E-08	6.98E-07	2.45E-08	0	0	3.33752E-10	0	0.0003	Res
582753.98_4130145.84	582753.98	4130145.84	1.60E-05	1.51E-08	9.09E-09	1.51E-08	1.01E-08	2.78E-08	6.52E-07	2.29E-08	0	0	3.03565E-10	0	0.0003	Res
582810.55_4130145.84	582810.55	4130145.84	1.47E-05	1.42E-08	8.53E-09	1.42E-08	9.54E-09	2.61E-08	6.12E-07	2.15E-08	0	0	2.78141E-10	0	0.0003	Res
582867.12_4130145.84	582867.12	4130145.84	1.30E-05	1.31E-08	7.85E-09	1.31E-08	8.80E-09	2.40E-08	5.63E-07	1.97E-08	0	0	2.46137E-10	0	0.0002	Res
581962_4130229.75	581962	4130229.75	6.36E-05	4.51E-08	2.71E-08	4.51E-08	2.95E-08	8.29E-08	1.95E-06	6.84E-08	0	0	1.20377E-09	0	0.0012	Res
582018.57_4130229.75	582018.57	4130229.75	6.07E-05	4.31E-08	2.58E-08	4.31E-08	2.82E-08	7.92E-08	1.86E-06	6.53E-08	0	0	1.14903E-09	0	0.0011	Res
582075.14_4130229.75	582075.14	4130229.75	5.65E-05	4.04E-08	2.42E-08	4.04E-08	2.64E-08	7.42E-08	1.74E-06	6.12E-08	0	0	1.06935E-09	0	0.0011	Res
582131.71_4130229.75	582131.71	4130229.75	5.09E-05	3.69E-08	2.22E-08	3.69E-08	2.42E-08	6.79E-08	1.59E-06	5.60E-08	0	0	9.63696E-10	0	0.0010	Res
582188.28_4130229.75	582188.28	4130229.75	4.54E-05	3.36E-08	2.02E-08	3.36E-08	2.21E-08	6.17E-08	1.45E-06	5.09E-08	0	0	8.60435E-10	0	0.0009	Res
582244.85_4130229.75	582244.85	4130229.75	4.07E-05	3.07E-08	1.84E-08	3.07E-08	2.02E-08	5.64E-08	1.32E-06	4.65E-08	0	0	7.70549E-10	0	0.0008	Res
582301.42_4130229.75	582301.42	4130229.75	3.67E-05	2.82E-08	1.69E-08	2.82E-08	1.86E-08	5.18E-08	1.22E-06	4.27E-08	0	0	6.94274E-10	0	0.0007	Res
582357.99_4130229.75	582357.99	4130229.75	3.31E-05	2.60E-08	1.56E-08	2.60E-08	1.72E-08	4.77E-08	1.12E-06	3.93E-08	0	0	6.27215E-10	0	0.0006	Res
582414.56_4130229.75	582414.56	4130229.75	2.96E-05	2.38E-08	1.43E-08	2.38E-08	1.57E-08	4.37E-08	1.02E-06	3.60E-08	0	0	5.60866E-10	0	0.0006	Res
582471.13_4130229.75	582471.13	4130229.75	2.62E-05	2.17E-08	1.30E-08	2.17E-08	1.44E-08	3.98E-08	9.33E-07	3.28E-08	0	0	4.96358E-10	0	0.0005	Res
582527.7_4130229.75	582527.7	4130229.75	2.32E-05	1.98E-08	1.19E-08	1.98E-08	1.32E-08	3.63E-08	8.52E-07	2.99E-08	0	0	4.39428E-10	0	0.0004	Res
582584.27_4130229.75	582584.27	4130229.75	2.07E-05	1.82E-08	1.09E-08	1.82E-08	1.21E-08	3.33E-08	7.82E-07	2.74E-08	0	0	3.90994E-10	0	0.0004	Res
582640.84_4130229.75	582640.84	4130229.75	1.85E-05	1.68E-08	1.01E-08	1.68E-08	1.12E-08	3.08E-08	7.22E-07	2.53E-08	0	0	3.50427E-10	0	0.0004	Res
582697.41_4130229.75	582697.41	4130229.75	1.68E-05	1.56E-08	9.38E-09	1.56E-08	1.05E-08	2.87E-08	6.73E-07	2.36E-08	0	0	3.17898E-10	0	0.0003	Res
582753.98_4130229.75	582753.98	4130229.75	1.53E-05	1.46E-08	8.78E-09	1.46E-08	9.81E-09	2.68E-08	6.29E-07	2.21E-08	0	0	2.90095E-10	0	0.0003	Res
582810.55_4130229.75	582810.55	4130229.75	1.41E-05	1.38E-08	8.27E-09	1.38E-08	9.26E-09	2.53E-08	5.93E-07	2.08E-08	0	0	2.67351E-10	0	0.0003	Res
582867.12_4130229.75	582867.12	4130229.75	1.31E-05	1.30E-08	7.83E-09	1.30E-08	8.78E-09	2.39E-08	5.61E-07	1.97E-08	0	0	2.48209E-10	0	0.0002	Res
582018.57_4130313.66	582018.57	4130313.66	6.54E-05	4.54E-08	2.72E-08	4.54E-08	2.97E-08	8.34E-08	1.96E-06	6.88E-08	0	0	1.23728E-09	0	0.0012	Res
582075.14_4130313.66	582075.14	4130313.66	6.06E-05	4.24E-08	2.54E-08	4.24E-08	2.77E-08	7.78E-08	1.83E-06	6.42E-08	0	0	1.14719E-09	0	0.0011	Res

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)								Risk Calculation Part 2, $\sum R1*C_{TAC}$					
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Cobalt	Lead	Nickel	Chromium VI	3rd Trimester	0<2	2<16	16<30	Cancer Risk - 2029 (per million)	Receptor Type
582131.71_4130313.66	582131.71	4130313.66	5.31E-05	3.79E-08	2.28E-08	3.79E-08	2.49E-08	6.97E-08	1.64E-06	5.75E-08	0	0	1.00553E-09	0	0.0010	Res
582188.28_4130313.66	582188.28	4130313.66	4.65E-05	3.40E-08	2.04E-08	3.40E-08	2.23E-08	6.24E-08	1.47E-06	5.15E-08	0	0	8.80424E-10	0	0.0009	Res
582244.85_4130313.66	582244.85	4130313.66	4.11E-05	3.07E-08	1.84E-08	3.07E-08	2.02E-08	5.64E-08	1.32E-06	4.65E-08	0	0	7.7825E-10	0	0.0008	Res
582301.42_4130313.66	582301.42	4130313.66	3.66E-05	2.80E-08	1.68E-08	2.80E-08	1.84E-08	5.14E-08	1.21E-06	4.23E-08	0	0	6.92234E-10	0	0.0007	Res
582357.99_4130313.66	582357.99	4130313.66	3.22E-05	2.53E-08	1.52E-08	2.53E-08	1.67E-08	4.65E-08	1.09E-06	3.83E-08	0	0	6.09747E-10	0	0.0006	Res
582414.56_4130313.66	582414.56	4130313.66	2.81E-05	2.28E-08	1.37E-08	2.28E-08	1.51E-08	4.19E-08	9.84E-07	3.45E-08	0	0	5.32841E-10	0	0.0005	Res
582471.13_4130313.66	582471.13	4130313.66	2.47E-05	2.07E-08	1.24E-08	2.07E-08	1.37E-08	3.80E-08	8.91E-07	3.13E-08	0	0	4.66767E-10	0	0.0005	Res
582527.7_4130313.66	582527.7	4130313.66	2.18E-05	1.89E-08	1.13E-08	1.89E-08	1.26E-08	3.47E-08	8.13E-07	2.85E-08	0	0	4.12651E-10	0	0.0004	Res
582584.27_4130313.66	582584.27	4130313.66	1.94E-05	1.74E-08	1.04E-08	1.74E-08	1.16E-08	3.19E-08	7.48E-07	2.63E-08	0	0	3.67921E-10	0	0.0004	Res
582640.84_4130313.66	582640.84	4130313.66	1.75E-05	1.61E-08	9.67E-09	1.61E-08	1.08E-08	2.96E-08	6.94E-07	2.44E-08	0	0	3.31997E-10	0	0.0003	Res
582697.41_4130313.66	582697.41	4130313.66	1.60E-05	1.51E-08	9.03E-09	1.51E-08	1.01E-08	2.76E-08	6.48E-07	2.27E-08	0	0	3.02057E-10	0	0.0003	Res
582753.98_4130313.66	582753.98	4130313.66	1.46E-05	1.41E-08	8.48E-09	1.41E-08	9.49E-09	2.59E-08	6.08E-07	2.13E-08	0	0	2.76645E-10	0	0.0003	Res
582810.55_4130313.66	582810.55	4130313.66	1.34E-05	1.33E-08	7.98E-09	1.33E-08	8.95E-09	2.44E-08	5.72E-07	2.01E-08	0	0	2.54157E-10	0	0.0003	Res
582867.12_4130313.66	582867.12	4130313.66	1.24E-05	1.26E-08	7.54E-09	1.26E-08	8.47E-09	2.30E-08	5.40E-07	1.90E-08	0	0	2.34507E-10	0	0.0002	Res
581848.86_4130397.57	581848.86	4130397.57	8.94E-05	5.95E-08	3.57E-08	5.95E-08	3.88E-08	1.09E-07	2.57E-06	9.03E-08	0	0	1.69228E-09	0	0.0017	Res
581905.43_4130397.57	581905.43	4130397.57	8.67E-05	5.76E-08	3.45E-08	5.76E-08	3.75E-08	1.06E-07	2.48E-06	8.73E-08	0	0	1.64101E-09	0	0.0016	Res
581962_4130397.57	581962	4130397.57	8.20E-05	5.45E-08	3.27E-08	5.45E-08	3.55E-08	1.00E-07	2.35E-06	8.27E-08	0	0	1.55202E-09	0	0.0016	Res
582018.57_4130397.57	582018.57	4130397.57	7.35E-05	4.95E-08	2.97E-08	4.95E-08	3.23E-08	9.11E-08	2.14E-06	7.51E-08	0	0	1.39244E-09	0	0.0014	Res
582075.14_4130397.57	582075.14	4130397.57	6.45E-05	4.42E-08	2.65E-08	4.42E-08	2.89E-08	8.13E-08	1.91E-06	6.70E-08	0	0	1.22062E-09	0	0.0012	Res
582131.71_4130397.57	582131.71	4130397.57	5.52E-05	3.88E-08	2.33E-08	3.88E-08	2.54E-08	7.14E-08	1.67E-06	5.89E-08	0	0	1.04502E-09	0	0.0010	Res
582188.28_4130397.57	582188.28	4130397.57	4.80E-05	3.46E-08	2.07E-08	3.46E-08	2.27E-08	6.35E-08	1.49E-06	5.24E-08	0	0	9.07915E-10	0	0.0009	Res
582244.85_4130397.57	582244.85	4130397.57	4.14E-05	3.07E-08	1.84E-08	3.07E-08	2.02E-08	5.64E-08	1.32E-06	4.65E-08	0	0	7.83586E-10	0	0.0008	Res
582301.42_4130397.57	582301.42	4130397.57	3.57E-05	2.73E-08	1.64E-08	2.73E-08	1.80E-08	5.02E-08	1.18E-06	4.14E-08	0	0	6.75564E-10	0	0.0007	Res
582357.99_4130397.57	582357.99	4130397.57	3.06E-05	2.43E-08	1.46E-08	2.43E-08	1.61E-08	4.46E-08	1.05E-06	3.67E-08	0	0	5.78848E-10	0	0.0006	Res
582414.56_4130397.57	582414.56	4130397.57	2.65E-05	2.18E-08	1.31E-08	2.18E-08	1.45E-08	4.00E-08	9.39E-07	3.30E-08	0	0	5.01464E-10	0	0.0005	Res
582471.13_4130397.57	582471.13	4130397.57	2.32E-05	1.98E-08	1.19E-08	1.98E-08	1.32E-08	3.63E-08	8.52E-07	2.99E-08	0	0	4.39948E-10	0	0.0004	Res
582527.7_4130397.57	582527.7	4130397.57	2.06E-05	1.81E-08	1.09E-08	1.81E-08	1.21E-08	3.33E-08	7.80E-07	2.74E-08	0	0	3.90008E-10	0	0.0004	Res
582584.27_4130397.57	582584.27	4130397.57	1.84E-05	1.67E-08	1.00E-08	1.67E-08	1.12E-08	3.07E-08	7.20E-07	2.53E-08	0	0	3.49055E-10	0	0.0003	Res
582640.84_4130397.57	582640.84	4130397.57	1.66E-05	1.55E-08	9.33E-09	1.55E-08	1.04E-08	2.85E-08	6.69E-07	2.35E-08	0	0	3.15007E-10	0	0.0003	Res
582697.41_4130397.57	582697.41	4130397.57	1.50E-05	1.45E-08	8.69E-09	1.45E-08	9.72E-09	2.66E-08	6.23E-07	2.19E-08	0	0	2.84809E-10	0	0.0003	Res
582753.98_4130397.57	582753.98	4130397.57	1.37E-05	1.36E-08	8.14E-09	1.36E-08	9.13E-09	2.49E-08	5.84E-07	2.05E-08	0	0	2.59561E-10	0	0.0003	Res
582810.55_4130397.57	582810.55	4130397.57	1.26E-05	1.28E-08	7.66E-09	1.28E-08	8.61E-09	2.34E-08	5.49E-07	1.93E-08	0	0	2.37866E-10	0	0.0002	Res
582867.12_4130397.57	582867.12	4130397.57	1.16E-05	1.21E-08	7.23E-09	1.21E-08	8.14E-09	2.21E-08	5.19E-07	1.82E-08	0	0	2.18949E-10	0	0.0002	Res
581848.86_4130481.48	581848.86	4130481.48	1.16E-04	7.33E-08	4.40E-08	7.33E-08	4.75E-08	1.35E-07	3.16E-06	1.11E-07	0	0	2.18767E-09	0	0.0022	Res
581905.43_4130481.48	581905.43	4130481.48	1.07E-04	6.82E-08	4.09E-08	6.82E-08	4.43E-08	1.25E-07	2.94E-06	1.04E-07	0	0	2.0273E-09	0	0.0020	Res
581962_4130481.48	581962	4130481.48	9.12E-05	5.93E-08	3.56E-08	5.93E-08	3.85E-08	1.09E-07	2.56E-06	8.99E-08	0	0	1.72731E-09	0	0.0017	Res
582018.57_4130481.48	582018.57	4130481.48	8.03E-05	5.29E-08	3.18E-08	5.29E-08	3.45E-08	9.73E-08	2.28E-06	8.03E-08	0	0	1.52071E-09	0	0.0015	Res
582075.14_4130481.48	582075.14	4130481.48	6.79E-05	4.58E-08	2.75E-08	4.58E-08	2.99E-08	8.42E-08	1.98E-06	6.94E-08	0	0	1.28485E-09	0	0.0013	Res
582131.71_4130481.48	582131.71	4130481.48	5.76E-05	3.99E-08	2.39E-08	3.99E-08	2.61E-08	7.33E-08	1.72E-06	6.04E-08	0	0	1.08979E-09	0	0.0011	Res
582188.28_4130481.48	582188.28	4130481.48	4.86E-05	3.47E-08	2.08E-08	3.47E-08	2.28E-08	6.38E-08	1.50E-06	5.26E-08	0	0	9.20347E-10	0	0.0009	Res
582244.85_4130481.48	582244.85	4130481.48	4.05E-05	3.00E-08	1.80E-08	3.00E-08	1.97E-08	5.51E-08	1.29E-06	4.54E-08	0	0	7.66347E-10	0	0.0008	Res
582301.42_4130481.48	582301.42	4130481.48	3.39E-05	2.62E-08	1.57E-08	2.62E-08	1.73E-08	4.81E-08	1.13E-06	3.96E-08	0	0	6.4216E-10	0	0.0006	Res
582357.99_4130481.48	582357.99	4130481.48	2.89E-05	2.32E-08	1.39E-08	2.32E-08	1.53E-08	4.26E-08	9.99E-07	3.51E-08	0	0	5.46709E-10	0	0.0005	Res
582414.56_4130481.48	582414.56	4130481.48	2.51E-05	2.09E-08	1.25E-08	2.09E-08	1.39E-08	3.83E-08	8.99E-07	3.16E-08	0	0	4.74422E-10	0	0.0005	Res
582471.13_4130481.48	582471.13	4130481.48	2.20E-05	1.90E-08	1.14E-08	1.90E-08	1.26E-08	3.48E-08	8.17E-07	2.87E-08	0	0	4.16254E-10	0	0.0004	Res
582527.7_4130481.48	582527.7	4130481.48	1.94E-05	1.74E-08	1.04E-08	1.74E-08	1.16E-08	3.18E-08	7.47E-07	2.62E-08	0	0	3.67749E-10	0	0.0004	Res
582584.27_4130481.48	582584.27	4130481.48	1.73E-05	1.60E-08	9.60E-09	1.60E-08	1.07E-08	2.94E-08	6.89E-07	2.42E-08	0	0	3.28014E-10	0	0.0003	Res
582640.84_4130481.48	582640.84	4130481.48	1.55E-05	1.48E-08	8.90E-09	1.48E-08	9.95E-09	2.72E-08	6.38E-07	2.24E-08	0	0	2.93906E-10	0	0.0003	Res
582697.41_4130481.48	582697.41	4130481.48	1.40E-05	1.38E-08	8.29E-09	1.38E-08	9.29E-09	2.53E-08	5.95E-07	2.09E-08	0	0	2.65402E-10	0	0.0003	Res
582753.98_4130481.48	582753.98	4130481.48	1.28E-05	1.30E-08	7.78E-09	1.30E-08	8.74E-09	2.38E-08	5.58E-07	1.96E-08	0	0	2.42013E-10	0	0.0002	Res
582810.55_4130481.48	582810.55	4130481.48	1.17E-05	1.22E-08	7.34E-09	1.22E-08	8.26E-09	2.24E-08	5.26E-07	1.85E-08	0	0	2.22256E-10	0	0.0002	Res
582867.12_4130481.48	582867.12	4130481.48	1.08E-05	1.16E-08	6.95E-09	1.16E-08	7.84E-09	2.12E-08	4.98E-07	1.75E-08	0	0	2.05246E-10	0	0.0002	Res
581735.72_4130565.39	581735.72	4130565.39	1.41E-04	8.74E-08	5.24E-08	8.74E-08	5.66E-08	1.61E-07	3.77E-06	1.33E-07	0	0	2.66354E-09	0	0.0027	Res
581792.29_4130565.39	581792.29	4130565.39	1.39E-04	8.58E-08	5.15E-08	8.58E-08	5.55E-08	1.58E-07	3.70E-06	1.30E-07	0	0	2.62264E-09	0	0.0026	Res
581848.86_4130565.39	581848.86	4130565.39	1.32E-04	8.16E-08	4.90E-08	8.16E-08	5.29E-08	1.50E-07	3.52E-06	1.24E-07	0	0	2.49433E-09	0	0.0025	Res
581905.43_4130565.39	581905.43	4130565.39	1.26E-04	7.80E-08	4.68E-08	7.80E-08	5.05E-08	1.43E-07	3.37E-06	1.18E-07	0	0	2.38209E-09	0	0.0024	Res
581962_4130565.39	581962	4130565.39	1.09E-04	6.82E-08	4.09E-08	6.82E-08	4.42E-08	1.25E-07	2.94E-06	1.03E-07	0	0	2.05479E-09	0	0.0021	Res

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)								Risk Calculation Part 2, $\sum R1*C_{TAC}$					
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Cobalt	Lead	Nickel	Chromium VI	3rd Trimester	0<2	2<16	16<30	Cancer Risk - 2029 (per million)	Receptor Type
582018.57_4130565.39	582018.57	4130565.39	8.78E-05	5.66E-08	3.40E-08	5.66E-08	3.68E-08	1.04E-07	2.44E-06	8.58E-08	0	0	1.66154E-09	0	0.0017	Res
582075.14_4130565.39	582075.14	4130565.39	7.12E-05	4.73E-08	2.84E-08	4.73E-08	3.08E-08	8.69E-08	2.04E-06	7.17E-08	0	0	1.34843E-09	0	0.0013	Res
582131.71_4130565.39	582131.71	4130565.39	5.84E-05	4.00E-08	2.40E-08	4.00E-08	2.62E-08	7.35E-08	1.73E-06	6.06E-08	0	0	1.10521E-09	0	0.0011	Res
582188.28_4130565.39	582188.28	4130565.39	4.69E-05	3.35E-08	2.01E-08	3.35E-08	2.20E-08	6.15E-08	1.44E-06	5.07E-08	0	0	8.87655E-10	0	0.0009	Res
582244.85_4130565.39	582244.85	4130565.39	3.81E-05	2.84E-08	1.71E-08	2.84E-08	1.87E-08	5.22E-08	1.23E-06	4.31E-08	0	0	7.20931E-10	0	0.0007	Res
582301.42_4130565.39	582301.42	4130565.39	3.21E-05	2.49E-08	1.49E-08	2.49E-08	1.64E-08	4.57E-08	1.07E-06	3.77E-08	0	0	6.06845E-10	0	0.0006	Res
582357.99_4130565.39	582357.99	4130565.39	2.71E-05	2.20E-08	1.32E-08	2.20E-08	1.46E-08	4.04E-08	9.48E-07	3.33E-08	0	0	5.13913E-10	0	0.0005	Res
582414.56_4130565.39	582414.56	4130565.39	2.33E-05	1.97E-08	1.18E-08	1.97E-08	1.31E-08	3.62E-08	8.49E-07	2.98E-08	0	0	4.41986E-10	0	0.0004	Res
582471.13_4130565.39	582471.13	4130565.39	2.04E-05	1.79E-08	1.07E-08	1.79E-08	1.19E-08	3.28E-08	7.69E-07	2.70E-08	0	0	3.85307E-10	0	0.0004	Res
582527.7_4130565.39	582527.7	4130565.39	1.79E-05	1.64E-08	9.81E-09	1.64E-08	1.09E-08	3.00E-08	7.04E-07	2.47E-08	0	0	3.39684E-10	0	0.0003	Res
582584.27_4130565.39	582584.27	4130565.39	1.60E-05	1.51E-08	9.07E-09	1.51E-08	1.01E-08	2.77E-08	6.50E-07	2.28E-08	0	0	3.03266E-10	0	0.0003	Res
582640.84_4130565.39	582640.84	4130565.39	1.43E-05	1.40E-08	8.41E-09	1.40E-08	9.42E-09	2.57E-08	6.03E-07	2.12E-08	0	0	2.71616E-10	0	0.0003	Res
582697.41_4130565.39	582697.41	4130565.39	1.30E-05	1.31E-08	7.87E-09	1.31E-08	8.83E-09	2.41E-08	5.64E-07	1.98E-08	0	0	2.46563E-10	0	0.0002	Res
582753.98_4130565.39	582753.98	4130565.39	1.19E-05	1.24E-08	7.42E-09	1.24E-08	8.34E-09	2.27E-08	5.32E-07	1.86E-08	0	0	2.25813E-10	0	0.0002	Res
582810.55_4130565.39	582810.55	4130565.39	1.10E-05	1.17E-08	7.03E-09	1.17E-08	7.91E-09	2.15E-08	5.04E-07	1.77E-08	0	0	2.08731E-10	0	0.0002	Res
582867.12_4130565.39	582867.12	4130565.39	1.03E-05	1.11E-08	6.69E-09	1.11E-08	7.54E-09	2.04E-08	4.79E-07	1.68E-08	0	0	1.94354E-10	0	0.0002	Res
581735.72_4130649.3	581735.72	4130649.3	1.52E-04	9.32E-08	5.59E-08	9.32E-08	6.03E-08	1.71E-07	4.02E-06	1.41E-07	0	0	2.88594E-09	0	0.0029	Res
581792.29_4130649.3	581792.29	4130649.3	1.48E-04	9.01E-08	5.41E-08	9.01E-08	5.83E-08	1.66E-07	3.89E-06	1.37E-07	0	0	2.79298E-09	0	0.0028	Res
581905.43_4130649.3	581905.43	4130649.3	1.48E-04	8.92E-08	5.35E-08	8.92E-08	5.77E-08	1.64E-07	3.85E-06	1.35E-07	0	0	2.79366E-09	0	0.0028	Res
581962_4130649.3	581962	4130649.3	1.22E-04	7.53E-08	4.52E-08	7.53E-08	4.87E-08	1.38E-07	3.25E-06	1.14E-07	0	0	2.31863E-09	0	0.0023	Res
582018.57_4130649.3	582018.57	4130649.3	9.30E-05	5.89E-08	3.54E-08	5.89E-08	3.83E-08	1.08E-07	2.54E-06	8.94E-08	0	0	1.76016E-09	0	0.0018	Res
582075.14_4130649.3	582075.14	4130649.3	7.22E-05	4.73E-08	2.84E-08	4.73E-08	3.08E-08	8.70E-08	2.04E-06	7.18E-08	0	0	1.36604E-09	0	0.0014	Res
582131.71_4130649.3	582131.71	4130649.3	5.60E-05	3.83E-08	2.30E-08	3.83E-08	2.50E-08	7.04E-08	1.65E-06	5.81E-08	0	0	1.06064E-09	0	0.0011	Res
582188.28_4130649.3	582188.28	4130649.3	4.40E-05	3.15E-08	1.89E-08	3.15E-08	2.07E-08	5.79E-08	1.36E-06	4.78E-08	0	0	8.33848E-10	0	0.0008	Res
582244.85_4130649.3	582244.85	4130649.3	3.54E-05	2.66E-08	1.60E-08	2.66E-08	1.75E-08	4.88E-08	1.15E-06	4.03E-08	0	0	6.70032E-10	0	0.0007	Res
582301.42_4130649.3	582301.42	4130649.3	2.92E-05	2.30E-08	1.38E-08	2.30E-08	1.52E-08	4.22E-08	9.91E-07	3.48E-08	0	0	5.52928E-10	0	0.0006	Res
582357.99_4130649.3	582357.99	4130649.3	2.47E-05	2.03E-08	1.22E-08	2.03E-08	1.35E-08	3.73E-08	8.75E-07	3.07E-08	0	0	4.6749E-10	0	0.0005	Res
582414.56_4130649.3	582414.56	4130649.3	2.13E-05	1.83E-08	1.10E-08	1.83E-08	1.22E-08	3.35E-08	7.87E-07	2.76E-08	0	0	4.03491E-10	0	0.0004	Res
582471.13_4130649.3	582471.13	4130649.3	1.86E-05	1.66E-08	9.95E-09	1.66E-08	1.11E-08	3.04E-08	7.14E-07	2.51E-08	0	0	3.5183E-10	0	0.0004	Res
582527.7_4130649.3	582527.7	4130649.3	1.64E-05	1.52E-08	9.14E-09	1.52E-08	1.02E-08	2.80E-08	6.56E-07	2.30E-08	0	0	3.11316E-10	0	0.0003	Res
582584.27_4130649.3	582584.27	4130649.3	1.48E-05	1.41E-08	8.49E-09	1.41E-08	9.49E-09	2.59E-08	6.09E-07	2.14E-08	0	0	2.79402E-10	0	0.0003	Res
582640.84_4130649.3	582640.84	4130649.3	1.34E-05	1.32E-08	7.95E-09	1.32E-08	8.90E-09	2.43E-08	5.70E-07	2.00E-08	0	0	2.53938E-10	0	0.0003	Res
582697.41_4130649.3	582697.41	4130649.3	1.23E-05	1.25E-08	7.49E-09	1.25E-08	8.40E-09	2.29E-08	5.37E-07	1.88E-08	0	0	2.33067E-10	0	0.0002	Res
582753.98_4130649.3	582753.98	4130649.3	1.14E-05	1.18E-08	7.11E-09	1.18E-08	7.99E-09	2.17E-08	5.09E-07	1.79E-08	0	0	2.163E-10	0	0.0002	Res
582810.55_4130649.3	582810.55	4130649.3	1.07E-05	1.13E-08	6.78E-09	1.13E-08	7.63E-09	2.07E-08	4.86E-07	1.70E-08	0	0	2.02493E-10	0	0.0002	Res
582867.12_4130649.3	582867.12	4130649.3	1.01E-05	1.08E-08	6.49E-09	1.08E-08	7.31E-09	1.98E-08	4.65E-07	1.63E-08	0	0	1.90326E-10	0	0.0002	Res
581848.86_4130733.21	581848.86	4130733.21	2.19E-04	1.28E-07	7.68E-08	1.28E-07	8.24E-08	2.35E-07	5.52E-06	1.94E-07	0	0	4.15285E-09	0	0.0042	Res
581905.43_4130733.21	581905.43	4130733.21	1.87E-04	1.10E-07	6.61E-08	1.10E-07	7.10E-08	2.03E-07	4.75E-06	1.67E-07	0	0	3.54463E-09	0	0.0035	Res
581962_4130733.21	581962	4130733.21	1.38E-04	8.29E-08	4.97E-08	8.29E-08	5.36E-08	1.52E-07	3.58E-06	1.26E-07	0	0	2.60575E-09	0	0.0026	Res
582018.57_4130733.21	582018.57	4130733.21	9.65E-05	6.03E-08	3.62E-08	6.03E-08	3.91E-08	1.11E-07	2.60E-06	9.15E-08	0	0	1.82771E-09	0	0.0018	Res
582075.14_4130733.21	582075.14	4130733.21	6.82E-05	4.47E-08	2.68E-08	4.47E-08	2.91E-08	8.21E-08	1.93E-06	6.77E-08	0	0	1.29153E-09	0	0.0013	Res
582131.71_4130733.21	582131.71	4130733.21	4.99E-05	3.44E-08	2.07E-08	3.44E-08	2.25E-08	6.33E-08	1.48E-06	5.22E-08	0	0	9.43985E-10	0	0.0009	Res
582188.28_4130733.21	582188.28	4130733.21	3.86E-05	2.81E-08	1.68E-08	2.81E-08	1.84E-08	5.16E-08	1.21E-06	4.25E-08	0	0	7.30875E-10	0	0.0007	Res
582244.85_4130733.21	582244.85	4130733.21	3.10E-05	2.37E-08	1.42E-08	2.37E-08	1.56E-08	4.36E-08	1.02E-06	3.59E-08	0	0	5.86829E-10	0	0.0006	Res
582301.42_4130733.21	582301.42	4130733.21	2.57E-05	2.06E-08	1.24E-08	2.06E-08	1.37E-08	3.79E-08	8.89E-07	3.12E-08	0	0	4.87124E-10	0	0.0005	Res
582357.99_4130733.21	582357.99	4130733.21	2.19E-05	1.84E-08	1.10E-08	1.84E-08	1.22E-08	3.37E-08	7.92E-07	2.78E-08	0	0	4.15338E-10	0	0.0004	Res
582414.56_4130733.21	582414.56	4130733.21	1.91E-05	1.67E-08	1.00E-08	1.67E-08	1.11E-08	3.06E-08	7.17E-07	2.52E-08	0	0	3.61996E-10	0	0.0004	Res
582471.13_4130733.21	582471.13	4130733.21	1.70E-05	1.53E-08	9.20E-09	1.53E-08	1.02E-08	2.81E-08	6.60E-07	2.32E-08	0	0	3.21997E-10	0	0.0003	Res
582527.7_4130733.21	582527.7	4130733.21	1.54E-05	1.43E-08	8.56E-09	1.43E-08	9.55E-09	2.62E-08	6.14E-07	2.15E-08	0	0	2.91009E-10	0	0.0003	Res
582584.27_4130733.21	582584.27	4130733.21	1.41E-05	1.34E-08	8.04E-09	1.34E-08	8.99E-09	2.46E-08	5.77E-07	2.02E-08	0	0	2.66533E-10	0	0.0003	Res
582640.84_4130733.21	582640.84	4130733.21	1.30E-05	1.27E-08	7.60E-09	1.27E-08	8.51E-09	2.32E-08	5.45E-07	1.91E-08	0	0	2.4648E-10	0	0.0002	Res
582697.41_4130733.21	582697.41	4130733.21	1.21E-05	1.20E-08	7.22E-09	1.20E-08	8.10E-09	2.21E-08	5.18E-07	1.82E-08	0	0	2.29702E-10	0	0.0002	Res
582753.98_4130733.21	582753.98	4130733.21	1.14E-05	1.15E-08	6.89E-09	1.15E-08	7.74E-09	2.11E-08	4.94E-07	1.73E-08	0	0	2.15115E-10	0	0.0002	Res
582810.55_4130733.21	582810.55	4130733.21	1.07E-05	1.10E-08	6.60E-09	1.10E-08	7.42E-09	2.02E-08	4.73E-07	1.66E-08	0	0	2.03028E-10	0	0.0002	Res
582867.12_4130733.21	582867.12	4130733.21	1.01E-05	1.05E-08	6.33E-09	1.05E-08	7.13E-09	1.93E-08	4.54E-07	1.59E-08	0	0	1.91674E-10	0	0.0002	Res
581735.72_4130817.12	581735.72	4130817.12	3.22E-04	1.84E-07	1.10E-07	1.84E-07	1.18E-07	3.38E-07	7.94E-06	2.79E-07	0	0	6.10046E-09	0	0.0061	Res
581792.29_4130817.12	581792.29	4130817.12	3.64E-04	2.06E-07	1.24E-07	2.06E-07	1.32E-07	3.79E-07	8.89E-06	3.13E-07	0	0	6.88427E-09	0	0.0069	Res

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)								Risk Calculation Part 2, $\sum R1*C_{TAC}$					
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Cobalt	Lead	Nickel	Chromium VI	3rd Trimester	0<2	2<16	16<30	Cancer Risk - 2029 (per million)	Receptor Type
581848.86_4130817.12	581848.86	4130817.12	3.26E-04	1.85E-07	1.11E-07	1.85E-07	1.19E-07	3.41E-07	8.00E-06	2.81E-07	0	0	6.1762E-09	0	0.0062	Res
581905.43_4130817.12	581905.43	4130817.12	2.47E-04	1.42E-07	8.51E-08	1.42E-07	9.13E-08	2.61E-07	6.12E-06	2.15E-07	0	0	4.67122E-09	0	0.0047	Res
581962_4130817.12	581962	4130817.12	1.50E-04	8.89E-08	5.33E-08	8.89E-08	5.74E-08	1.63E-07	3.84E-06	1.35E-07	0	0	2.83468E-09	0	0.0028	Res
582018.57_4130817.12	582018.57	4130817.12	8.98E-05	5.61E-08	3.36E-08	5.61E-08	3.64E-08	1.03E-07	2.42E-06	8.50E-08	0	0	1.69942E-09	0	0.0017	Res
582075.14_4130817.12	582075.14	4130817.12	5.82E-05	3.87E-08	2.32E-08	3.87E-08	2.52E-08	7.11E-08	1.67E-06	5.86E-08	0	0	1.10158E-09	0	0.0011	Res
582131.71_4130817.12	582131.71	4130817.12	4.20E-05	2.96E-08	1.78E-08	2.96E-08	1.94E-08	5.44E-08	1.28E-06	4.49E-08	0	0	7.94558E-10	0	0.0008	Res
582188.28_4130817.12	582188.28	4130817.12	3.26E-05	2.43E-08	1.46E-08	2.43E-08	1.60E-08	4.47E-08	1.05E-06	3.68E-08	0	0	6.17566E-10	0	0.0006	Res
582244.85_4130817.12	582244.85	4130817.12	2.67E-05	2.09E-08	1.25E-08	2.09E-08	1.38E-08	3.84E-08	9.01E-07	3.17E-08	0	0	5.06124E-10	0	0.0005	Res
582301.42_4130817.12	582301.42	4130817.12	2.28E-05	1.86E-08	1.12E-08	1.86E-08	1.23E-08	3.41E-08	8.01E-07	2.81E-08	0	0	4.3213E-10	0	0.0004	Res
582357.99_4130817.12	582357.99	4130817.12	2.01E-05	1.69E-08	1.01E-08	1.69E-08	1.12E-08	3.10E-08	7.28E-07	2.56E-08	0	0	3.79648E-10	0	0.0004	Res
582414.56_4130817.12	582414.56	4130817.12	1.79E-05	1.56E-08	9.34E-09	1.56E-08	1.04E-08	2.86E-08	6.71E-07	2.35E-08	0	0	3.39795E-10	0	0.0003	Res
582471.13_4130817.12	582471.13	4130817.12	1.63E-05	1.45E-08	8.72E-09	1.45E-08	9.70E-09	2.67E-08	6.25E-07	2.20E-08	0	0	3.09189E-10	0	0.0003	Res
582527.7_4130817.12	582527.7	4130817.12	1.50E-05	1.36E-08	8.18E-09	1.36E-08	9.12E-09	2.50E-08	5.87E-07	2.06E-08	0	0	2.83376E-10	0	0.0003	Res
582584.27_4130817.12	582584.27	4130817.12	1.39E-05	1.29E-08	7.72E-09	1.29E-08	8.63E-09	2.36E-08	5.54E-07	1.94E-08	0	0	2.62223E-10	0	0.0003	Res
582640.84_4130817.12	582640.84	4130817.12	1.29E-05	1.22E-08	7.33E-09	1.22E-08	8.19E-09	2.24E-08	5.25E-07	1.84E-08	0	0	2.44084E-10	0	0.0002	Res
582697.41_4130817.12	582697.41	4130817.12	1.21E-05	1.16E-08	6.97E-09	1.16E-08	7.81E-09	2.13E-08	5.00E-07	1.75E-08	0	0	2.28185E-10	0	0.0002	Res
582753.98_4130817.12	582753.98	4130817.12	1.13E-05	1.11E-08	6.64E-09	1.11E-08	7.45E-09	2.03E-08	4.76E-07	1.67E-08	0	0	2.13605E-10	0	0.0002	Res
582810.55_4130817.12	582810.55	4130817.12	1.06E-05	1.06E-08	6.35E-09	1.06E-08	7.14E-09	1.94E-08	4.55E-07	1.60E-08	0	0	2.00939E-10	0	0.0002	Res
582867.12_4130817.12	582867.12	4130817.12	1.00E-05	1.01E-08	6.09E-09	1.01E-08	6.85E-09	1.86E-08	4.36E-07	1.53E-08	0	0	1.89658E-10	0	0.0002	Res
581735.72_4130901.03	581735.72	4130901.03	6.40E-04	3.56E-07	2.13E-07	3.56E-07	2.28E-07	6.55E-07	1.54E-05	5.41E-07	0	0	1.21217E-08	0	0.0121	Res
581792.29_4130901.03	581792.29	4130901.03	6.84E-04	3.79E-07	2.27E-07	3.79E-07	2.43E-07	6.97E-07	1.64E-05	5.76E-07	0	0	1.29445E-08	0	0.0129	Res
581848.86_4130901.03	581848.86	4130901.03	6.09E-04	3.38E-07	2.03E-07	3.38E-07	2.17E-07	6.23E-07	1.46E-05	5.14E-07	0	0	1.15373E-08	0	0.0115	Res
581905.43_4130901.03	581905.43	4130901.03	3.20E-04	1.81E-07	1.09E-07	1.81E-07	1.16E-07	3.33E-07	7.82E-06	2.75E-07	0	0	6.05979E-09	0	0.0061	Res
581962_4130901.03	581962	4130901.03	1.30E-04	7.77E-08	4.66E-08	7.77E-08	5.02E-08	1.43E-07	3.35E-06	1.18E-07	0	0	2.46166E-09	0	0.0025	Res
582018.57_4130901.03	582018.57	4130901.03	6.99E-05	4.48E-08	2.69E-08	4.48E-08	2.91E-08	8.23E-08	1.93E-06	6.79E-08	0	0	1.32254E-09	0	0.0013	Res
582075.14_4130901.03	582075.14	4130901.03	4.69E-05	3.21E-08	1.93E-08	3.21E-08	2.10E-08	5.90E-08	1.39E-06	4.87E-08	0	0	8.8871E-10	0	0.0009	Res
582131.71_4130901.03	582131.71	4130901.03	3.60E-05	2.59E-08	1.56E-08	2.59E-08	1.70E-08	4.77E-08	1.12E-06	3.93E-08	0	0	6.81313E-10	0	0.0007	Res
582188.28_4130901.03	582188.28	4130901.03	2.95E-05	2.22E-08	1.33E-08	2.22E-08	1.46E-08	4.08E-08	9.58E-07	3.37E-08	0	0	5.58955E-10	0	0.0006	Res
582244.85_4130901.03	582244.85	4130901.03	2.51E-05	1.96E-08	1.18E-08	1.96E-08	1.30E-08	3.61E-08	8.46E-07	2.97E-08	0	0	4.75752E-10	0	0.0005	Res
582301.42_4130901.03	582301.42	4130901.03	2.19E-05	1.77E-08	1.06E-08	1.77E-08	1.17E-08	3.25E-08	7.62E-07	2.67E-08	0	0	4.14085E-10	0	0.0004	Res
582357.99_4130901.03	582357.99	4130901.03	1.94E-05	1.61E-08	9.69E-09	1.61E-08	1.07E-08	2.96E-08	6.95E-07	2.44E-08	0	0	3.66965E-10	0	0.0004	Res
582414.56_4130901.03	582414.56	4130901.03	1.74E-05	1.49E-08	8.93E-09	1.49E-08	9.91E-09	2.73E-08	6.41E-07	2.25E-08	0	0	3.28989E-10	0	0.0003	Res
582471.13_4130901.03	582471.13	4130901.03	1.58E-05	1.39E-08	8.31E-09	1.39E-08	9.24E-09	2.54E-08	5.96E-07	2.09E-08	0	0	2.98444E-10	0	0.0003	Res
582527.7_4130901.03	582527.7	4130901.03	1.44E-05	1.30E-08	7.78E-09	1.30E-08	8.67E-09	2.38E-08	5.58E-07	1.96E-08	0	0	2.72795E-10	0	0.0003	Res
582584.27_4130901.03	582584.27	4130901.03	1.33E-05	1.22E-08	7.33E-09	1.22E-08	8.18E-09	2.24E-08	5.26E-07	1.85E-08	0	0	2.51807E-10	0	0.0003	Res
582640.84_4130901.03	582640.84	4130901.03	1.24E-05	1.16E-08	6.94E-09	1.16E-08	7.76E-09	2.12E-08	4.98E-07	1.75E-08	0	0	2.34044E-10	0	0.0002	Res
582697.41_4130901.03	582697.41	4130901.03	1.15E-05	1.10E-08	6.60E-09	1.10E-08	7.39E-09	2.02E-08	4.73E-07	1.66E-08	0	0	2.18642E-10	0	0.0002	Res
582753.98_4130901.03	582753.98	4130901.03	1.08E-05	1.05E-08	6.30E-09	1.05E-08	7.06E-09	1.92E-08	4.51E-07	1.58E-08	0	0	2.0505E-10	0	0.0002	Res
582810.55_4130901.03	582810.55	4130901.03	1.02E-05	1.00E-08	6.01E-09	1.00E-08	6.75E-09	1.84E-08	4.31E-07	1.51E-08	0	0	1.92704E-10	0	0.0002	Res
582867.12_4130901.03	582867.12	4130901.03	9.61E-06	9.60E-09	5.76E-09	9.60E-09	6.48E-09	1.76E-08	4.13E-07	1.45E-08	0	0	1.82018E-10	0	0.0002	Res
581735.72_4130984.94	581735.72	4130984.94	1.71E-03	9.34E-07	5.60E-07	9.34E-07	5.98E-07	1.72E-06	4.03E-05	1.42E-06	0	0	3.23028E-08	0	0.0323	Res
581792.29_4130984.94	581792.29	4130984.94	2.24E-03	1.22E-06	7.34E-07	1.22E-06	7.83E-07	2.25E-06	5.28E-05	1.86E-06	0	0	4.24072E-08	0	0.0424	Res
581848.86_4130984.94	581848.86	4130984.94	2.61E-03	1.42E-06	8.53E-07	1.42E-06	9.10E-07	2.62E-06	6.14E-05	2.16E-06	0	0	4.93348E-08	0	0.0493	Res
581905.43_4130984.94	581905.43	4130984.94	2.08E-04	1.20E-07	7.19E-08	1.20E-07	7.71E-08	2.20E-07	5.17E-06	1.82E-07	0	0	3.93087E-09	0	0.0039	Res
581962_4130984.94	581962	4130984.94	8.92E-05	5.53E-08	3.32E-08	5.53E-08	3.58E-08	1.02E-07	2.39E-06	8.39E-08	0	0	1.68946E-09	0	0.0017	Res
582018.57_4130984.94	582018.57	4130984.94	5.75E-05	3.78E-08	2.27E-08	3.78E-08	2.46E-08	6.95E-08	1.63E-06	5.73E-08	0	0	1.08902E-09	0	0.0011	Res
582075.14_4130984.94	582075.14	4130984.94	4.24E-05	2.94E-08	1.76E-08	2.94E-08	1.92E-08	5.40E-08	1.27E-06	4.46E-08	0	0	8.03389E-10	0	0.0008	Res
582131.71_4130984.94	582131.71	4130984.94	3.36E-05	2.44E-08	1.46E-08	2.44E-08	1.60E-08	4.48E-08	1.05E-06	3.69E-08	0	0	6.35589E-10	0	0.0006	Res
582188.28_4130984.94	582188.28	4130984.94	2.77E-05	2.10E-08	1.26E-08	2.10E-08	1.38E-08	3.85E-08	9.03E-07	3.17E-08	0	0	5.23953E-10	0	0.0005	Res
582244.85_4130984.94	582244.85	4130984.94	2.35E-05	1.85E-08	1.11E-08	1.85E-08	1.22E-08	3.40E-08	7.97E-07	2.80E-08	0	0	4.4466E-10	0	0.0004	Res
582301.42_4130984.94	582301.42	4130984.94	2.04E-05	1.66E-08	9.97E-09	1.66E-08	1.10E-08	3.05E-08	7.16E-07	2.51E-08	0	0	3.85891E-10	0	0.0004	Res
582357.99_4130984.94	582357.99	4130984.94	1.80E-05	1.52E-08	9.09E-09	1.52E-08	1.01E-08	2.78E-08	6.53E-07	2.29E-08	0	0	3.40932E-10	0	0.0003	Res
582414.56_4130984.94	582414.56	4130984.94	1.61E-05	1.40E-08	8.38E-09	1.40E-08	9.30E-09	2.56E-08	6.01E-07	2.11E-08	0	0	3.05292E-10	0	0.0003	Res
582471.13_4130984.94	582471.13	4130984.94	1.46E-05	1.30E-08	7.78E-09	1.30E-08	8.66E-09	2.38E-08	5.59E-07	1.96E-08	0	0	2.76429E-10	0	0.0003	Res
582527.7_4130984.94	582527.7	4130984.94	1.33E-05	1.21E-08	7.28E-09	1.21E-08	8.12E-09	2.23E-08	5.22E-07	1.83E-08	0	0	2.52505E-10	0	0.0003	Res
582584.27_4130984.94	582584.27	4130984.94	1.23E-05	1.14E-08	6.86E-09	1.14E-08	7.67E-09	2.10E-08	4.92E-07	1.73E-08	0	0	2.3315E-10	0	0.0002	Res
582640.84_4130984.94	582640.84	4130984.94	1.15E-05	1.09E-08	6.51E-09	1.09E-08	7.28E-09	1.99E-08	4.67E-07	1.64E-08	0	0	2.17348E-10	0	0.0002	Res

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)								Risk Calculation Part 2, $\sum R1*C_{TAC}$					
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Cobalt	Lead	Nickel	Chromium VI	3rd Trimester	0<2	2<16	16<30	Cancer Risk - 2029 (per million)	Receptor Type
582697.41_4130984.94	582697.41	4130984.94	1.07E-05	1.03E-08	6.19E-09	1.03E-08	6.93E-09	1.89E-08	4.44E-07	1.56E-08	0	0	2.03005E-10	0	0.0002	Res
582753.98_4130984.94	582753.98	4130984.94	1.01E-05	9.85E-09	5.91E-09	9.85E-09	6.63E-09	1.81E-08	4.24E-07	1.49E-08	0	0	1.91174E-10	0	0.0002	Res
582810.55_4130984.94	582810.55	4130984.94	9.53E-06	9.43E-09	5.66E-09	9.43E-09	6.35E-09	1.73E-08	4.06E-07	1.42E-08	0	0	1.80372E-10	0	0.0002	Res
582867.12_4130984.94	582867.12	4130984.94	9.01E-06	9.04E-09	5.43E-09	9.04E-09	6.10E-09	1.66E-08	3.89E-07	1.36E-08	0	0	1.70671E-10	0	0.0002	Res
581735.72_4131068.85	581735.72	4131068.85	2.79E-04	1.59E-07	9.54E-08	1.59E-07	1.02E-07	2.93E-07	6.87E-06	2.42E-07	0	0	5.28204E-09	0	0.0053	Res
581792.29_4131068.85	581792.29	4131068.85	2.23E-04	1.28E-07	7.69E-08	1.28E-07	8.25E-08	2.36E-07	5.54E-06	1.95E-07	0	0	4.21408E-09	0	0.0042	Res
581848.86_4131068.85	581848.86	4131068.85	1.20E-04	7.22E-08	4.33E-08	7.22E-08	4.67E-08	1.33E-07	3.12E-06	1.10E-07	0	0	2.2703E-09	0	0.0023	Res
581905.43_4131068.85	581905.43	4131068.85	7.65E-05	4.84E-08	2.90E-08	4.84E-08	3.14E-08	8.90E-08	2.09E-06	7.34E-08	0	0	1.44764E-09	0	0.0014	Res
581962_4131068.85	581962	4131068.85	5.54E-05	3.68E-08	2.21E-08	3.68E-08	2.40E-08	6.75E-08	1.59E-06	5.57E-08	0	0	1.04956E-09	0	0.0010	Res
582018.57_4131068.85	582018.57	4131068.85	4.21E-05	2.93E-08	1.76E-08	2.93E-08	1.92E-08	5.38E-08	1.26E-06	4.43E-08	0	0	7.96245E-10	0	0.0008	Res
582075.14_4131068.85	582075.14	4131068.85	3.34E-05	2.43E-08	1.46E-08	2.43E-08	1.60E-08	4.47E-08	1.05E-06	3.69E-08	0	0	6.32087E-10	0	0.0006	Res
582131.71_4131068.85	582131.71	4131068.85	2.75E-05	2.10E-08	1.26E-08	2.10E-08	1.38E-08	3.85E-08	9.03E-07	3.17E-08	0	0	5.21334E-10	0	0.0005	Res
582188.28_4131068.85	582188.28	4131068.85	2.33E-05	1.85E-08	1.11E-08	1.85E-08	1.22E-08	3.39E-08	7.95E-07	2.79E-08	0	0	4.40739E-10	0	0.0004	Res
582244.85_4131068.85	582244.85	4131068.85	2.01E-05	1.66E-08	9.93E-09	1.66E-08	1.10E-08	3.04E-08	7.13E-07	2.50E-08	0	0	3.81183E-10	0	0.0004	Res
582301.42_4131068.85	582301.42	4131068.85	1.77E-05	1.51E-08	9.03E-09	1.51E-08	1.00E-08	2.76E-08	6.48E-07	2.28E-08	0	0	3.35152E-10	0	0.0003	Res
582357.99_4131068.85	582357.99	4131068.85	1.58E-05	1.38E-08	8.29E-09	1.38E-08	9.21E-09	2.54E-08	5.95E-07	2.09E-08	0	0	2.98645E-10	0	0.0003	Res
582414.56_4131068.85	582414.56	4131068.85	1.42E-05	1.28E-08	7.70E-09	1.28E-08	8.57E-09	2.35E-08	5.52E-07	1.94E-08	0	0	2.696E-10	0	0.0003	Res
582471.13_4131068.85	582471.13	4131068.85	1.30E-05	1.20E-08	7.19E-09	1.20E-08	8.01E-09	2.20E-08	5.16E-07	1.81E-08	0	0	2.45645E-10	0	0.0002	Res
582527.7_4131068.85	582527.7	4131068.85	1.19E-05	1.13E-08	6.75E-09	1.13E-08	7.54E-09	2.06E-08	4.84E-07	1.70E-08	0	0	2.25587E-10	0	0.0002	Res
582584.27_4131068.85	582584.27	4131068.85	1.10E-05	1.06E-08	6.36E-09	1.06E-08	7.12E-09	1.95E-08	4.56E-07	1.60E-08	0	0	2.08234E-10	0	0.0002	Res
582640.84_4131068.85	582640.84	4131068.85	1.03E-05	1.01E-08	6.06E-09	1.01E-08	6.79E-09	1.85E-08	4.35E-07	1.53E-08	0	0	1.95409E-10	0	0.0002	Res
582697.41_4131068.85	582697.41	4131068.85	9.70E-06	9.63E-09	5.78E-09	9.63E-09	6.48E-09	1.77E-08	4.14E-07	1.45E-08	0	0	1.83661E-10	0	0.0002	Res
582753.98_4131068.85	582753.98	4131068.85	9.20E-06	9.24E-09	5.54E-09	9.24E-09	6.23E-09	1.69E-08	3.97E-07	1.39E-08	0	0	1.7411E-10	0	0.0002	Res
582810.55_4131068.85	582810.55	4131068.85	8.74E-06	8.88E-09	5.33E-09	8.88E-09	5.99E-09	1.63E-08	3.82E-07	1.34E-08	0	0	1.65553E-10	0	0.0002	Res
582867.12_4131068.85	582867.12	4131068.85	8.27E-06	8.51E-09	5.10E-09	8.51E-09	5.75E-09	1.56E-08	3.66E-07	1.28E-08	0	0	1.56597E-10	0	0.0002	Res
582018.57_4131152.76	582018.57	4131152.76	2.82E-05	2.16E-08	1.30E-08	2.16E-08	1.43E-08	3.97E-08	9.32E-07	3.28E-08	0	0	5.34075E-10	0	0.0005	Res
582244.85_4131152.76	582244.85	4131152.76	1.70E-05	1.48E-08	8.90E-09	1.48E-08	9.87E-09	2.72E-08	6.38E-07	2.24E-08	0	0	3.22649E-10	0	0.0003	Res
582301.42_4131152.76	582301.42	4131152.76	1.53E-05	1.37E-08	8.24E-09	1.37E-08	9.16E-09	2.52E-08	5.91E-07	2.08E-08	0	0	2.90589E-10	0	0.0003	Res
582357.99_4131152.76	582357.99	4131152.76	1.39E-05	1.28E-08	7.66E-09	1.28E-08	8.53E-09	2.34E-08	5.49E-07	1.93E-08	0	0	2.62482E-10	0	0.0003	Res
582414.56_4131152.76	582414.56	4131152.76	1.26E-05	1.19E-08	7.16E-09	1.19E-08	7.99E-09	2.19E-08	5.13E-07	1.80E-08	0	0	2.39197E-10	0	0.0002	Res
582471.13_4131152.76	582471.13	4131152.76	1.15E-05	1.11E-08	6.69E-09	1.11E-08	7.48E-09	2.04E-08	4.80E-07	1.68E-08	0	0	2.17305E-10	0	0.0002	Res
582527.7_4131152.76	582527.7	4131152.76	1.06E-05	1.05E-08	6.30E-09	1.05E-08	7.05E-09	1.92E-08	4.51E-07	1.58E-08	0	0	1.99872E-10	0	0.0002	Res
582584.27_4131152.76	582584.27	4131152.76	9.77E-06	9.91E-09	5.95E-09	9.91E-09	6.67E-09	1.82E-08	4.26E-07	1.50E-08	0	0	1.84915E-10	0	0.0002	Res
582640.84_4131152.76	582640.84	4131152.76	9.13E-06	9.43E-09	5.66E-09	9.43E-09	6.36E-09	1.73E-08	4.06E-07	1.42E-08	0	0	1.72834E-10	0	0.0002	Res
582697.41_4131152.76	582697.41	4131152.76	8.58E-06	9.00E-09	5.40E-09	9.00E-09	6.07E-09	1.65E-08	3.87E-07	1.36E-08	0	0	1.62501E-10	0	0.0002	Res
582753.98_4131152.76	582753.98	4131152.76	8.17E-06	8.65E-09	5.19E-09	8.65E-09	5.84E-09	1.59E-08	3.72E-07	1.31E-08	0	0	1.54729E-10	0	0.0002	Res
582810.55_4131152.76	582810.55	4131152.76	7.79E-06	8.33E-09	5.00E-09	8.33E-09	5.63E-09	1.53E-08	3.58E-07	1.26E-08	0	0	1.47497E-10	0	0.0001	Res
582867.12_4131152.76	582867.12	4131152.76	7.39E-06	7.99E-09	4.79E-09	7.99E-09	5.41E-09	1.46E-08	3.44E-07	1.20E-08	0	0	1.39823E-10	0	0.0001	Res

B-2 Cancer Risk Calculations – 2015 OEHHA Guidance

HRA Permanente Creek Restoration Project

Construction Year 2024

Emissions Inputs

Construction Activity	Construction Year & Source	DPM Exhaust	PM10 Dust for speciation	Arsenic	Beryllium	Cadmium	Cobalt	Copper	Lead	Mercury	Nickel	Selenium	Chromium VI	Crystalline Silica
		(tons/year)	(tons/year)	(tons/year)	(tons/year)	(tons/year)	(tons/year)	(tons/year)	(tons/year)	(tons/year)	(tons/year)	(tons/year)	(tons/year)	(tons/year)
Concrete Channel 2024	2024_CONCRTE	0.000	0.00	2.91E-12	1.74E-12	2.91E-12	1.49E-11	3.26E-11	2.91E-12	4.65E-13	5.35E-11	5.81E-12	2.33E-13	8.63E-09
Paved road	2024_PAVED	2.07E-04	0.08	1.04E-07	6.26E-08	1.04E-07	6.68E-08	2.09E-06	1.92E-07	1.17E-08	4.51E-06	2.09E-07	1.59E-07	5.93E-04
Unpaved road	2024_CCP_UNPV	6.27E-05	0.20	2.56E-07	1.54E-07	2.56E-07	1.64E-07	5.12E-06	4.71E-07	2.87E-08	1.11E-05	5.12E-07	3.89E-07	1.46E-03
Channel Widening 2024	2024_CHAN_RCK	0.002	0.16	2.05E-07	1.23E-07	2.05E-07	1.05E-06	2.29E-06	2.05E-07	3.28E-08	3.77E-06	4.09E-07	1.64E-08	6.08E-04
Paved road	2024_PAVED	1.80E-03	2.39	2.99E-06	1.79E-06	2.99E-06	1.91E-06	5.98E-05	5.50E-06	3.35E-07	1.29E-04	5.98E-06	4.54E-06	1.70E-02
Rock Pile Area 2025	2025_CHAN_RCK	0.006	0.25	3.16E-07	1.89E-07	3.16E-07	1.62E-06	3.54E-06	3.16E-07	5.05E-08	5.81E-06	6.31E-07	2.53E-08	9.37E-04
Paved road	2025_PAVED	5.95E-03	2.44	3.05E-06	1.83E-06	3.05E-06	1.95E-06	6.10E-05	5.61E-06	3.41E-07	1.32E-04	6.10E-06	4.63E-06	1.73E-02
Rock Pile Area 2026	2026_CHAN_RCK	0.006	0.25	3.16E-07	1.89E-07	3.16E-07	1.62E-06	3.54E-06	3.16E-07	5.05E-08	5.81E-06	6.31E-07	2.53E-08	9.37E-04
Paved road	2026_PAVED	5.84E-03	2.44	3.05E-06	1.83E-06	3.05E-06	1.95E-06	6.10E-05	5.61E-06	3.41E-07	1.32E-04	6.10E-06	4.63E-06	1.73E-02
Channel Widening 2027	2027_CHAN_RCK	0.002	0.98	1.23E-06	7.36E-07	1.23E-06	6.28E-06	1.37E-05	1.23E-06	1.96E-07	2.26E-05	2.45E-06	9.82E-08	3.64E-03
Paved road	2027_PAVED	5.61E-03	2.39	2.99E-06	1.79E-06	2.99E-06	1.91E-06	5.98E-05	5.50E-06	3.35E-07	1.29E-04	5.98E-06	4.54E-06	1.70E-02
Material Removal 2028	2028_MATRMVL	0.001	0.25	3.15E-07	1.89E-07	3.15E-07	1.62E-06	3.53E-06	3.15E-07	5.05E-08	5.80E-06	6.31E-07	2.52E-08	9.37E-04
Paved road	2028_PAVED	5.57E-03	2.39	2.99E-06	1.80E-06	2.99E-06	1.92E-06	5.98E-05	5.51E-06	3.35E-07	1.29E-04	5.98E-06	4.55E-06	1.70E-02
Unpaved road	2028_UNPAVED	3.40E-03	11.84	1.48E-05	8.88E-06	1.48E-05	9.47E-06	2.96E-04	2.72E-05	1.66E-06	6.40E-04	2.96E-05	2.25E-05	8.41E-02
Material Removal 2029	2029_MATRMVL	0.001	0.25	3.15E-07	1.89E-07	3.15E-07	1.62E-06	3.53E-06	3.15E-07	5.05E-08	5.80E-06	6.31E-07	2.52E-08	9.37E-04
Paved road	2029_PAVED	5.56E-03	2.41	3.01E-06	1.81E-06	3.01E-06	1.93E-06	6.03E-05	5.55E-06	3.38E-07	1.30E-04	6.03E-06	4.58E-06	1.71E-02
Unpaved road	2029_UNPAVED	3.39E-03	11.93	1.49E-05	8.95E-06	1.49E-05	9.55E-06	2.98E-04	2.74E-05	1.67E-06	6.44E-04	2.98E-05	2.27E-05	8.47E-02

Construction Activity	Construction Year	DPM	Arsenic	Beryllium	Cadmium	Cobalt	Copper	Lead	Mercury	Nickel	Selenium	Chromium VI	Crystalline Silica
		(g/s)	(g/s)	(g/s)	(g/s)	(g/s)	(g/s)	(g/s)	(g/s)	(g/s)	(g/s)	(g/s)	(g/s)
Concrete Channel 2024	2024_CONCRTE	2.877E-07	8.36E-14	5.02E-14	8.36E-14	4.28E-13	9.37E-13	8.36E-14	1.34E-14	1.54E-12	1.67E-13	6.69E-15	2.48E-10
Paved road	2024_PAVED	5.948E-06	3.00E-09	1.80E-09	3.00E-09	1.92E-09	6.01E-08	5.53E-09	3.36E-10	1.30E-07	6.01E-09	4.56E-09	1.71E-05
Unpaved road	2024_CCP_UNPV	1.802E-06	7.37E-09	4.42E-09	7.37E-09	4.72E-09	1.47E-07	1.36E-08	8.26E-10	3.18E-07	1.47E-08	1.12E-08	4.19E-05
Channel Widening 2024	2024_CHAN_RCK	5.566E-05	5.889E-09	3.533E-09	5.889E-09	3.015E-08	6.595E-08	5.889E-09	9.422E-10	1.084E-07	1.178E-08	4.711E-10	1.749E-05
Paved road	2024_PAVED	5.173E-05	8.597E-08	5.158E-08	8.597E-08	5.502E-08	1.719E-06	1.582E-07	9.629E-09	3.714E-06	1.719E-07	1.307E-07	4.883E-04
Rock Pile Area 2025	2025_CHAN_RCK	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Paved road	2025_PAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Rock Pile Area 2026	2026_CHAN_RCK	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Paved road	2026_PAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Channel Widening 2027	2027_CHAN_RCK	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Paved road	2027_PAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Material Removal 2028	2028_MATRMVL	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Paved road	2028_PAVED	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Unpaved road	2028_UNPAVED	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Material Removal 2029	2029_MATRMVL	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Paved road	2029_PAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Unpaved road	2029_UNPAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

N/A = not including PM10 on-site dust in HRA calculation; it is only for speciating metals.

Exposure Duration, ED

	Exposure Start	3rd Trimester	0<2	2<16	16<30
Years	1/1/2024	0.25	0.75	0	0

Risk Factors

	Abbreviation	UOM	3rd Trimester	0<2	2<16	16<30
Daily Breathing Rate (95th %'ile)	DBR	L/kg-day	361	1090	572	261
Fraction Of Time At Home [a]	FAH	unitless	0.85	0.85	0.72	0.73
Exposure Frequency	EF	days/year	0.96	0.96	0.96	0.96
Age Sensitivity Factor	ASF	unitless	10	10	3	1
Inhalation Absorption Factor	A	unitless	1	1	1	1
Conversion Factor	CF_1	m^3/L	0.001	0.001	0.001	0.001
Conversion Factor	CF_2	$\mu g/m^3$	0.001	0.001	0.001	0.001
Averaging Time (for residential exposure)	AT	years	70.00	70.00	70.00	70.00

[a] assume school or daycare will have cancer risk of >1 per million

Cancer Potency Factor, CPF

TAC	UOM	
DPM	$mg/kg\text{-}day^{-1}$	1.1
Arsenic	$mg/kg\text{-}day^{-1}$	12
Beryllium	$mg/kg\text{-}day^{-1}$	8.4
Cadmium	$mg/kg\text{-}day^{-1}$	15
Cobalt	$mg/kg\text{-}day^{-1}$	27
Lead	$mg/kg\text{-}day^{-1}$	0.04
Nickel	$mg/kg\text{-}day^{-1}$	0.91
Chromium VI	$mg/kg\text{-}day^{-1}$	510

Intake Factor for Inhalation, IF (m^3/kg-day)

Equation	3rd Trimester	0<2	2<16	16<30
DBR*FAH*EF*ED*ASF*A*CF/AT	0.011	0.095	0.000	0.000

Risk Calculation Part 1, R1

	TAC	3rd Trimester	0<2	2<16	16<30
IF*CPF*CF	DPM	1.16E-05	1.05E-04	0.00E+00	0.00E+00
	Arsenic	1.26E-04	1.14E-03	0.00E+00	0.00E+00
	Beryllium	8.83E-05	8.00E-04	0.00E+00	0.00E+00
	Cadmium	1.58E-04	1.43E-03	0.00E+00	0.00E+00
	Cobalt	2.84E-04	2.57E-03	0.00E+00	0.00E+00
	Lead	4.20E-07	3.81E-06	0.00E+00	0.00E+00
	Nickel	9.56E-06	8.66E-05	0.00E+00	0.00E+00
	Chromium VI	5.36E-03	4.85E-02	0.00E+00	0.00E+00

	Max	
CT House	0.055851524	per million
Res	0.779666769	per million

Risk Calculation Part 2, $\sum R1*C_{TAC}$

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)								3rd Trimester	0<2	2<16	16<30	Cancer Risk - 2024	Receptor Type	Cancer Risk Total
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Cobalt	Lead	Nickel	Chromium VI					(per million)		(per million)
581336.22_4131207.48	581336.22	4131207.48	6.80E-05	1.05E-07	6.28E-08	1.05E-07	6.75E-08	1.92E-07	4.51E-06	1.59E-07	7.85631E-10	7.11638E-09	0	0	0.0079	CT House	0.0559
581554.22_4130688.06	581554.22	4130688.06	4.73E-05	7.23E-08	4.34E-08	7.23E-08	4.74E-08	1.33E-07	3.12E-06	1.09E-07	5.47066E-10	4.95542E-09	0	0	0.0055	Res	0.0383
579793.36_4131503.29	579793.36	4131503.29	4.22E-06	3.82E-09	2.29E-09	3.82E-09	3.36E-09	6.86E-09	1.60E-07	5.51E-09	4.8765E-11	4.41721E-10	0	0	0.0005	Acute	0.0034
580488.37_4131517.71	580488.37	4131517.71	5.66E-06	7.89E-09	4.73E-09	7.89E-09	5.58E-09	1.44E-08	3.38E-07	1.18E-08	6.53906E-11	5.92319E-10	0	0	0.0007	Acute	0.0044
581678.43_4131040.03	581678.43	4131040.03	2.14E-04	3.30E-07	1.98E-07	3.30E-07	2.12E-07	6.07E-07	1.43E-05	5.01E-07	2.47759E-09	2.24425E-08	0	0	0.0249	Res	0.1771
581635.43_4130978.54	581635.43	4130978.54	4.33E-04	6.68E-07	4.01E-07	6.68E-07	4.28E-07	1.23E-06	2.88E-05	1.01E-06	5.00589E-09	4.53442E-08	0	0	0.0504	Res	0.3581
581830.06_4131027.55	581830.06	4131027.55	1.97E-04	3.03E-07	1.82E-07	3.03E-07	1.95E-07	5.58E-07	1.31E-05	4.61E-07	2.27999E-09	2.06525E-08	0	0	0.0229	Res	0.1631
581727.48_4130976.54	581727.48	4130976.54	5.24E-04	8.07E-07	4.84E-07	8.07E-07	5.17E-07	1.49E-06	3.49E-05	1.23E-06	6.05239E-09	5.48236E-08	0	0	0.0609	Res	0.4333
581789.11_4130419.65	581789.11	4130419.65	3.68E-05	5.44E-08	3.27E-08	5.44E-08	3.63E-08	9.99E-08	2.34E-06	8.23E-08	4.25349E-10	3.85289E-09	0	0	0.0043	Res	0.0296
581700.32_4130781.89	581700.32	4130781.89	1.05E-04	1.62E-07	9.74E-08	1.62E-07	1.05E-07	2.99E-07	7.01E-06	2.47E-07	1.21711E-09	1.10248E-08	0	0	0.0122	Res	0.0864
581426.07_4131299.01	581426.07	4131299.01	2.49E-05	3.77E-08	2.26E-08	3.77E-08	2.46E-08	6.93E-08	1.63E-06	5.72E-08	2.87629E-10	2.60539E-09	0	0	0.0029	Acute	0.0203
582301.42_4129474.56	582301.42	4129474.56	1.32E-05	1.75E-08	1.05E-08	1.75E-08	1.26E-08	3.20E-08	7.50E-07	2.62E-08	1.53105E-10	1.38685E-09	0	0	0.0015	Res	0.0104
582357.99_4129474.56	582357.99	4129474.56	1.24E-05	1.63E-08	9.79E-09	1.63E-08	1.17E-08	2.98E-08	6.98E-07	2.44E-08	1.43125E-10	1.29645E-09	0	0	0.0014	Res	0.0097
582414.56_4129474.56	582414.56	4129474.56	1.16E-05	1.52E-08	9.11E-09	1.52E-08	1.09E-08	2.77E-08	6.49E-07	2.27E-08	1.34068E-10	1.21441E-09	0	0	0.0013	Res	0.0091
582471.13_4129474.56	582471.13	4129474.56	1.09E-05	1.42E-08	8.49E-09	1.42E-08	1.02E-08	2.58E-08	6.05E-07	2.11E-08	1.25812E-10	1.13963E-09	0	0	0.0013	Res	0.0085
582527.7_4129474.56	582527.7	4129474.56	1.03E-05	1.33E-08	7.97E-09	1.33E-08	9.59E-09	2.42E-08	5.68E-07	1.98E-08	1.18724E-10	1.07542E-09	0	0	0.0012	Res	0.0081
582584.27_4129474.56	582584.27	4129474.56	9.65E-06	1.24E-08	7.44E-09	1.24E-08	8.97E-09	2.26E-08	5.30E-07	1.85E-08	1.1154E-10	1.01035E-09	0	0	0.0011	Res	0.0076
582640.84_4129474.56	582640.84	4129474.56	9.01E-06	1.15E-08	6.90E-09	1.15E-08	8.34E-09	2.10E-08	4.91E-07	1.71E-08	1.04164E-10	9.43533E-10	0	0	0.0010	Res	0.0071
582244.85_4129558.47	582244.85	4129558.47	1.37E-05	1.76E-08	1.06E-08	1.76E-08	1.28E-08	3.22E-08	7.53E-07	2.63E-08	1.58592E-10	1.43655E-09	0	0	0.0016	Res	0.0107
582301.42_4129558.47	582301.42	4129558.47	1.34E-05	1.77E-08	1.06E-08	1.77E-08	1.27E-08	3.22E-08	7.55E-07	2.64E-08	1.55086E-10	1.4048E-09	0	0	0.0016	Res	0.0105
582357.99_4129558.47	582357.99	4129558.47	1.26E-05	1.66E-08	9.97E-09	1.66E-08	1.19E-08	3.03E-08	7.11E-07	2.48E-08	1.46018E-10	1.32265E-09	0	0	0.0015	Res	0.0099
582414.56_4129558.47	582414.56	4129558.47	1.18E-05	1.55E-08	9.28E-09	1.55E-08	1.11E-08	2.82E-08	6.61E-07	2.31E-08	1.36781E-10	1.23899E-09	0	0	0.0014	Res	0.0093
582471.13_4129558.47	582471.13	4129558.47	1.10E-05	1.43E-08	8.59E-09	1.43E-08	1.03E-08	2.61E-08	6.12E-07	2.14E-08	1.27469E-10	1.15463E-09	0	0	0.0013	Res	0.0087
582527.7_4129558.47	582527.7	4129558.47	1.03E-05	1.33E-08	7.99E-09	1.33E-08	9.61E-09	2.43E-08	5.69E-07	1.99E-08	1.19325E-10	1.08087E-09	0	0	0.0012	Res	0.0081
582584.27_4129558.47	582584.27	4129558.47	9.66E-06	1.24E-08	7.43E-09	1.24E-08	8.96E-09	2.26E-08	5.29E-07	1.85E-08	1.11707E-10	1.01186E-09	0	0	0.0011	Res	0.0076
582640.84_4129558.47	582640.84	4129558.47	9.11E-06	1.16E-08	6.96E-09	1.16E-08	8.42E-09	2.12E-08	4.96E-07	1.73E-08	1.05291E-10	9.53747E-10	0	0	0.0011	Res	0.0072
582697.41_4129558.47	582697.41	4129558.47	8.58E-06	1.09E-08	6.52E-09	1.09E-08	7.91E-09	1.98E-08	4.64E-07	1.62E-08	9.91796E-11	8.98386E-10	0	0	0.0010	Res	0.0068
582244.85_4129642.38	582244.85	4129642.38	1.24E-05	1.50E-08	9.00E-09	1.50E-08	1.12E-08	2.73E-08	6.39E-07	2.23E-08	1.43765E-10	1.30225E-09	0	0	0.0014	Res	0.0098
582301.42_4129642.38	582301.42	4129642.38	1.32E-05	1.70E-08	1.02E-08	1.70E-08	1.23E-08	3.10E-08	7.25E-07	2.53E-08	1.52342E-10	1.37994E-09	0	0	0.0015	Res	0.0103
582357.99_4129642.38	582357.99	4129642.38	1.28E-05	1.68E-08	1.01E-08	1.68E-08	1.21E-08	3.07E-08	7.20E-07	2.52E-08	1.48116E-10	1.34166E-09	0	0	0.0015	Res	0.0100
582414.56_4129642.38	582414.56	4129642.38	1.20E-05	1.57E-08	9.43E-09	1.57E-08	1.13E-08	2.87E-08	6.72E-07	2.35E-08	1.38968E-10	1.25879E-09	0	0	0.0014	Res	0.0095
582471.13_4129642.38	582471.13	4129642.38	1.13E-05	1.46E-08	8.78E-09	1.46E-08	1.05E-08	2.67E-08	6.26E-07	2.19E-08	1.30072E-10	1.17821E-09	0	0	0.0013	Res	0.0089
582527.7_4129642.38	582527.7	4129642.38	1.06E-05	1.37E-08	8.20E-09	1.37E-08	9.83E-09	2.49E-08	5.84E-07	2.04E-08	1.22122E-10	1.1062E-09	0	0	0.0012	Res	0.0083
582584.27_4129642.38	582584.27	4129642.38	9.84E-06	1.26E-08	7.58E-09	1.26E-08	9.13E-09	2.31E-08	5.40E-07	1.89E-08	1.13783E-10	1.03067E-09	0	0	0.0011	Res	0.0078
582640.84_4129642.38	582640.84	4129642.38	9.22E-06	1.18E-08	7.06E-09	1.18E-08	8.52E-09	2.15E-08	5.03E-07	1.76E-08	1.06587E-10	9.65487E-10	0	0	0.0011	Res	0.0073
582697.41_4129642.38	582697.41	4129642.38	8.66E-06	1.10E-08	6.59E-09	1.10E-08	7.97E-09	2.00E-08	4.69E-07	1.64E-08	1.00051E-10	9.06278E-10	0	0	0.0010	Res	0.0069
582753.98_4129642.38	582753.98	4129642.38	8.11E-06	1.02E-08	6.14E-09	1.02E-08	7.45E-09	1.86E-08	4.37E-07	1.53E-08	9.37953E-11	8.49614E-10	0	0	0.0009	Res	0.0064
582810.55_4129642.38	582810.55	4129642.38	7.63E-06	9.55E-09	5.73E-09	9.55E-09	6.99E-09	1.74E-08	4.08E-07	1.42E-08	8.8211E-11	7.9903E-10	0	0	0.0009	Res	0.0060
582867.12_4129642.38	582867.12	4129642.38	7.11E-06	8.83E-09	5.30E-09	8.83E-09	6.49E-09	1.61E-08	3.77E-07	1.32E-08	8.22265E-11	7.44822E-10	0	0	0.0008	Res	0.0056
582244.85_4129726.29	582244.85	4129726.29	1.33E-05	1.66E-08	9.94E-09	1.66E-08	1.22E-08	3.02E-08	7.07E-07	2.47E-08	1.53798E-10	1.39313E-09	0	0	0.0015	Res	0.0105
582301.42_4129726.29	582301.42	4129726.29	1.29E-05	1.63E-08	9.77E-09	1.63E-08	1.19E-08	2.97E-08	6.96E-07	2.43E-08	1.4861E-10	1.34614E-09	0	0	0.0015	Res	0.0101
582357.99_4129726.29	582357.99	4129726.29	1.29E-05	1.69E-08	1.01E-08	1.69E-08	1.21E-08	3.08E-08	7.22E-07	2.52E-08	1.48686E-10	1.34682E-09	0	0	0.0015	Res	0.0101
582414.56_4129726.29	582414.56	4129726.29	1.22E-05	1.60E-08	9.59E-09	1.60E-08	1.14E-08	2.92E-08	6.84E-07	2.39E-08	1.40941E-10	1.27667E-09	0	0	0.0014	Res	0.0096
582471.13_4129726.29	582471.13	4129726.29	1.15E-05	1.50E-08	8.98E-09	1.50E-08	1.07E-08	2.73E-08	6.40E-07	2.24E-08	1.32559E-10	1.20074E-09	0	0	0.0013	Res	0.0091
582527.7_4129726.29	582527.7	4129726.29	1.08E-05	1.40E-08	8.38E-09	1.40E-08	1.00E-08	2.55E-08	5.98E-07	2.09E-08	1.24363E-10	1.1265E-09	0	0	0.0013	Res	0.0085
582584.27_4129726.29	582584.27	4129726.29	1.01E-05	1.30E-08	7.81E-09	1.30E-08	9.36E-09	2.38E-08	5.57E-07	1.95E-08	1.16518E-10	1.05544E-09	0	0	0.0012	Res	0.0080

Risk Calculation Part 2, $\sum R1*C_{TAC}$

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)								3rd Trimester	0<2	2<16	16<30	Cancer Risk - 2024	Receptor Type	Cancer Risk Total
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Cobalt	Lead	Nickel	Chromium VI					(per million)		(per million)
582640.84_4129726.29	582640.84	4129726.29	9.43E-06	1.21E-08	7.26E-09	1.21E-08	8.73E-09	2.21E-08	5.18E-07	1.81E-08	1.08989E-10	9.87241E-10	0	0	0.0011	Res	0.0075
582697.41_4129726.29	582697.41	4129726.29	8.76E-06	1.12E-08	6.70E-09	1.12E-08	8.08E-09	2.04E-08	4.77E-07	1.67E-08	1.0126E-10	9.1723E-10	0	0	0.0010	Res	0.0069
582753.98_4129726.29	582753.98	4129726.29	8.11E-06	1.02E-08	6.14E-09	1.02E-08	7.45E-09	1.87E-08	4.37E-07	1.53E-08	9.37101E-11	8.48842E-10	0	0	0.0009	Res	0.0064
582810.55_4129726.29	582810.55	4129726.29	7.44E-06	9.29E-09	5.58E-09	9.29E-09	6.80E-09	1.69E-08	3.97E-07	1.38E-08	8.59667E-11	7.78701E-10	0	0	0.0009	Res	0.0059
582244.85_4129810.2	582244.85	4129810.2	1.30E-05	1.59E-08	9.57E-09	1.59E-08	1.18E-08	2.91E-08	6.80E-07	2.37E-08	1.49738E-10	1.35636E-09	0	0	0.0015	Res	0.0102
582301.42_4129810.2	582301.42	4129810.2	1.29E-05	1.65E-08	9.88E-09	1.65E-08	1.20E-08	3.00E-08	7.03E-07	2.46E-08	1.49301E-10	1.3524E-09	0	0	0.0015	Res	0.0102
582357.99_4129810.2	582357.99	4129810.2	1.27E-05	1.65E-08	9.93E-09	1.65E-08	1.19E-08	3.02E-08	7.08E-07	2.47E-08	1.46564E-10	1.32761E-09	0	0	0.0015	Res	0.0100
582414.56_4129810.2	582414.56	4129810.2	1.22E-05	1.61E-08	9.63E-09	1.61E-08	1.15E-08	2.93E-08	6.87E-07	2.40E-08	1.4122E-10	1.27919E-09	0	0	0.0014	Res	0.0096
582471.13_4129810.2	582471.13	4129810.2	1.16E-05	1.52E-08	9.11E-09	1.52E-08	1.08E-08	2.77E-08	6.50E-07	2.27E-08	1.33826E-10	1.21222E-09	0	0	0.0013	Res	0.0092
582527.7_4129810.2	582527.7	4129810.2	1.09E-05	1.42E-08	8.50E-09	1.42E-08	1.01E-08	2.59E-08	6.06E-07	2.12E-08	1.25469E-10	1.13652E-09	0	0	0.0013	Res	0.0086
582584.27_4129810.2	582584.27	4129810.2	1.01E-05	1.31E-08	7.87E-09	1.31E-08	9.41E-09	2.40E-08	5.61E-07	1.96E-08	1.16965E-10	1.05949E-09	0	0	0.0012	Res	0.0080
582640.84_4129810.2	582640.84	4129810.2	9.30E-06	1.19E-08	7.17E-09	1.19E-08	8.61E-09	2.18E-08	5.11E-07	1.79E-08	1.07482E-10	9.73587E-10	0	0	0.0011	Res	0.0074
582697.41_4129810.2	582697.41	4129810.2	8.56E-06	1.09E-08	6.54E-09	1.09E-08	7.90E-09	1.99E-08	4.66E-07	1.63E-08	9.89974E-11	8.96736E-10	0	0	0.0010	Res	0.0068
581905.43_4129894.11	581905.43	4129894.11	1.57E-05	2.11E-08	1.26E-08	2.11E-08	1.48E-08	3.85E-08	9.03E-07	3.16E-08	1.81315E-10	1.64238E-09	0	0	0.0018	Res	0.0125
581962_4129894.11	581962	4129894.11	1.67E-05	2.11E-08	1.27E-08	2.11E-08	1.53E-08	3.85E-08	9.03E-07	3.15E-08	1.92503E-10	1.74372E-09	0	0	0.0019	Res	0.0132
582131.71_4129894.11	582131.71	4129894.11	1.48E-05	1.83E-08	1.10E-08	1.83E-08	1.34E-08	3.33E-08	7.81E-07	2.72E-08	1.70663E-10	1.5459E-09	0	0	0.0017	Res	0.0117
582188.28_4129894.11	582188.28	4129894.11	1.41E-05	1.76E-08	1.06E-08	1.76E-08	1.29E-08	3.22E-08	7.53E-07	2.63E-08	1.63009E-10	1.47656E-09	0	0	0.0016	Res	0.0111
582244.85_4129894.11	582244.85	4129894.11	1.37E-05	1.75E-08	1.05E-08	1.75E-08	1.26E-08	3.18E-08	7.46E-07	2.61E-08	1.58049E-10	1.43164E-09	0	0	0.0016	Res	0.0108
582301.42_4129894.11	582301.42	4129894.11	1.31E-05	1.70E-08	1.02E-08	1.70E-08	1.23E-08	3.11E-08	7.28E-07	2.54E-08	1.51843E-10	1.37542E-09	0	0	0.0015	Res	0.0104
582357.99_4129894.11	582357.99	4129894.11	1.25E-05	1.63E-08	9.79E-09	1.63E-08	1.17E-08	2.98E-08	6.98E-07	2.44E-08	1.4442E-10	1.30818E-09	0	0	0.0015	Res	0.0099
582414.56_4129894.11	582414.56	4129894.11	1.24E-05	1.64E-08	9.87E-09	1.64E-08	1.17E-08	3.00E-08	7.04E-07	2.46E-08	1.43474E-10	1.29962E-09	0	0	0.0014	Res	0.0098
582471.13_4129894.11	582471.13	4129894.11	1.16E-05	1.53E-08	9.17E-09	1.53E-08	1.09E-08	2.79E-08	6.54E-07	2.29E-08	1.33972E-10	1.21354E-09	0	0	0.0013	Res	0.0092
582527.7_4129894.11	582527.7	4129894.11	1.07E-05	1.40E-08	8.41E-09	1.40E-08	9.99E-09	2.56E-08	6.00E-07	2.10E-08	1.23782E-10	1.12124E-09	0	0	0.0012	Res	0.0085
582584.27_4129894.11	582584.27	4129894.11	9.85E-06	1.28E-08	7.67E-09	1.28E-08	9.16E-09	2.33E-08	5.47E-07	1.91E-08	1.13892E-10	1.03166E-09	0	0	0.0011	Res	0.0078
582640.84_4129894.11	582640.84	4129894.11	9.04E-06	1.16E-08	6.98E-09	1.16E-08	8.37E-09	2.12E-08	4.97E-07	1.74E-08	1.04536E-10	9.46905E-10	0	0	0.0011	Res	0.0072
582697.41_4129894.11	582697.41	4129894.11	8.29E-06	1.06E-08	6.33E-09	1.06E-08	7.64E-09	1.93E-08	4.51E-07	1.58E-08	9.58529E-11	8.68252E-10	0	0	0.0010	Res	0.0066
581962_4129978.02	581962	4129978.02	1.72E-05	2.19E-08	1.32E-08	2.19E-08	1.58E-08	4.00E-08	9.37E-07	3.28E-08	1.98449E-10	1.79758E-09	0	0	0.0020	Res	0.0136
582018.57_4129978.02	582018.57	4129978.02	1.64E-05	2.05E-08	1.23E-08	2.05E-08	1.50E-08	3.74E-08	8.77E-07	3.06E-08	1.89439E-10	1.71597E-09	0	0	0.0019	Res	0.0130
582075.14_4129978.02	582075.14	4129978.02	1.67E-05	2.14E-08	1.28E-08	2.14E-08	1.54E-08	3.90E-08	9.14E-07	3.19E-08	1.92816E-10	1.74656E-09	0	0	0.0019	Res	0.0132
582131.71_4129978.02	582131.71	4129978.02	1.64E-05	2.16E-08	1.29E-08	2.16E-08	1.54E-08	3.94E-08	9.22E-07	3.23E-08	1.89776E-10	1.71902E-09	0	0	0.0019	Res	0.0130
582188.28_4129978.02	582188.28	4129978.02	1.62E-05	2.19E-08	1.31E-08	2.19E-08	1.54E-08	4.00E-08	9.38E-07	3.28E-08	1.87579E-10	1.69913E-09	0	0	0.0019	Res	0.0128
582244.85_4129978.02	582244.85	4129978.02	1.47E-05	1.97E-08	1.18E-08	1.97E-08	1.40E-08	3.60E-08	8.44E-07	2.95E-08	1.70403E-10	1.54354E-09	0	0	0.0017	Res	0.0117
582301.42_4129978.02	582301.42	4129978.02	1.44E-05	1.94E-08	1.16E-08	1.94E-08	1.36E-08	3.55E-08	8.32E-07	2.91E-08	1.66049E-10	1.5041E-09	0	0	0.0017	Res	0.0114
582357.99_4129978.02	582357.99	4129978.02	1.35E-05	1.82E-08	1.09E-08	1.82E-08	1.28E-08	3.32E-08	7.79E-07	2.73E-08	1.5612E-10	1.41416E-09	0	0	0.0016	Res	0.0107
582414.56_4129978.02	582414.56	4129978.02	1.25E-05	1.67E-08	1.00E-08	1.67E-08	1.18E-08	3.06E-08	7.16E-07	2.51E-08	1.44494E-10	1.30885E-09	0	0	0.0015	Res	0.0100
582471.13_4129978.02	582471.13	4129978.02	1.15E-05	1.52E-08	9.15E-09	1.52E-08	1.08E-08	2.79E-08	6.53E-07	2.28E-08	1.32769E-10	1.20265E-09	0	0	0.0013	Res	0.0092
582527.7_4129978.02	582527.7	4129978.02	1.05E-05	1.38E-08	8.30E-09	1.38E-08	9.82E-09	2.53E-08	5.92E-07	2.07E-08	1.21479E-10	1.10038E-09	0	0	0.0012	Res	0.0084
582584.27_4129978.02	582584.27	4129978.02	9.61E-06	1.25E-08	7.51E-09	1.25E-08	8.94E-09	2.29E-08	5.36E-07	1.87E-08	1.11041E-10	1.00583E-09	0	0	0.0011	Res	0.0076
582640.84_4129978.02	582640.84	4129978.02	8.79E-06	1.13E-08	6.81E-09	1.13E-08	8.15E-09	2.07E-08	4.85E-07	1.70E-08	1.01664E-10	9.20894E-10	0	0	0.0010	Res	0.0070
582697.41_4129978.02	582697.41	4129978.02	8.05E-06	1.03E-08	6.16E-09	1.03E-08	7.42E-09	1.87E-08	4.39E-07	1.53E-08	9.30334E-11	8.42712E-10	0	0	0.0009	Res	0.0064
582753.98_4129978.02	582753.98	4129978.02	7.32E-06	9.21E-09	5.53E-09	9.21E-09	6.71E-09	1.68E-08	3.93E-07	1.37E-08	8.45787E-11	7.66128E-10	0	0	0.0009	Res	0.0058
582810.55_4129978.02	582810.55	4129978.02	6.53E-06	8.08E-09	4.85E-09	8.08E-09	5.94E-09	1.47E-08	3.45E-07	1.20E-08	7.54586E-11	6.83517E-10	0	0	0.0008	Res	0.0052
581905.43_4130061.93	581905.43	4130061.93	2.37E-05	3.27E-08	1.96E-08	3.27E-08	2.28E-08	5.98E-08	1.40E-06	4.91E-08	2.73995E-10	2.48189E-09	0	0	0.0028	Res	0.0188
581962_4130061.93	581962	4130061.93	2.23E-05	3.07E-08	1.84E-08	3.07E-08	2.14E-08	5.62E-08	1.32E-06	4.61E-08	2.57424E-10	2.33179E-09	0	0	0.0026	Res	0.0177
582018.57_4130061.93	582018.57	4130061.93	1.92E-05	2.56E-08	1.54E-08	2.56E-08	1.80E-08	4.68E-08	1.10E-06	3.84E-08	2.21535E-10	2.0067E-09	0	0	0.0022	Res	0.0153
582075.14_4130061.93	582075.14	4130061.93	1.72E-05	2.27E-08	1.36E-08	2.27E-08	1.61E-08	4.14E-08	9.70E-07	3.39E-08	1.9885E-10	1.80122E-09	0	0	0.0020	Res	0.0137
582131.71_4130061.93	582131.71	4130061.93	1.67E-05	2.25E-08	1.35E-08	2.25E-08	1.58E-08	4.11E-08	9.63E-07	3.37E-08	1.93521E-10	1.75295E-09	0	0	0.0019	Res	0.0133
582188.28_4130061.93	582188.28	4130061.93	1.63E-05	2.22E-08	1.33E-08	2.22E-08	1.55E-08	4.07E-08	9.53E-07	3.34E-08	1.87997E-10	1.70291E-09	0	0	0.0019	Res	0.0129
582244.85_4130061.93	582244.85	4130061.93	1.58E-05	2.17E-08	1.30E-08	2.17E-08	1.51E-08	3.98E-08	9.32E-07	3.26E-08	1.82247E-10	1.65082E-09	0	0	0.0018	Res	0.0125
582301.42_4130061.93	582301.42	4130061.93	1.46E-05	2.00E-08	1.20E-08	2.00E-08	1.39E-08	3.66E-08	8.59E-07	3.01E-08	1.68982E-10	1.53066E-09	0	0	0.0017	Res	0.0117
582357.99_4130061.93	582357.99	4130061.93	1.36E-05	1.85E-08	1.11E-08	1.85E-08	1.29E-08	3.38E-08	7.91E-07	2.77E-08	1.5664E-10	1.41887E-09	0	0	0.0016	Res	0.0108
582414.56_4130061.93	582414.56	4130061.93	1.25E-05	1.68E-08	1.01E-08	1.68E-08	1.18E-08	3.08E-08	7.22E-07	2.53E-08	1.43918E-10	1.30363E-09	0	0	0.0014	Res	0.0099
582471.13_4130061.93	582471.13	4130061.93	1.13E-05	1.52E-08	9.12E-09	1.52E-08	1.07E-08	2.78E-08	6.52E-07	2.28E-08	1.31127E-10	1.18777E-09	0	0	0.0013	Res	0.0091
582527.7_4130061.93	582527.7	4130061.93	1.03E-05	1.37E-08	8.20E-09	1.37E-08	9.66E-09	2.50E-08	5.85E-07	2.05E-08	1.19042E-10	1.0783E-09	0	0	0.0012	Res	0.0082
582584.27_4130061.93	582584.27	4130061.93	9.36E-06	1.23E-08	7.38E-09	1.23E-08	8.74E-09	2.25E-08	5.26E-07	1.84E-08	1.08245E-10	9.80504E-10	0	0	0.0011	Res	0.0075
582640.84_4130061.93	582640.84	4130061.93	8.50E-06	1.10E-08	6.62E-09	1.10E-08	7.89E-09	2.01E-08	4.72E-07	1.65E-08	9.82424E-11	8.89896E-10	0	0	0.0010	Res	0.0068
582697.41_4130061.93	582697.41	4130061.93	7.74E-06	9.92E-09	5.95E-09	9.92E-09	7.15E-09	1.81E-08	4.24E-07	1.48E-08	8.95131E-11	8.10825E-10	0	0	0.0009	Res	0.0062
582753.98_4130061.93	582753.98	4130061.93	7.08E-06	8.96E-09	5.38E-09	8.96E-09	6.50E-09	1.63E-08	3.83E-07	1.34E-08	8.18414E-11	7.41333E-10	0	0	0.0008	Res	0.0056
582810.55_4130061.93	582810.55	4130061.93	6.47E-06	8.08E-09	4.85E-09	8.08E-09	5.91E-09	1.47E-08	3.45E-07	1.20E-08	7.48342E-11	6.77861E-10	0	0	0.0008	Res	0.0051
581962_4130145.84	581962	4130145.84	2.52E-05	3.64E-08	2.18E-08	3.64E-08	2.48E-08	6.67E-08	1.56E-06	5.49E-08	2.9122E-10	2.63792E-09	0	0	0.0029	Res	0.0200

Risk Calculation Part 2, $\sum R1*C_{TAC}$

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)								3rd Trimester	0<2	2<16	16<30	Cancer Risk - 2024	Receptor Type	Cancer Risk Total
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Cobalt	Lead	Nickel	Chromium VI					(per million)		(per million)
582018.57_4130145.84	582018.57	4130145.84	2.33E-05	3.35E-08	2.01E-08	3.35E-08	2.28E-08	6.14E-08	1.44E-06	5.05E-08	2.69324E-10	2.43958E-09	0	0	0.0027	Res	0.0185
582075.14_4130145.84	582075.14	4130145.84	2.00E-05	2.81E-08	1.69E-08	2.81E-08	1.93E-08	5.15E-08	1.21E-06	4.23E-08	2.31123E-10	2.09355E-09	0	0	0.0023	Res	0.0159
582131.71_4130145.84	582131.71	4130145.84	1.85E-05	2.61E-08	1.56E-08	2.61E-08	1.79E-08	4.77E-08	1.12E-06	3.92E-08	2.14207E-10	1.94033E-09	0	0	0.0022	Res	0.0148
582188.28_4130145.84	582188.28	4130145.84	1.77E-05	2.50E-08	1.50E-08	2.50E-08	1.71E-08	4.58E-08	1.07E-06	3.76E-08	2.05146E-10	1.85824E-09	0	0	0.0021	Res	0.0142
582244.85_4130145.84	582244.85	4130145.84	1.62E-05	2.27E-08	1.36E-08	2.27E-08	1.56E-08	4.15E-08	9.73E-07	3.41E-08	1.87282E-10	1.69643E-09	0	0	0.0019	Res	0.0130
582301.42_4130145.84	582301.42	4130145.84	1.47E-05	2.05E-08	1.23E-08	2.05E-08	1.41E-08	3.75E-08	8.78E-07	3.08E-08	1.70374E-10	1.54327E-09	0	0	0.0017	Res	0.0118
582357.99_4130145.84	582357.99	4130145.84	1.35E-05	1.85E-08	1.11E-08	1.85E-08	1.28E-08	3.39E-08	7.96E-07	2.79E-08	1.55584E-10	1.40931E-09	0	0	0.0016	Res	0.0108
582414.56_4130145.84	582414.56	4130145.84	1.23E-05	1.68E-08	1.01E-08	1.68E-08	1.16E-08	3.07E-08	7.19E-07	2.52E-08	1.41723E-10	1.28375E-09	0	0	0.0014	Res	0.0098
582471.13_4130145.84	582471.13	4130145.84	1.11E-05	1.50E-08	9.01E-09	1.50E-08	1.05E-08	2.75E-08	6.44E-07	2.25E-08	1.2824E-10	1.16162E-09	0	0	0.0013	Res	0.0089
582527.7_4130145.84	582527.7	4130145.84	9.97E-06	1.33E-08	8.01E-09	1.33E-08	9.38E-09	2.44E-08	5.72E-07	2.00E-08	1.15268E-10	1.04412E-09	0	0	0.0012	Res	0.0080
582584.27_4130145.84	582584.27	4130145.84	8.96E-06	1.18E-08	7.10E-09	1.18E-08	8.38E-09	2.16E-08	5.07E-07	1.77E-08	1.03515E-10	9.37654E-10	0	0	0.0010	Res	0.0072
582640.84_4130145.84	582640.84	4130145.84	8.08E-06	1.05E-08	6.32E-09	1.05E-08	7.51E-09	1.92E-08	4.51E-07	1.58E-08	9.33443E-11	8.45528E-10	0	0	0.0009	Res	0.0064
582697.41_4130145.84	582697.41	4130145.84	7.33E-06	9.43E-09	5.66E-09	9.43E-09	6.78E-09	1.72E-08	4.03E-07	1.41E-08	8.46838E-11	7.6708E-10	0	0	0.0009	Res	0.0058
582753.98_4130145.84	582753.98	4130145.84	6.70E-06	8.52E-09	5.11E-09	8.52E-09	6.16E-09	1.55E-08	3.64E-07	1.27E-08	7.74356E-11	7.01425E-10	0	0	0.0008	Res	0.0053
582810.55_4130145.84	582810.55	4130145.84	6.17E-06	7.75E-09	4.65E-09	7.75E-09	5.64E-09	1.41E-08	3.31E-07	1.16E-08	7.12874E-11	6.45733E-10	0	0	0.0007	Res	0.0049
582867.12_4130145.84	582867.12	4130145.84	5.49E-06	6.77E-09	4.06E-09	6.77E-09	4.99E-09	1.23E-08	2.89E-07	1.01E-08	6.35131E-11	5.75313E-10	0	0	0.0006	Res	0.0044
581962_4130229.75	581962	4130229.75	2.54E-05	3.67E-08	2.20E-08	3.67E-08	2.49E-08	6.72E-08	1.58E-06	5.53E-08	2.93726E-10	2.66062E-09	0	0	0.0030	Res	0.0203
582018.57_4130229.75	582018.57	4130229.75	2.42E-05	3.50E-08	2.10E-08	3.50E-08	2.37E-08	6.42E-08	1.51E-06	5.28E-08	2.79217E-10	2.5292E-09	0	0	0.0028	Res	0.0193
582075.14_4130229.75	582075.14	4130229.75	2.24E-05	3.23E-08	1.94E-08	3.23E-08	2.18E-08	5.92E-08	1.39E-06	4.87E-08	2.58677E-10	2.34314E-09	0	0	0.0026	Res	0.0179
582131.71_4130229.75	582131.71	4130229.75	2.02E-05	2.89E-08	1.73E-08	2.89E-08	1.96E-08	5.29E-08	1.24E-06	4.36E-08	2.33065E-10	2.11114E-09	0	0	0.0023	Res	0.0162
582188.28_4130229.75	582188.28	4130229.75	1.80E-05	2.56E-08	1.54E-08	2.56E-08	1.75E-08	4.70E-08	1.10E-06	3.86E-08	2.08453E-10	1.88821E-09	0	0	0.0021	Res	0.0145
582244.85_4130229.75	582244.85	4130229.75	1.62E-05	2.28E-08	1.37E-08	2.28E-08	1.56E-08	4.18E-08	9.80E-07	3.44E-08	1.87049E-10	1.69432E-09	0	0	0.0019	Res	0.0130
582301.42_4130229.75	582301.42	4130229.75	1.46E-05	2.04E-08	1.23E-08	2.04E-08	1.40E-08	3.74E-08	8.78E-07	3.08E-08	1.68863E-10	1.52959E-09	0	0	0.0017	Res	0.0117
582357.99_4130229.75	582357.99	4130229.75	1.32E-05	1.84E-08	1.10E-08	1.84E-08	1.26E-08	3.36E-08	7.88E-07	2.76E-08	1.52874E-10	1.38475E-09	0	0	0.0015	Res	0.0106
582414.56_4130229.75	582414.56	4130229.75	1.19E-05	1.63E-08	9.79E-09	1.63E-08	1.13E-08	2.99E-08	7.00E-07	2.45E-08	1.37186E-10	1.24266E-09	0	0	0.0014	Res	0.0095
582471.13_4130229.75	582471.13	4130229.75	1.06E-05	1.43E-08	8.61E-09	1.43E-08	9.99E-09	2.62E-08	6.15E-07	2.15E-08	1.2203E-10	1.10537E-09	0	0	0.0012	Res	0.0085
582527.7_4130229.75	582527.7	4130229.75	9.40E-06	1.26E-08	7.57E-09	1.26E-08	8.85E-09	2.31E-08	5.41E-07	1.89E-08	1.08642E-10	9.84098E-10	0	0	0.0011	Res	0.0075
582584.27_4130229.75	582584.27	4130229.75	8.41E-06	1.11E-08	6.68E-09	1.11E-08	7.87E-09	2.04E-08	4.77E-07	1.67E-08	9.72114E-11	8.80558E-10	0	0	0.0010	Res	0.0067
582640.84_4130229.75	582640.84	4130229.75	7.58E-06	9.91E-09	5.95E-09	9.91E-09	7.05E-09	1.81E-08	4.24E-07	1.48E-08	8.75946E-11	7.93447E-10	0	0	0.0009	Res	0.0061
582697.41_4130229.75	582697.41	4130229.75	6.91E-06	8.92E-09	5.35E-09	8.92E-09	6.40E-09	1.63E-08	3.82E-07	1.33E-08	7.98519E-11	7.23313E-10	0	0	0.0008	Res	0.0055
582753.98_4130229.75	582753.98	4130229.75	6.33E-06	8.08E-09	4.85E-09	8.08E-09	5.83E-09	1.48E-08	3.46E-07	1.21E-08	7.31784E-11	6.62862E-10	0	0	0.0007	Res	0.0051
582810.55_4130229.75	582810.55	4130229.75	5.86E-06	7.40E-09	4.44E-09	7.40E-09	5.37E-09	1.35E-08	3.16E-07	1.10E-08	6.76814E-11	6.1307E-10	0	0	0.0007	Res	0.0047
582867.12_4130229.75	582867.12	4130229.75	5.45E-06	6.83E-09	4.10E-09	6.83E-09	4.98E-09	1.24E-08	2.92E-07	1.02E-08	6.30432E-11	5.71056E-10	0	0	0.0006	Res	0.0043
582018.57_4130313.66	582018.57	4130313.66	2.57E-05	3.74E-08	2.25E-08	3.74E-08	2.52E-08	6.87E-08	1.61E-06	5.65E-08	2.96981E-10	2.69011E-09	0	0	0.0030	Res	0.0206
582075.14_4130313.66	582075.14	4130313.66	2.37E-05	3.44E-08	2.06E-08	3.44E-08	2.31E-08	6.30E-08	1.48E-06	5.19E-08	2.74009E-10	2.48202E-09	0	0	0.0028	Res	0.0191
582131.71_4130313.66	582131.71	4130313.66	2.08E-05	3.00E-08	1.80E-08	3.00E-08	2.02E-08	5.49E-08	1.29E-06	4.52E-08	2.40791E-10	2.18112E-09	0	0	0.0024	Res	0.0168
582188.28_4130313.66	582188.28	4130313.66	1.83E-05	2.61E-08	1.57E-08	2.61E-08	1.77E-08	4.78E-08	1.12E-06	3.93E-08	2.11536E-10	1.91613E-09	0	0	0.0021	Res	0.0147
582244.85_4130313.66	582244.85	4130313.66	1.62E-05	2.29E-08	1.38E-08	2.29E-08	1.56E-08	4.20E-08	9.86E-07	3.46E-08	1.8755E-10	1.69886E-09	0	0	0.0019	Res	0.0131
582301.42_4130313.66	582301.42	4130313.66	1.45E-05	2.03E-08	1.22E-08	2.03E-08	1.39E-08	3.72E-08	8.71E-07	3.05E-08	1.67277E-10	1.51523E-09	0	0	0.0017	Res	0.0116
582357.99_4130313.66	582357.99	4130313.66	1.28E-05	1.78E-08	1.07E-08	1.78E-08	1.22E-08	3.25E-08	7.62E-07	2.67E-08	1.47934E-10	1.34001E-09	0	0	0.0015	Res	0.0103
582414.56_4130313.66	582414.56	4130313.66	1.12E-05	1.54E-08	9.25E-09	1.54E-08	1.07E-08	2.82E-08	6.61E-07	2.32E-08	1.29958E-10	1.17718E-09	0	0	0.0013	Res	0.0090
582471.13_4130313.66	582471.13	4130313.66	9.90E-06	1.34E-08	8.05E-09	1.34E-08	9.35E-09	2.45E-08	5.75E-07	2.01E-08	1.14489E-10	1.03706E-09	0	0	0.0012	Res	0.0079
582527.7_4130313.66	582527.7	4130313.66	8.80E-06	1.18E-08	7.06E-09	1.18E-08	8.27E-09	2.15E-08	5.04E-07	1.77E-08	1.01752E-10	9.21689E-10	0	0	0.0010	Res	0.0071
582584.27_4130313.66	582584.27	4130313.66	7.89E-06	1.04E-08	6.25E-09	1.04E-08	7.37E-09	1.90E-08	4.46E-07	1.56E-08	9.11766E-11	8.25893E-10	0	0	0.0009	Res	0.0063
582640.84_4130313.66	582640.84	4130313.66	7.15E-06	9.33E-09	5.60E-09	9.33E-09	6.65E-09	1.70E-08	3.99E-07	1.40E-08	8.26262E-11	7.48443E-10	0	0	0.0008	Res	0.0057
582697.41_4130313.66	582697.41	4130313.66	6.53E-06	8.43E-09	5.06E-09	8.43E-09	6.04E-09	1.54E-08	3.61E-07	1.26E-08	7.54522E-11	6.83459E-10	0	0	0.0008	Res	0.0052
582753.98_4130313.66	582753.98	4130313.66	6.00E-06	7.67E-09	4.60E-09	7.67E-09	5.53E-09	1.40E-08	3.28E-07	1.15E-08	6.93463E-11	6.28151E-10	0	0	0.0007	Res	0.0048
582810.55_4130313.66	582810.55	4130313.66	5.53E-06	7.00E-09	4.20E-09	7.00E-09	5.08E-09	1.28E-08	2.99E-07	1.04E-08	6.39359E-11	5.79143E-10	0	0	0.0006	Res	0.0044
582867.12_4130313.66	582867.12	4130313.66	5.12E-06	6.42E-09	3.85E-09	6.42E-09	4.68E-09	1.17E-08	2.74E-07	9.57E-09	5.92003E-11	5.36247E-10	0	0	0.0006	Res	0.0041
581848.86_4130397.57	581848.86	4130397.57	3.49E-05	5.15E-08	3.09E-08	5.15E-08	3.44E-08	9.45E-08	2.22E-06	7.78E-08	4.02979E-10	3.65025E-09	0	0	0.0041	Res	0.0280
581905.43_4130397.57	581905.43	4130397.57	3.37E-05	4.99E-08	2.99E-08	4.99E-08	3.32E-08	9.16E-08	2.15E-06	7.54E-08	3.89462E-10	3.52782E-09	0	0	0.0039	Res	0.0271
581962_4130397.57	581962	4130397.57	3.17E-05	4.68E-08	2.81E-08	4.68E-08	3.12E-08	8.59E-08	2.02E-06	7.08E-08	3.66734E-10	3.32194E-09	0	0	0.0037	Res	0.0256
582018.57_4130397.57	582018.57	4130397.57	2.85E-05	4.17E-08	2.50E-08	4.17E-08	2.78E-08	7.65E-08	1.79E-06	6.30E-08	3.28894E-10	2.97918E-09	0	0	0.0033	Res	0.0230
582075.14_4130397.57	582075.14	4130397.57	2.50E-05	3.63E-08	2.18E-08	3.63E-08	2.43E-08	6.66E-08	1.56E-06	5.49E-08	2.88826E-10	2.61624E-09	0	0	0.0029	Res	0.0202
582131.71_4130397.57	582131.71	4130397.57	2.15E-05	3.10E-08	1.86E-08	3.10E-08	2.08E-08	5.68E-08	1.33E-06	4.67E-08	2.48444E-10	2.25045E-09	0	0	0.0025	Res	0.0174
582188.28_4130397.57	582188.28	4130397.57	1.87E-05	2.68E-08	1.61E-08	2.68E-08	1.81E-08	4.91E-08	1.15E-06	4.04E-08	2.16732E-10	1.9632E-09	0	0	0.0022	Res	0.0151
582244.85_4130397.57	582244.85	4130397.57	1.63E-05	2.30E-08	1.38E-08	2.30E-08	1.56E-08	4.21E-08	9.88E-07	3.46E-08	1.88041E-10	1.70331E-09	0	0	0.0019	Res	0.0131
582301.42_4130397.57	582301.42	4130397.57	1.41E-05	1.97E-08	1.18E-08	1.97E-08	1.35E-08	3.61E-08	8.46E-07	2.97E-08	1.63042E-10	1.47686E-09	0	0	0.0016	Res	0.0114
582357.99_4130397.57	582357.99	4130397.57	1.22E-05	1.68E-08	1.01E-08	1.68E-08	1.16E-08	3.07E-08	7.20E-07	2.52E-08	1.40658E-10	1.2741E-09	0	0	0.0014	Res	0.0098
582414.56_4130397.57	582414.56	4130397.57	1.06E-05	1.44E-08	8.66E-09	1.44E-08	1.00E-08	2.64E-08	6.19E-07	2.17E-08	1.2262E-10	1.11071E-09	0	0	0.0012	Res	0.0085
582471.13_4130397.57	582471.13	4130397.57	9.36E-06	1.26E-08	7.55E-09	1.26E-08	8.81E-09	2.30E-08	5.39E-07	1.89E-08	1.08209E-10	9.80179E-10	0	0	0.0011	Res	0.0075
582527.7_4130397.57	582527.7	4130397.57	8.34E-06	1.11E-08	6.64E-09	1.11E-08	7.81E-09	2.02E-08	4.74E-07	1.66E-08	9.64297E-11	8.73477E-10	0	0	0.0010	Res	0.0067
582584.27_4130397.57	582584.27	4130397.57	7.50E-06	9.84E-09	5.91E-09	9.84E-09	6.99E-09	1.80E-08	4.21E-07	1.47E-08	8.66957E-11	7.85305E-10	0	0	0.0009	Res	0.0060

Risk Calculation Part 2, $\sum R1*C_{TAC}$

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)								3rd Trimester	0<2	2<16	16<30	Cancer Risk - 2024	Receptor Type	Cancer Risk Total
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Cobalt	Lead	Nickel	Chromium VI					(per million)		(per million)
582640.84_4130397.57	582640.84	4130397.57	6.80E-06	8.82E-09	5.29E-09	8.82E-09	6.31E-09	1.61E-08	3.78E-07	1.32E-08	7.85757E-11	7.11752E-10	0	0	0.0008	Res	0.0054
582697.41_4130397.57	582697.41	4130397.57	6.17E-06	7.92E-09	4.75E-09	7.92E-09	5.70E-09	1.45E-08	3.39E-07	1.18E-08	7.13426E-11	6.46234E-10	0	0	0.0007	Res	0.0049
582753.98_4130397.57	582753.98	4130397.57	5.65E-06	7.17E-09	4.30E-09	7.17E-09	5.19E-09	1.31E-08	3.06E-07	1.07E-08	6.52697E-11	5.91224E-10	0	0	0.0007	Res	0.0045
582810.55_4130397.57	582810.55	4130397.57	5.19E-06	6.53E-09	3.92E-09	6.53E-09	4.76E-09	1.19E-08	2.79E-07	9.73E-09	6.00352E-11	5.4381E-10	0	0	0.0006	Res	0.0041
582867.12_4130397.57	582867.12	4130397.57	4.80E-06	5.97E-09	3.58E-09	5.97E-09	4.38E-09	1.09E-08	2.55E-07	8.89E-09	5.54431E-11	5.02214E-10	0	0	0.0006	Res	0.0038
581848.86_4130481.48	581848.86	4130481.48	4.39E-05	6.62E-08	3.97E-08	6.62E-08	4.35E-08	1.22E-07	2.85E-06	1.00E-07	5.07259E-10	4.59484E-09	0	0	0.0051	Res	0.0356
581905.43_4130481.48	581905.43	4130481.48	4.06E-05	6.08E-08	3.65E-08	6.08E-08	4.01E-08	1.12E-07	2.62E-06	9.21E-08	4.69506E-10	4.25287E-09	0	0	0.0047	Res	0.0330
581962_4130481.48	581962	4130481.48	3.48E-05	5.17E-08	3.10E-08	5.17E-08	3.42E-08	9.49E-08	2.23E-06	7.82E-08	4.01924E-10	3.6407E-09	0	0	0.0040	Res	0.0282
582018.57_4130481.48	582018.57	4130481.48	3.07E-05	4.52E-08	2.71E-08	4.52E-08	3.00E-08	8.30E-08	1.95E-06	6.84E-08	3.54375E-10	3.20999E-09	0	0	0.0036	Res	0.0249
582075.14_4130481.48	582075.14	4130481.48	2.60E-05	3.80E-08	2.28E-08	3.80E-08	2.54E-08	6.98E-08	1.64E-06	5.75E-08	3.00934E-10	2.72591E-09	0	0	0.0030	Res	0.0211
582131.71_4130481.48	582131.71	4130481.48	2.22E-05	3.21E-08	1.93E-08	3.21E-08	2.15E-08	5.89E-08	1.38E-06	4.85E-08	2.5669E-10	2.32514E-09	0	0	0.0026	Res	0.0180
582188.28_4130481.48	582188.28	4130481.48	1.89E-05	2.70E-08	1.62E-08	2.70E-08	1.82E-08	4.95E-08	1.16E-06	4.08E-08	2.18273E-10	1.97715E-09	0	0	0.0022	Res	0.0153
582244.85_4130481.48	582244.85	4130481.48	1.59E-05	2.24E-08	1.34E-08	2.24E-08	1.52E-08	4.10E-08	9.62E-07	3.37E-08	1.83375E-10	1.66104E-09	0	0	0.0018	Res	0.0128
582301.42_4130481.48	582301.42	4130481.48	1.34E-05	1.87E-08	1.12E-08	1.87E-08	1.28E-08	3.42E-08	8.02E-07	2.81E-08	1.55075E-10	1.4047E-09	0	0	0.0016	Res	0.0108
582357.99_4130481.48	582357.99	4130481.48	1.15E-05	1.58E-08	9.48E-09	1.58E-08	1.09E-08	2.89E-08	6.78E-07	2.37E-08	1.33186E-10	1.20642E-09	0	0	0.0013	Res	0.0093
582414.56_4130481.48	582414.56	4130481.48	1.01E-05	1.36E-08	8.18E-09	1.36E-08	9.50E-09	2.49E-08	5.84E-07	2.05E-08	1.16444E-10	1.05477E-09	0	0	0.0012	Res	0.0081
582471.13_4130481.48	582471.13	4130481.48	8.90E-06	1.19E-08	7.13E-09	1.19E-08	8.35E-09	2.17E-08	5.09E-07	1.78E-08	1.02912E-10	9.32196E-10	0	0	0.0010	Res	0.0071
582527.7_4130481.48	582527.7	4130481.48	7.92E-06	1.04E-08	6.26E-09	1.04E-08	7.39E-09	1.91E-08	4.47E-07	1.56E-08	9.15271E-11	8.29068E-10	0	0	0.0009	Res	0.0063
582584.27_4130481.48	582584.27	4130481.48	7.11E-06	9.24E-09	5.54E-09	9.24E-09	6.60E-09	1.69E-08	3.95E-07	1.38E-08	8.21312E-11	7.43958E-10	0	0	0.0008	Res	0.0057
582640.84_4130481.48	582640.84	4130481.48	6.40E-06	8.22E-09	4.93E-09	8.22E-09	5.92E-09	1.50E-08	3.52E-07	1.23E-08	7.4006E-11	6.70359E-10	0	0	0.0007	Res	0.0051
582697.41_4130481.48	582697.41	4130481.48	5.81E-06	7.37E-09	4.42E-09	7.37E-09	5.35E-09	1.34E-08	3.15E-07	1.10E-08	6.71642E-11	6.08384E-10	0	0	0.0007	Res	0.0046
582753.98_4130481.48	582753.98	4130481.48	5.32E-06	6.68E-09	4.01E-09	6.68E-09	4.88E-09	1.22E-08	2.85E-07	9.95E-09	6.15117E-11	5.57184E-10	0	0	0.0006	Res	0.0042
582810.55_4130481.48	582810.55	4130481.48	4.90E-06	6.09E-09	3.65E-09	6.09E-09	4.48E-09	1.11E-08	2.60E-07	9.07E-09	5.66903E-11	5.1351E-10	0	0	0.0006	Res	0.0039
582867.12_4130481.48	582867.12	4130481.48	4.54E-06	5.59E-09	3.35E-09	5.59E-09	4.13E-09	1.02E-08	2.38E-07	8.31E-09	5.25091E-11	4.75636E-10	0	0	0.0005	Res	0.0036
581735.72_4130565.39	581735.72	4130565.39	5.30E-05	8.13E-08	4.88E-08	8.13E-08	5.31E-08	1.49E-07	3.51E-06	1.23E-07	6.12184E-10	5.54527E-09	0	0	0.0062	Res	0.0429
581792.29_4130565.39	581792.29	4130565.39	5.19E-05	7.93E-08	4.76E-08	7.93E-08	5.18E-08	1.46E-07	3.42E-06	1.20E-07	6.00295E-10	5.43757E-09	0	0	0.0060	Res	0.0422
581848.86_4130565.39	581848.86	4130565.39	4.93E-05	7.49E-08	4.49E-08	7.49E-08	4.89E-08	1.38E-07	3.23E-06	1.13E-07	5.69768E-10	5.16106E-09	0	0	0.0057	Res	0.0401
581905.43_4130565.39	581905.43	4130565.39	4.70E-05	7.10E-08	4.26E-08	7.10E-08	4.64E-08	1.30E-07	3.06E-06	1.08E-07	5.42758E-10	4.9164E-09	0	0	0.0055	Res	0.0383
581962_4130565.39	581962	4130565.39	4.06E-05	6.10E-08	3.66E-08	6.10E-08	4.00E-08	1.12E-07	2.63E-06	9.24E-08	4.69281E-10	4.25082E-09	0	0	0.0047	Res	0.0331
582018.57_4130565.39	582018.57	4130565.39	3.30E-05	4.92E-08	2.95E-08	4.92E-08	3.24E-08	9.03E-08	2.12E-06	7.45E-08	3.81754E-10	3.45799E-09	0	0	0.0038	Res	0.0269
582075.14_4130565.39	582075.14	4130565.39	2.70E-05	3.98E-08	2.39E-08	3.98E-08	2.64E-08	7.31E-08	1.71E-06	6.02E-08	3.11981E-10	2.82597E-09	0	0	0.0031	Res	0.0220
582131.71_4130565.39	582131.71	4130565.39	2.23E-05	3.25E-08	1.95E-08	3.25E-08	2.17E-08	5.97E-08	1.40E-06	4.91E-08	2.57689E-10	2.33419E-09	0	0	0.0026	Res	0.0181
582188.28_4130565.39	582188.28	4130565.39	1.81E-05	2.60E-08	1.56E-08	2.60E-08	1.75E-08	4.77E-08	1.12E-06	3.93E-08	2.09184E-10	1.89482E-09	0	0	0.0021	Res	0.0147
582244.85_4130565.39	582244.85	4130565.39	1.49E-05	2.10E-08	1.26E-08	2.10E-08	1.43E-08	3.86E-08	9.05E-07	3.17E-08	1.71888E-10	1.55699E-09	0	0	0.0017	Res	0.0120
582301.42_4130565.39	582301.42	4130565.39	1.26E-05	1.76E-08	1.06E-08	1.76E-08	1.21E-08	3.23E-08	7.57E-07	2.65E-08	1.46152E-10	1.32387E-09	0	0	0.0015	Res	0.0102
582357.99_4130565.39	582357.99	4130565.39	1.08E-05	1.49E-08	8.91E-09	1.49E-08	1.03E-08	2.72E-08	6.37E-07	2.23E-08	1.25129E-10	1.13344E-09	0	0	0.0013	Res	0.0087
582414.56_4130565.39	582414.56	4130565.39	9.41E-06	1.27E-08	7.62E-09	1.27E-08	8.88E-09	2.32E-08	5.45E-07	1.91E-08	1.08736E-10	9.84946E-10	0	0	0.0011	Res	0.0075
582471.13_4130565.39	582471.13	4130565.39	8.28E-06	1.10E-08	6.60E-09	1.10E-08	7.77E-09	2.01E-08	4.71E-07	1.65E-08	9.57169E-11	8.6702E-10	0	0	0.0010	Res	0.0066
582527.7_4130565.39	582527.7	4130565.39	7.36E-06	9.64E-09	5.78E-09	9.64E-09	6.87E-09	1.76E-08	4.13E-07	1.44E-08	8.51316E-11	7.71137E-10	0	0	0.0009	Res	0.0059
582584.27_4130565.39	582584.27	4130565.39	6.63E-06	8.55E-09	5.13E-09	8.55E-09	6.15E-09	1.56E-08	3.66E-07	1.28E-08	7.66192E-11	6.9403E-10	0	0	0.0008	Res	0.0053
582640.84_4130565.39	582640.84	4130565.39	5.98E-06	7.60E-09	4.56E-09	7.60E-09	5.51E-09	1.39E-08	3.25E-07	1.13E-08	6.91294E-11	6.26186E-10	0	0	0.0007	Res	0.0048
582697.41_4130565.39	582697.41	4130565.39	5.46E-06	6.85E-09	4.11E-09	6.85E-09	5.01E-09	1.25E-08	2.93E-07	1.02E-08	6.31427E-11	5.71957E-10	0	0	0.0006	Res	0.0043
582753.98_4130565.39	582753.98	4130565.39	5.03E-06	6.23E-09	3.74E-09	6.23E-09	4.59E-09	1.14E-08	2.66E-07	9.28E-09	5.81201E-11	5.26462E-10	0	0	0.0006	Res	0.0040
582810.55_4130565.39	582810.55	4130565.39	4.67E-06	5.72E-09	3.43E-09	5.72E-09	4.24E-09	1.04E-08	2.44E-07	8.52E-09	5.39354E-11	4.88556E-10	0	0	0.0005	Res	0.0037
582867.12_4130565.39	582867.12	4130565.39	4.36E-06	5.30E-09	3.18E-09	5.30E-09	3.95E-09	9.64E-09	2.26E-07	7.87E-09	5.03578E-11	4.56149E-10	0	0	0.0005	Res	0.0034
581735.72_4130649.3	581735.72	4130649.3	5.67E-05	8.68E-08	5.21E-08	8.68E-08	5.65E-08	1.59E-07	3.74E-06	1.32E-07	6.55301E-10	5.93583E-09	0	0	0.0066	Res	0.0462
581792.29_4130649.3	581792.29	4130649.3	5.48E-05	8.36E-08	5.02E-08	8.36E-08	5.44E-08	1.54E-07	3.61E-06	1.27E-07	6.32936E-10	5.73324E-09	0	0	0.0064	Res	0.0447
581905.43_4130649.3	581905.43	4130649.3	5.45E-05	8.29E-08	4.98E-08	8.29E-08	5.39E-08	1.52E-07	3.58E-06	1.26E-07	6.29618E-10	5.70319E-09	0	0	0.0063	Res	0.0446
581962_4130649.3	581962	4130649.3	4.53E-05	6.86E-08	4.12E-08	6.86E-08	4.47E-08	1.26E-07	2.96E-06	1.04E-07	5.23807E-10	4.74474E-09	0	0	0.0053	Res	0.0371
582018.57_4130649.3	582018.57	4130649.3	3.46E-05	5.20E-08	3.12E-08	5.20E-08	3.41E-08	9.56E-08	2.24E-06	7.89E-08	4.0016E-10	3.62472E-09	0	0	0.0040	Res	0.0283
582075.14_4130649.3	582075.14	4130649.3	2.71E-05	4.03E-08	2.42E-08	4.03E-08	2.65E-08	7.40E-08	1.74E-06	6.10E-08	3.12833E-10	2.8337E-09	0	0	0.0031	Res	0.0221
582131.71_4130649.3	582131.71	4130649.3	2.12E-05	3.12E-08	1.87E-08	3.12E-08	2.07E-08	5.73E-08	1.34E-06	4.72E-08	2.45179E-10	2.22087E-09	0	0	0.0025	Res	0.0172
582188.28_4130649.3	582188.28	4130649.3	1.69E-05	2.45E-08	1.47E-08	2.45E-08	1.64E-08	4.49E-08	1.05E-06	3.70E-08	1.94901E-10	1.76545E-09	0	0	0.0020	Res	0.0137
582244.85_4130649.3	582244.85	4130649.3	1.37E-05	1.96E-08	1.18E-08	1.96E-08	1.33E-08	3.59E-08	8.42E-07	2.95E-08	1.58565E-10	1.43631E-09	0	0	0.0016	Res	0.0111
582301.42_4130649.3	582301.42	4130649.3	1.15E-05	1.61E-08	9.65E-09	1.61E-08	1.10E-08	2.95E-08	6.91E-07	2.42E-08	1.32486E-10	1.20008E-09	0	0	0.0013	Res	0.0092
582357.99_4130649.3	582357.99	4130649.3	9.81E-06	1.35E-08	8.12E-09	1.35E-08	9.36E-09	2.48E-08	5.81E-07	2.03E-08	1.13412E-10	1.0273E-09	0	0	0.0011	Res	0.0079
582414.56_4130649.3	582414.56	4130649.3	8.57E-06	1.16E-08	6.97E-09	1.16E-08	8.12E-09	2.12E-08	4.98E-07	1.74E-08	9.90679E-11	8.97374E-10	0	0	0.0010	Res	0.0069
582471.13_4130649.3	582471.13	4130649.3	7.56E-06	1.01E-08	6.04E-09	1.01E-08	7.11E-09	1.84E-08	4.31E-07	1.51E-08	8.73772E-11	7.91478E-10	0	0	0.0009	Res	0.0060
582527.7_4130649.3	582527.7	4130649.3	6.76E-06	8.85E-09	5.31E-09	8.85E-09	6.31E-09	1.62E-08	3.79E-07	1.32E-08	7.81499E-11	7.07895E-10	0	0	0.0008	Res	0.0054
582584.27_4130649.3	582584.27	4130649.3	6.13E-06	7.89E-09	4.73E-09	7.89E-09	5.69E-09	1.44E-08	3.37E-07	1.18E-08	7.08108E-11	6.41416E-10	0	0	0.0007	Res	0.0049
582640.84_4130649.3	582640.84	4130649.3	5.61E-06	7.12E-09	4.27E-09	7.12E-09	5.18E-09	1.30E-08	3.04E-07	1.06E-08	6.48884E-11	5.8777E-10	0	0	0.0007	Res	0.0045
582697.41_4130649.3	582697.41	4130649.3	5.19E-06	6.50E-09	3.90E-09	6.50E-09	4.76E-09	1.18E-08	2.77E-07	9.68E-09	5.99633E-11	5.43157E-10	0	0	0.0006	Res	0.0041
582753.98_4130649.3	582753.98	4130649.3	4.84E-06	5.99E-09	3.60E-09	5.99E-09	4.42E-09	1.09E-08	2.56E-07	8.92E-09	5.59409E-11	5.06722E-10	0	0	0.0006	Res	0.0038

Risk Calculation Part 2, $\sum R1*C_{TAC}$

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)								3rd Trimester	0<2	2<16	16<30	Cancer Risk - 2024	Receptor Type	Cancer Risk Total
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Cobalt	Lead	Nickel	Chromium VI					(per million)		(per million)
582810.55_4130649.3	582810.55	4130649.3	4.55E-06	5.58E-09	3.35E-09	5.58E-09	4.14E-09	1.02E-08	2.38E-07	8.30E-09	5.25911E-11	4.7638E-10	0	0	0.0005	Res	0.0036
582867.12_4130649.3	582867.12	4130649.3	4.29E-06	5.21E-09	3.13E-09	5.21E-09	3.89E-09	9.49E-09	2.22E-07	7.75E-09	4.9579E-11	4.49095E-10	0	0	0.0005	Res	0.0034
581848.86_4130733.21	581848.86	4130733.21	8.03E-05	1.23E-07	7.39E-08	1.23E-07	7.96E-08	2.27E-07	5.32E-06	1.87E-07	9.28429E-10	8.40987E-09	0	0	0.0093	Res	0.0660
581905.43_4130733.21	581905.43	4130733.21	6.86E-05	1.05E-07	6.30E-08	1.05E-07	6.79E-08	1.93E-07	4.53E-06	1.59E-07	7.92803E-10	7.18135E-09	0	0	0.0080	Res	0.0564
581962_4130733.21	581962	4130733.21	5.06E-05	7.71E-08	4.63E-08	7.71E-08	5.00E-08	1.42E-07	3.33E-06	1.17E-07	5.84871E-10	5.29786E-09	0	0	0.0059	Res	0.0415
582018.57_4130733.21	582018.57	4130733.21	3.57E-05	5.41E-08	3.24E-08	5.41E-08	3.52E-08	9.94E-08	2.33E-06	8.20E-08	4.12759E-10	3.73884E-09	0	0	0.0042	Res	0.0292
582075.14_4130733.21	582075.14	4130733.21	2.54E-05	3.82E-08	2.29E-08	3.82E-08	2.51E-08	7.01E-08	1.65E-06	5.78E-08	2.94127E-10	2.66425E-09	0	0	0.0030	Res	0.0208
582131.71_4130733.21	582131.71	4130733.21	1.88E-05	2.78E-08	1.67E-08	2.78E-08	1.84E-08	5.11E-08	1.20E-06	4.21E-08	2.17194E-10	1.96738E-09	0	0	0.0022	Res	0.0153
582188.28_4130733.21	582188.28	4130733.21	1.47E-05	2.15E-08	1.29E-08	2.15E-08	1.44E-08	3.94E-08	9.25E-07	3.25E-08	1.69989E-10	1.53979E-09	0	0	0.0017	Res	0.0119
582244.85_4130733.21	582244.85	4130733.21	1.19E-05	1.72E-08	1.03E-08	1.72E-08	1.16E-08	3.15E-08	7.39E-07	2.59E-08	1.38066E-10	1.25063E-09	0	0	0.0014	Res	0.0096
582301.42_4130733.21	582301.42	4130733.21	1.00E-05	1.42E-08	8.52E-09	1.42E-08	9.69E-09	2.60E-08	6.10E-07	2.14E-08	1.15972E-10	1.05049E-09	0	0	0.0012	Res	0.0081
582357.99_4130733.21	582357.99	4130733.21	8.66E-06	1.20E-08	7.23E-09	1.20E-08	8.30E-09	2.20E-08	5.17E-07	1.81E-08	1.00056E-10	9.06323E-10	0	0	0.0010	Res	0.0069
582414.56_4130733.21	582414.56	4130733.21	7.63E-06	1.04E-08	6.26E-09	1.04E-08	7.27E-09	1.91E-08	4.48E-07	1.57E-08	8.82174E-11	7.99088E-10	0	0	0.0009	Res	0.0061
582471.13_4130733.21	582471.13	4130733.21	6.86E-06	9.23E-09	5.54E-09	9.23E-09	6.49E-09	1.69E-08	3.95E-07	1.38E-08	7.93152E-11	7.18451E-10	0	0	0.0008	Res	0.0055
582527.7_4130733.21	582527.7	4130733.21	6.26E-06	8.29E-09	4.97E-09	8.29E-09	5.89E-09	1.51E-08	3.55E-07	1.24E-08	7.23864E-11	6.55688E-10	0	0	0.0007	Res	0.0050
582584.27_4130733.21	582584.27	4130733.21	5.79E-06	7.55E-09	4.53E-09	7.55E-09	5.40E-09	1.38E-08	3.23E-07	1.13E-08	6.68793E-11	6.05804E-10	0	0	0.0007	Res	0.0046
582640.84_4130733.21	582640.84	4130733.21	5.39E-06	6.94E-09	4.17E-09	6.94E-09	5.01E-09	1.27E-08	2.97E-07	1.04E-08	6.2343E-11	5.64714E-10	0	0	0.0006	Res	0.0043
582697.41_4130733.21	582697.41	4130733.21	5.06E-06	6.43E-09	3.86E-09	6.43E-09	4.67E-09	1.17E-08	2.75E-07	9.60E-09	5.8504E-11	5.2994E-10	0	0	0.0006	Res	0.0040
582753.98_4130733.21	582753.98	4130733.21	4.77E-06	5.99E-09	3.60E-09	5.99E-09	4.38E-09	1.09E-08	2.56E-07	8.94E-09	5.51364E-11	4.99435E-10	0	0	0.0006	Res	0.0038
582810.55_4130733.21	582810.55	4130733.21	4.53E-06	5.63E-09	3.38E-09	5.63E-09	4.14E-09	1.03E-08	2.40E-07	8.39E-09	5.2327E-11	4.73987E-10	0	0	0.0005	Res	0.0036
582867.12_4130733.21	582867.12	4130733.21	4.30E-06	5.29E-09	3.17E-09	5.29E-09	3.91E-09	9.64E-09	2.26E-07	7.87E-09	4.96477E-11	4.49718E-10	0	0	0.0005	Res	0.0034
581735.72_4130817.12	581735.72	4130817.12	1.18E-04	1.81E-07	1.09E-07	1.81E-07	1.17E-07	3.34E-07	7.83E-06	2.76E-07	1.36141E-09	1.23319E-08	0	0	0.0137	Res	0.0969
581792.29_4130817.12	581792.29	4130817.12	1.32E-04	2.04E-07	1.22E-07	2.04E-07	1.31E-07	3.75E-07	8.80E-06	3.10E-07	1.53114E-09	1.38693E-08	0	0	0.0154	Res	0.1092
581848.86_4130817.12	581848.86	4130817.12	1.19E-04	1.83E-07	1.10E-07	1.83E-07	1.18E-07	3.36E-07	7.89E-06	2.77E-07	1.37331E-09	1.24397E-08	0	0	0.0138	Res	0.0979
581905.43_4130817.12	581905.43	4130817.12	9.00E-05	1.38E-07	8.28E-08	1.38E-07	8.90E-08	2.54E-07	5.96E-06	2.10E-07	1.0401E-09	9.42136E-09	0	0	0.0105	Res	0.0741
581962_4130817.12	581962	4130817.12	5.49E-05	8.39E-08	5.03E-08	8.39E-08	5.43E-08	1.54E-07	3.62E-06	1.27E-07	6.34283E-10	5.74544E-09	0	0	0.0064	Res	0.0451
582018.57_4130817.12	582018.57	4130817.12	3.32E-05	5.03E-08	3.02E-08	5.03E-08	3.28E-08	9.25E-08	2.17E-06	7.63E-08	3.83257E-10	3.47161E-09	0	0	0.0039	Res	0.0271
582075.14_4130817.12	582075.14	4130817.12	2.17E-05	3.26E-08	1.96E-08	3.26E-08	2.14E-08	5.99E-08	1.41E-06	4.94E-08	2.50885E-10	2.27256E-09	0	0	0.0025	Res	0.0177
582131.71_4130817.12	582131.71	4130817.12	1.58E-05	2.35E-08	1.41E-08	2.35E-08	1.56E-08	4.31E-08	1.01E-06	3.55E-08	1.82731E-10	1.65521E-09	0	0	0.0018	Res	0.0128
582188.28_4130817.12	582188.28	4130817.12	1.24E-05	1.82E-08	1.09E-08	1.82E-08	1.22E-08	3.34E-08	7.83E-07	2.75E-08	1.43369E-10	1.29866E-09	0	0	0.0014	Res	0.0100
582244.85_4130817.12	582244.85	4130817.12	1.03E-05	1.48E-08	8.90E-09	1.48E-08	1.00E-08	2.72E-08	6.38E-07	2.24E-08	1.18543E-10	1.07378E-09	0	0	0.0012	Res	0.0083
582301.42_4130817.12	582301.42	4130817.12	8.83E-06	1.26E-08	7.56E-09	1.26E-08	8.58E-09	2.31E-08	5.42E-07	1.90E-08	1.02075E-10	9.24616E-10	0	0	0.0010	Res	0.0071
582357.99_4130817.12	582357.99	4130817.12	7.82E-06	1.10E-08	6.61E-09	1.10E-08	7.55E-09	2.02E-08	4.73E-07	1.66E-08	9.04123E-11	8.1897E-10	0	0	0.0009	Res	0.0063
582414.56_4130817.12	582414.56	4130817.12	7.06E-06	9.81E-09	5.88E-09	9.81E-09	6.78E-09	1.79E-08	4.21E-07	1.47E-08	8.15813E-11	7.38977E-10	0	0	0.0008	Res	0.0057
582471.13_4130817.12	582471.13	4130817.12	6.47E-06	8.88E-09	5.33E-09	8.88E-09	6.18E-09	1.62E-08	3.81E-07	1.33E-08	7.48359E-11	6.77876E-10	0	0	0.0008	Res	0.0052
582527.7_4130817.12	582527.7	4130817.12	5.98E-06	8.09E-09	4.86E-09	8.09E-09	5.68E-09	1.48E-08	3.47E-07	1.21E-08	6.91453E-11	6.2633E-10	0	0	0.0007	Res	0.0048
582584.27_4130817.12	582584.27	4130817.12	5.58E-06	7.45E-09	4.47E-09	7.45E-09	5.26E-09	1.36E-08	3.19E-07	1.12E-08	6.4505E-11	5.84297E-10	0	0	0.0006	Res	0.0045
582640.84_4130817.12	582640.84	4130817.12	5.24E-06	6.90E-09	4.14E-09	6.90E-09	4.91E-09	1.26E-08	2.95E-07	1.03E-08	6.05348E-11	5.48335E-10	0	0	0.0006	Res	0.0042
582697.41_4130817.12	582697.41	4130817.12	4.93E-06	6.42E-09	3.85E-09	6.42E-09	4.60E-09	1.17E-08	2.75E-07	9.61E-09	5.70443E-11	5.16717E-10	0	0	0.0006	Res	0.0039
582753.98_4130817.12	582753.98	4130817.12	4.66E-06	5.98E-09	3.59E-09	5.98E-09	4.32E-09	1.09E-08	2.56E-07	8.94E-09	5.38211E-11	4.8752E-10	0	0	0.0005	Res	0.0037
582810.55_4130817.12	582810.55	4130817.12	4.41E-06	5.60E-09	3.36E-09	5.60E-09	4.07E-09	1.02E-08	2.39E-07	8.36E-09	5.10053E-11	4.62014E-10	0	0	0.0005	Res	0.0035
582867.12_4130817.12	582867.12	4130817.12	4.20E-06	5.27E-09	3.16E-09	5.27E-09	3.85E-09	9.60E-09	2.25E-07	7.85E-09	4.84931E-11	4.39259E-10	0	0	0.0005	Res	0.0033
581735.72_4130901.03	581735.72	4130901.03	2.32E-04	3.58E-07	2.15E-07	3.58E-07	2.30E-07	6.59E-07	1.55E-05	5.44E-07	2.68634E-09	2.43333E-08	0	0	0.0270	Res	0.1919
581792.29_4130901.03	581792.29	4130901.03	2.48E-04	3.82E-07	2.29E-07	3.82E-07	2.45E-07	7.02E-07	1.65E-05	5.80E-07	2.86553E-09	2.59565E-08	0	0	0.0288	Res	0.2049
581848.86_4130901.03	581848.86	4130901.03	2.21E-04	3.40E-07	2.04E-07	3.40E-07	2.18E-07	6.26E-07	1.47E-05	5.17E-07	2.55385E-09	2.31332E-08	0	0	0.0257	Res	0.1826
581905.43_4130901.03	581905.43	4130901.03	1.16E-04	1.79E-07	1.07E-07	1.79E-07	1.15E-07	3.29E-07	7.72E-06	2.72E-07	1.34542E-09	1.21871E-08	0	0	0.0135	Res	0.0961
581962_4130901.03	581962	4130901.03	4.77E-05	7.28E-08	4.37E-08	7.28E-08	4.71E-08	1.34E-07	3.14E-06	1.10E-07	5.51434E-10	4.99498E-09	0	0	0.0055	Res	0.0392
582018.57_4130901.03	582018.57	4130901.03	2.59E-05	3.91E-08	2.35E-08	3.91E-08	2.56E-08	7.19E-08	1.69E-06	5.93E-08	2.99498E-10	2.71291E-09	0	0	0.0030	Res	0.0212
582075.14_4130901.03	582075.14	4130901.03	1.76E-05	2.63E-08	1.58E-08	2.63E-08	1.73E-08	4.83E-08	1.13E-06	3.98E-08	2.03203E-10	1.84065E-09	0	0	0.0020	Res	0.0143
582131.71_4130901.03	582131.71	4130901.03	1.36E-05	2.01E-08	1.21E-08	2.01E-08	1.34E-08	3.69E-08	8.66E-07	3.04E-08	1.56886E-10	1.4211E-09	0	0	0.0016	Res	0.0110
582188.28_4130901.03	582188.28	4130901.03	1.12E-05	1.64E-08	9.86E-09	1.64E-08	1.10E-08	3.01E-08	7.07E-07	2.48E-08	1.29437E-10	1.17247E-09	0	0	0.0013	Res	0.0090
582244.85_4130901.03	582244.85	4130901.03	9.58E-06	1.39E-08	8.35E-09	1.39E-08	9.37E-09	2.55E-08	5.99E-07	2.10E-08	1.10725E-10	1.00296E-09	0	0	0.0011	Res	0.0077
582301.42_4130901.03	582301.42	4130901.03	8.38E-06	1.21E-08	7.24E-09	1.21E-08	8.16E-09	2.21E-08	5.18E-07	1.82E-08	9.68557E-11	8.77335E-10	0	0	0.0010	Res	0.0067
582357.99_4130901.03	582357.99	4130901.03	7.46E-06	1.06E-08	6.38E-09	1.06E-08	7.24E-09	1.95E-08	4.57E-07	1.60E-08	8.62783E-11	7.81524E-10	0	0	0.0009	Res	0.0060
582414.56_4130901.03	582414.56	4130901.03	6.73E-06	9.48E-09	5.69E-09	9.48E-09	6.50E-09	1.74E-08	4.07E-07	1.43E-08	7.77884E-11	7.04621E-10	0	0	0.0008	Res	0.0054
582471.13_4130901.03	582471.13	4130901.03	6.14E-06	8.56E-09	5.14E-09	8.56E-09	5.90E-09	1.57E-08	3.67E-07	1.29E-08	7.10079E-11	6.43202E-10	0	0	0.0007	Res	0.0049
582527.7_4130901.03	582527.7	4130901.03	5.65E-06	7.79E-09	4.67E-09	7.79E-09	5.41E-09	1.42E-08	3.34E-07	1.17E-08	6.5349E-11	5.91942E-10	0	0	0.0007	Res	0.0045
582584.27_4130901.03	582584.27	4130901.03	5.26E-06	7.15E-09	4.29E-09	7.15E-09	5.00E-09	1.31E-08	3.07E-07	1.07E-08	6.07622E-11	5.50395E-10	0	0	0.0006	Res	0.0042
582640.84_4130901.03	582640.84	4130901.03	4.92E-06	6.62E-09	3.97E-09	6.62E-09	4.66E-09	1.21E-08	2.84E-07	9.92E-09	5.69161E-11	5.15556E-10	0	0	0.0006	Res	0.0039
582697.41_4130901.03	582697.41	4130901.03	4.64E-06	6.16E-09	3.69E-09	6.16E-09	4.36E-09	1.12E-08	2.64E-07	9.22E-09	5.35942E-11	4.85465E-10	0	0	0.0005	Res	0.0037
582753.98_4130901.03	582753.98	4130901.03	4.38E-06	5.75E-09	3.45E-09	5.75E-09	4.10E-09	1.05E-08	2.46E-07	8.60E-09	5.06811E-11	4.59078E-10	0	0	0.0005	Res	0.0035
582810.55_4130901.03	582810.55	4130901.03	4.16E-06	5.38E-09	3.23E-09	5.38E-09	3.87E-09	9.82E-09	2.30E-07	8.04E-09	4.80341E-11	4.35101E-10	0	0	0.0005	Res	0.0033
582867.12_4130901.03	582867.12	4130901.03	3.96E-06	5.06E-09	3.04E-09	5.06E-09	3.66E-09	9.23E-09	2.16E-07	7.56E-09	4.57516E-11	4.14426E-10	0	0	0.0005	Res	0.0031

Risk Calculation Part 2, $\sum R1*C_{TAC}$

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)								3rd Trimester	0<2	2<16	16<30	Cancer Risk - 2024	Receptor Type	Cancer Risk Total
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Cobalt	Lead	Nickel	Chromium VI					(per million)		(per million)
581735.72_4130984.94	581735.72	4130984.94	6.17E-04	9.51E-07	5.71E-07	9.51E-07	6.09E-07	1.75E-06	4.11E-05	1.45E-06	7.13195E-09	6.46025E-08	0	0	0.0717	Res	0.5107
581792.29_4130984.94	581792.29	4130984.94	8.09E-04	1.25E-06	7.49E-07	1.25E-06	7.99E-07	2.30E-06	5.39E-05	1.90E-06	9.35711E-09	8.47583E-08	0	0	0.0941	Res	0.6703
581848.86_4130984.94	581848.86	4130984.94	9.41E-04	1.45E-06	8.71E-07	1.45E-06	9.30E-07	2.67E-06	6.27E-05	2.21E-06	1.08825E-08	9.85757E-08	0	0	0.1095	Res	0.7797
581905.43_4130984.94	581905.43	4130984.94	7.57E-05	1.16E-07	6.96E-08	1.16E-07	7.48E-08	2.13E-07	5.01E-06	1.76E-07	8.75486E-10	7.9303E-09	0	0	0.0088	Res	0.0624
581962_4130984.94	581962	4130984.94	3.29E-05	4.99E-08	3.00E-08	4.99E-08	3.25E-08	9.18E-08	2.15E-06	7.57E-08	3.80594E-10	3.44748E-09	0	0	0.0038	Res	0.0270
582018.57_4130984.94	582018.57	4130984.94	2.14E-05	3.22E-08	1.93E-08	3.22E-08	2.11E-08	5.91E-08	1.39E-06	4.87E-08	2.47455E-10	2.24149E-09	0	0	0.0025	Res	0.0175
582075.14_4130984.94	582075.14	4130984.94	1.59E-05	2.37E-08	1.42E-08	2.37E-08	1.56E-08	4.35E-08	1.02E-06	3.58E-08	1.83827E-10	1.66513E-09	0	0	0.0018	Res	0.0129
582131.71_4130984.94	582131.71	4130984.94	1.27E-05	1.87E-08	1.12E-08	1.87E-08	1.24E-08	3.42E-08	8.03E-07	2.82E-08	1.4625E-10	1.32476E-09	0	0	0.0015	Res	0.0103
582188.28_4130984.94	582188.28	4130984.94	1.05E-05	1.53E-08	9.19E-09	1.53E-08	1.03E-08	2.81E-08	6.59E-07	2.31E-08	1.21119E-10	1.09712E-09	0	0	0.0012	Res	0.0085
582244.85_4130984.94	582244.85	4130984.94	8.93E-06	1.29E-08	7.76E-09	1.29E-08	8.71E-09	2.37E-08	5.57E-07	1.95E-08	1.03201E-10	9.34812E-10	0	0	0.0010	Res	0.0072
582301.42_4130984.94	582301.42	4130984.94	7.78E-06	1.12E-08	6.70E-09	1.12E-08	7.56E-09	2.05E-08	4.80E-07	1.69E-08	8.98774E-11	8.14125E-10	0	0	0.0009	Res	0.0063
582357.99_4130984.94	582357.99	4130984.94	6.89E-06	9.82E-09	5.89E-09	9.82E-09	6.68E-09	1.80E-08	4.22E-07	1.48E-08	7.96769E-11	7.21727E-10	0	0	0.0008	Res	0.0055
582414.56_4130984.94	582414.56	4130984.94	6.19E-06	8.75E-09	5.25E-09	8.75E-09	5.98E-09	1.60E-08	3.76E-07	1.32E-08	7.16072E-11	6.48631E-10	0	0	0.0007	Res	0.0050
582471.13_4130984.94	582471.13	4130984.94	5.63E-06	7.88E-09	4.73E-09	7.88E-09	5.42E-09	1.44E-08	3.38E-07	1.19E-08	6.50924E-11	5.89618E-10	0	0	0.0007	Res	0.0045
582527.7_4130984.94	582527.7	4130984.94	5.17E-06	7.16E-09	4.30E-09	7.16E-09	4.95E-09	1.31E-08	3.07E-07	1.08E-08	5.97298E-11	5.41042E-10	0	0	0.0006	Res	0.0041
582584.27_4130984.94	582584.27	4130984.94	4.80E-06	6.58E-09	3.95E-09	6.58E-09	4.58E-09	1.20E-08	2.82E-07	9.88E-09	5.54354E-11	5.02143E-10	0	0	0.0006	Res	0.0038
582640.84_4130984.94	582640.84	4130984.94	4.50E-06	6.11E-09	3.66E-09	6.11E-09	4.27E-09	1.12E-08	2.62E-07	9.17E-09	5.19744E-11	4.70793E-10	0	0	0.0005	Res	0.0036
582697.41_4130984.94	582697.41	4130984.94	4.23E-06	5.68E-09	3.41E-09	5.68E-09	4.00E-09	1.04E-08	2.43E-07	8.52E-09	4.88629E-11	4.42609E-10	0	0	0.0005	Res	0.0034
582753.98_4130984.94	582753.98	4130984.94	4.01E-06	5.33E-09	3.20E-09	5.33E-09	3.77E-09	9.74E-09	2.28E-07	7.98E-09	4.63433E-11	4.19786E-10	0	0	0.0005	Res	0.0032
582810.55_4130984.94	582810.55	4130984.94	3.81E-06	5.01E-09	3.01E-09	5.01E-09	3.57E-09	9.15E-09	2.14E-07	7.50E-09	4.40541E-11	3.99049E-10	0	0	0.0004	Res	0.0030
582867.12_4130984.94	582867.12	4130984.94	3.63E-06	4.72E-09	2.83E-09	4.72E-09	3.39E-09	8.62E-09	2.02E-07	7.06E-09	4.2016E-11	3.80588E-10	0	0	0.0004	Res	0.0029
581735.72_4131068.85	581735.72	4131068.85	1.02E-04	1.56E-07	9.36E-08	1.56E-07	1.00E-07	2.87E-07	6.74E-06	2.37E-07	1.17517E-09	1.06449E-08	0	0	0.0118	Res	0.0838
581792.29_4131068.85	581792.29	4131068.85	8.12E-05	1.24E-07	7.47E-08	1.24E-07	8.02E-08	2.29E-07	5.37E-06	1.89E-07	9.3871E-10	8.50299E-09	0	0	0.0094	Res	0.0669
581848.86_4131068.85	581848.86	4131068.85	4.41E-05	6.71E-08	4.03E-08	6.71E-08	4.35E-08	1.23E-07	2.90E-06	1.02E-07	5.09412E-10	4.61434E-09	0	0	0.0051	Res	0.0362
581905.43_4131068.85	581905.43	4131068.85	2.83E-05	4.28E-08	2.57E-08	4.28E-08	2.79E-08	7.86E-08	1.84E-06	6.48E-08	3.27255E-10	2.96434E-09	0	0	0.0033	Res	0.0232
581962_4131068.85	581962	4131068.85	2.07E-05	3.10E-08	1.86E-08	3.10E-08	2.03E-08	5.69E-08	1.33E-06	4.69E-08	2.38832E-10	2.16338E-09	0	0	0.0024	Res	0.0169
582018.57_4131068.85	582018.57	4131068.85	1.58E-05	2.34E-08	1.41E-08	2.34E-08	1.55E-08	4.30E-08	1.01E-06	3.55E-08	1.82356E-10	1.65181E-09	0	0	0.0018	Res	0.0128
582075.14_4131068.85	582075.14	4131068.85	1.26E-05	1.85E-08	1.11E-08	1.85E-08	1.23E-08	3.40E-08	7.98E-07	2.80E-08	1.45582E-10	1.31871E-09	0	0	0.0015	Res	0.0102
582131.71_4131068.85	582131.71	4131068.85	1.04E-05	1.52E-08	9.13E-09	1.52E-08	1.02E-08	2.79E-08	6.55E-07	2.30E-08	1.20642E-10	1.09279E-09	0	0	0.0012	Res	0.0084
582188.28_4131068.85	582188.28	4131068.85	8.86E-06	1.28E-08	7.68E-09	1.28E-08	8.63E-09	2.35E-08	5.50E-07	1.93E-08	1.02386E-10	9.27429E-10	0	0	0.0010	Res	0.0072
582244.85_4131068.85	582244.85	4131068.85	7.68E-06	1.10E-08	6.60E-09	1.10E-08	7.46E-09	2.02E-08	4.73E-07	1.66E-08	8.88274E-11	8.04614E-10	0	0	0.0009	Res	0.0062
582301.42_4131068.85	582301.42	4131068.85	6.77E-06	9.62E-09	5.77E-09	9.62E-09	6.56E-09	1.76E-08	4.13E-07	1.45E-08	7.82847E-11	7.09117E-10	0	0	0.0008	Res	0.0055
582357.99_4131068.85	582357.99	4131068.85	6.05E-06	8.52E-09	5.11E-09	8.52E-09	5.84E-09	1.56E-08	3.66E-07	1.28E-08	6.98935E-11	6.33107E-10	0	0	0.0007	Res	0.0049
582414.56_4131068.85	582414.56	4131068.85	5.47E-06	7.65E-09	4.59E-09	7.65E-09	5.26E-09	1.40E-08	3.28E-07	1.15E-08	6.31926E-11	5.72409E-10	0	0	0.0006	Res	0.0044
582471.13_4131068.85	582471.13	4131068.85	4.99E-06	6.93E-09	4.16E-09	6.93E-09	4.79E-09	1.27E-08	2.97E-07	1.04E-08	5.76708E-11	5.22392E-10	0	0	0.0006	Res	0.0040
582527.7_4131068.85	582527.7	4131068.85	4.59E-06	6.33E-09	3.80E-09	6.33E-09	4.39E-09	1.16E-08	2.71E-07	9.51E-09	5.30586E-11	4.80614E-10	0	0	0.0005	Res	0.0037
582584.27_4131068.85	582584.27	4131068.85	4.25E-06	5.81E-09	3.48E-09	5.81E-09	4.05E-09	1.06E-08	2.49E-07	8.72E-09	4.90934E-11	4.44697E-10	0	0	0.0005	Res	0.0034
582640.84_4131068.85	582640.84	4131068.85	4.00E-06	5.43E-09	3.26E-09	5.43E-09	3.80E-09	9.92E-09	2.33E-07	8.14E-09	4.62018E-11	4.18504E-10	0	0	0.0005	Res	0.0032
582697.41_4131068.85	582697.41	4131068.85	3.77E-06	5.08E-09	3.05E-09	5.08E-09	3.57E-09	9.28E-09	2.18E-07	7.62E-09	4.35921E-11	3.94865E-10	0	0	0.0004	Res	0.0030
582753.98_4131068.85	582753.98	4131068.85	3.59E-06	4.80E-09	2.88E-09	4.80E-09	3.39E-09	8.77E-09	2.05E-07	7.19E-09	4.1513E-11	3.76032E-10	0	0	0.0004	Res	0.0029
582810.55_4131068.85	582810.55	4131068.85	3.43E-06	4.55E-09	2.73E-09	4.55E-09	3.22E-09	8.30E-09	1.95E-07	6.81E-09	3.96844E-11	3.59468E-10	0	0	0.0004	Res	0.0027
582867.12_4131068.85	582867.12	4131068.85	3.27E-06	4.28E-09	2.57E-09	4.28E-09	3.05E-09	7.82E-09	1.83E-07	6.41E-09	3.7763E-11	3.42064E-10	0	0	0.0004	Res	0.0026
582018.57_4131152.76	582018.57	4131152.76	1.07E-05	1.56E-08	9.36E-09	1.56E-08	1.05E-08	2.86E-08	6.72E-07	2.36E-08	1.23896E-10	1.12227E-09	0	0	0.0012	Res	0.0087
582244.85_4131152.76	582244.85	4131152.76	6.54E-06	9.24E-09	5.55E-09	9.24E-09	6.32E-09	1.69E-08	3.97E-07	1.39E-08	7.56455E-11	6.8521E-10	0	0	0.0008	Res	0.0053
582301.42_4131152.76	582301.42	4131152.76	5.90E-06	8.28E-09	4.97E-09	8.28E-09	5.69E-09	1.52E-08	3.55E-07	1.25E-08	6.82262E-11	6.18005E-10	0	0	0.0007	Res	0.0047
582357.99_4131152.76	582357.99	4131152.76	5.34E-06	7.43E-09	4.46E-09	7.43E-09	5.13E-09	1.36E-08	3.19E-07	1.12E-08	6.16919E-11	5.58816E-10	0	0	0.0006	Res	0.0043
582414.56_4131152.76	582414.56	4131152.76	4.87E-06	6.73E-09	4.04E-09	6.73E-09	4.66E-09	1.23E-08	2.89E-07	1.01E-08	5.62536E-11	5.09555E-10	0	0	0.0006	Res	0.0039
582471.13_4131152.76	582471.13	4131152.76	4.42E-06	6.07E-09	3.64E-09	6.07E-09	4.22E-09	1.11E-08	2.60E-07	9.11E-09	5.11275E-11	4.63122E-10	0	0	0.0005	Res	0.0035
582527.7_4131152.76	582527.7	4131152.76	4.07E-06	5.54E-09	3.33E-09	5.54E-09	3.88E-09	1.01E-08	2.38E-07	8.32E-09	4.70316E-11	4.26021E-10	0	0	0.0005	Res	0.0033
582584.27_4131152.76	582584.27	4131152.76	3.76E-06	5.09E-09	3.06E-09	5.09E-09	3.58E-09	9.32E-09	2.18E-07	7.64E-09	4.35164E-11	3.94179E-10	0	0	0.0004	Res	0.0030
582640.84_4131152.76	582640.84	4131152.76	3.52E-06	4.73E-09	2.84E-09	4.73E-09	3.33E-09	8.65E-09	2.03E-07	7.10E-09	4.06922E-11	3.68597E-10	0	0	0.0004	Res	0.0028
582697.41_4131152.76	582697.41	4131152.76	3.31E-06	4.43E-09	2.66E-09	4.43E-09	3.13E-09	8.09E-09	1.90E-07	6.63E-09	3.82949E-11	3.46882E-10	0	0	0.0004	Res	0.0027
582753.98_4131152.76	582753.98	4131152.76	3.16E-06	4.20E-09	2.52E-09	4.20E-09	2.98E-09	7.67E-09	1.80E-07	6.29E-09	3.65249E-11	3.30849E-10	0	0	0.0004	Res	0.0025
582810.55_4131152.76	582810.55	4131152.76	3.02E-06	3.99E-09	2.39E-09	3.99E-09	2.84E-09	7.28E-09	1.71E-07	5.97E-09	3.4909E-11	3.16212E-10	0	0	0.0004	Res	0.0024
582867.12_4131152.76	582867.12	4131152.76	2.87E-06	3.76E-09	2.26E-09	3.76E-09	2.69E-09	6.87E-09	1.61E-07	5.63E-09	3.31928E-11	3.00666E-10	0	0	0.0003	Res	0.0023

HRA Permanente Creek Restoration Project

Construction Year 2025

Emissions Inputs

Construction Activity	Construction Year & Source	DPM Exhaust (tons/year)	PM10 Dust for speciation (tons/year)	Arsenic (tons/year)	Beryllium (tons/year)	Cadmium (tons/year)	Cobalt (tons/year)	Copper (tons/year)	Lead (tons/year)	Mercury (tons/year)	Nickel (tons/year)	Selenium (tons/year)	Chromium VI (tons/year)	Crystalline Silica (tons/year)
Concrete Channel 2024	2024_CONCRTE	0.000	0.00	2.91E-12	1.74E-12	2.91E-12	1.49E-11	3.26E-11	2.91E-12	4.65E-13	5.35E-11	5.81E-12	2.33E-13	8.63E-09
Paved road	2024_PAVED	2.07E-04	0.08	1.04E-07	6.26E-08	1.04E-07	6.68E-08	2.09E-06	1.92E-07	1.17E-08	4.51E-06	2.09E-07	1.59E-07	5.93E-04
Unpaved road	2024_CCP_UNPV	6.27E-05	0.20	2.56E-07	1.54E-07	2.56E-07	1.64E-07	5.12E-06	4.71E-07	2.87E-08	1.11E-05	5.12E-07	3.89E-07	1.46E-03
Channel Widening 2024	2024_CHAN_RCK	0.002	0.16	2.05E-07	1.23E-07	2.05E-07	1.05E-06	2.29E-06	2.05E-07	3.28E-08	3.77E-06	4.09E-07	1.64E-08	6.08E-04
Paved road	2024_PAVED	1.80E-03	2.39	2.99E-06	1.79E-06	2.99E-06	1.91E-06	5.98E-05	5.50E-06	3.35E-07	1.29E-04	5.98E-06	4.54E-06	1.70E-02
Rock Pile Area 2025	2025_CHAN_RCK	0.006	0.25	3.16E-07	1.89E-07	3.16E-07	1.62E-06	3.54E-06	3.16E-07	5.05E-08	5.81E-06	6.31E-07	2.53E-08	9.37E-04
Paved road	2025_PAVED	5.95E-03	2.44	3.05E-06	1.83E-06	3.05E-06	1.95E-06	6.10E-05	5.61E-06	3.41E-07	1.32E-04	6.10E-06	4.63E-06	1.73E-02
Rock Pile Area 2026	2026_CHAN_RCK	0.006	0.25	3.16E-07	1.89E-07	3.16E-07	1.62E-06	3.54E-06	3.16E-07	5.05E-08	5.81E-06	6.31E-07	2.53E-08	9.37E-04
Paved road	2026_PAVED	5.84E-03	2.44	3.05E-06	1.83E-06	3.05E-06	1.95E-06	6.10E-05	5.61E-06	3.41E-07	1.32E-04	6.10E-06	4.63E-06	1.73E-02
Channel Widening 2027	2027_CHAN_RCK	0.002	0.98	1.23E-06	7.36E-07	1.23E-06	6.28E-06	1.37E-05	1.23E-06	1.96E-07	2.26E-05	2.45E-06	9.82E-08	3.64E-03
Paved road	2027_PAVED	5.61E-03	2.39	2.99E-06	1.79E-06	2.99E-06	1.91E-06	5.98E-05	5.50E-06	3.35E-07	1.29E-04	5.98E-06	4.54E-06	1.70E-02
Material Removal 2028	2028_MATRMVL	0.001	0.25	3.15E-07	1.89E-07	3.15E-07	1.62E-06	3.53E-06	3.15E-07	5.05E-08	5.80E-06	6.31E-07	2.52E-08	9.37E-04
Paved road	2028_PAVED	5.57E-03	2.39	2.99E-06	1.80E-06	2.99E-06	1.92E-06	5.98E-05	5.51E-06	3.35E-07	1.29E-04	5.98E-06	4.55E-06	1.70E-02
Unpaved road	2028_UNPAVED	3.40E-03	11.84	1.48E-05	8.88E-06	1.48E-05	9.47E-06	2.96E-04	2.72E-05	1.66E-06	6.40E-04	2.96E-05	2.25E-05	8.41E-02
Material Removal 2029	2029_MATRMVL	0.001	0.25	3.15E-07	1.89E-07	3.15E-07	1.62E-06	3.53E-06	3.15E-07	5.05E-08	5.80E-06	6.31E-07	2.52E-08	9.37E-04
Paved road	2029_PAVED	5.56E-03	2.41	3.01E-06	1.81E-06	3.01E-06	1.93E-06	6.03E-05	5.55E-06	3.38E-07	1.30E-04	6.03E-06	4.58E-06	1.71E-02
Unpaved road	2029_UNPAVED	3.39E-03	11.93	1.49E-05	8.95E-06	1.49E-05	9.55E-06	2.98E-04	2.74E-05	1.67E-06	6.44E-04	2.98E-05	2.27E-05	8.47E-02

Construction Activity	Construction Year	DPM (g/s)	Arsenic (g/s)	Beryllium (g/s)	Cadmium (g/s)	Cobalt (g/s)	Copper (g/s)	Lead (g/s)	Mercury (g/s)	Nickel (g/s)	Selenium (g/s)	Chromium VI (g/s)	Crystalline Silica (g/s)
Concrete Channel 2024	2024_CONCRTE	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Paved road	2024_PAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Unpaved road	2024_CCP_UNPV	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Channel Widening 2024	2024_CHAN_RCK	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Paved road	2024_PAVED	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Rock Pile Area 2025	2025_CHAN_RCK	1.698E-04	9.08E-09	5.45E-09	9.08E-09	4.65E-08	1.02E-07	9.08E-09	1.45E-09	1.67E-07	1.82E-08	7.26E-10	2.70E-05
Paved road	2025_PAVED	1.711E-04	8.77E-08	5.26E-08	8.77E-08	5.61E-08	1.75E-06	1.61E-07	9.82E-09	3.79E-06	1.75E-07	1.33E-07	4.98E-04
Rock Pile Area 2026	2026_CHAN_RCK	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Paved road	2026_PAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Channel Widening 2027	2027_CHAN_RCK	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Paved road	2027_PAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Material Removal 2028	2028_MATRMVL	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Paved road	2028_PAVED	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Unpaved road	2028_UNPAVED	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Material Removal 2029	2029_MATRMVL	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Paved road	2029_PAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Unpaved road	2029_UNPAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

N/A = not including PM10 on-site dust in HRA calculation; it is only for speciating metals.

Exposure Duration, ED

	Exposure Start	3rd Trimester	0<2	2<16	16<30
Years	1/1/2025	0	1	0	0

Risk Factors

	Abbreviation	UOM	3rd Trimester	0<2	2<16	16<30
Daily Breathing Rate (95th %'ile)	DBR	L/kg-day	361	1090	572	261
Fraction Of Time At Home [a]	FAH	unitless	0.85	0.85	0.72	0.73
Exposure Frequency	EF	days/year	0.96	0.96	0.96	0.96
Age Sensitivity Factor	ASF	unitless	10	10	3	1
Inhalation Absorption Factor	A	unitless	1	1	1	1
Conversion Factor	CF_1	m^3/L	0.001	0.001	0.001	0.001
Conversion Factor	CF_2	$\mu g/m^3$	0.001	0.001	0.001	0.001
Averaging Time (for residential exposure)	AT	years	70.00	70.00	70.00	70.00

[a] assume school or daycare will have cancer risk of >1 per million

Cancer Potency Factor, CPF

TAC	UOM	
DPM	$mg/kg\text{-}day^{-1}$	1.1
Arsenic	$mg/kg\text{-}day^{-1}$	12
Beryllium	$mg/kg\text{-}day^{-1}$	8.4
Cadmium	$mg/kg\text{-}day^{-1}$	15
Cobalt	$mg/kg\text{-}day^{-1}$	27
Lead	$mg/kg\text{-}day^{-1}$	0.04
Nickel	$mg/kg\text{-}day^{-1}$	0.91
Chromium VI	$mg/kg\text{-}day^{-1}$	510

Intake Factor for Inhalation, IF (m^3/kg-day)

Equation	3rd Trimester	0<2	2<16	16<30
DBR*FAH*EF*ED*ASF*A*CF/AT	0.000	0.127	0.000	0.000

Risk Calculation Part 1, R1

	TAC	3rd Trimester	0<2	2<16	16<30
IF*CPF*CF	DPM	0.00E+00	1.40E-04	0.00E+00	0.00E+00
	Arsenic	0.00E+00	1.52E-03	0.00E+00	0.00E+00
	Beryllium	0.00E+00	1.07E-03	0.00E+00	0.00E+00
	Cadmium	0.00E+00	1.90E-03	0.00E+00	0.00E+00
	Cobalt	0.00E+00	3.43E-03	0.00E+00	0.00E+00
	Lead	0.00E+00	5.08E-06	0.00E+00	0.00E+00
	Nickel	0.00E+00	1.15E-04	0.00E+00	0.00E+00
	Chromium VI	0.00E+00	6.47E-02	0.00E+00	0.00E+00

Risk Calculation Part 2, $\sum R1*C_{TAC}$

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)								3rd Trimester	0<2	2<16	16<30	Cancer Risk - 2025	Receptor Type
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Cobalt	Lead	Nickel	Chromium VI					(per million)	
581336.22_4131207.48	581336.22	4131207.48	2.00E-04	1.01E-07	6.05E-08	1.01E-07	6.54E-08	1.85E-07	4.35E-06	1.53E-07	0	2.791E-08	0	0	0.0279	CT House
581554.22_4130688.06	581554.22	4130688.06	1.37E-04	6.70E-08	4.02E-08	6.70E-08	4.46E-08	1.23E-07	2.88E-06	1.01E-07	0	1.916E-08	0	0	0.0192	Res
579793.36_4131503.29	579793.36	4131503.29	1.25E-05	3.69E-09	2.21E-09	3.69E-09	3.78E-09	6.52E-09	1.51E-07	5.15E-09	0	1.744E-09	0	0	0.0017	Acute
580488.37_4131517.71	580488.37	4131517.71	1.58E-05	6.54E-09	3.92E-09	6.54E-09	5.01E-09	1.19E-08	2.78E-07	9.68E-09	0	2.21E-09	0	0	0.0022	Acute
581678.43_4131040.03	581678.43	4131040.03	6.34E-04	3.23E-07	1.94E-07	3.23E-07	2.08E-07	5.94E-07	1.39E-05	4.91E-07	0	8.854E-08	0	0	0.0885	Res
581635.43_4130978.54	581635.43	4130978.54	1.28E-03	6.55E-07	3.93E-07	6.55E-07	4.20E-07	1.20E-06	2.83E-05	9.95E-07	0	1.79E-07	0	0	0.1790	Res
581830.06_4131027.55	581830.06	4131027.55	5.84E-04	2.97E-07	1.78E-07	2.97E-07	1.91E-07	5.47E-07	1.28E-05	4.52E-07	0	8.154E-08	0	0	0.0815	Res
581727.48_4130976.54	581727.48	4130976.54	1.55E-03	7.93E-07	4.76E-07	7.93E-07	5.09E-07	1.46E-06	3.43E-05	1.21E-06	0	2.166E-07	0	0	0.2166	Res
581789.11_4130419.65	581789.11	4130419.65	1.07E-04	5.04E-08	3.02E-08	5.04E-08	3.45E-08	9.23E-08	2.16E-06	7.59E-08	0	1.49E-08	0	0	0.0149	Res
581700.32_4130781.89	581700.32	4130781.89	3.09E-04	1.56E-07	9.37E-08	1.56E-07	1.01E-07	2.87E-07	6.74E-06	2.37E-07	0	4.321E-08	0	0	0.0432	Res
581426.07_4131299.01	581426.07	4131299.01	7.29E-05	3.59E-08	2.15E-08	3.59E-08	2.37E-08	6.59E-08	1.55E-06	5.43E-08	0	1.017E-08	0	0	0.0102	Acute
582301.42_4129474.56	582301.42	4129474.56	3.79E-05	1.55E-08	9.29E-09	1.55E-08	1.20E-08	2.81E-08	6.57E-07	2.29E-08	0	5.297E-09	0	0	0.0053	Res
582357.99_4129474.56	582357.99	4129474.56	3.55E-05	1.45E-08	8.67E-09	1.45E-08	1.12E-08	2.62E-08	6.14E-07	2.13E-08	0	4.96E-09	0	0	0.0050	Res
582414.56_4129474.56	582414.56	4129474.56	3.33E-05	1.35E-08	8.11E-09	1.35E-08	1.05E-08	2.45E-08	5.74E-07	2.00E-08	0	4.655E-09	0	0	0.0047	Res
582471.13_4129474.56	582471.13	4129474.56	3.14E-05	1.27E-08	7.61E-09	1.27E-08	9.88E-09	2.30E-08	5.38E-07	1.87E-08	0	4.378E-09	0	0	0.0044	Res
582527.7_4129474.56	582527.7	4129474.56	2.96E-05	1.20E-08	7.18E-09	1.20E-08	9.34E-09	2.17E-08	5.08E-07	1.76E-08	0	4.139E-09	0	0	0.0041	Res
582584.27_4129474.56	582584.27	4129474.56	2.79E-05	1.12E-08	6.74E-09	1.12E-08	8.79E-09	2.04E-08	4.77E-07	1.66E-08	0	3.897E-09	0	0	0.0039	Res
582640.84_4129474.56	582640.84	4129474.56	2.61E-05	1.05E-08	6.27E-09	1.05E-08	8.22E-09	1.90E-08	4.43E-07	1.54E-08	0	3.645E-09	0	0	0.0036	Res
582244.85_4129558.47	582244.85	4129558.47	3.95E-05	1.57E-08	9.41E-09	1.57E-08	1.24E-08	2.84E-08	6.64E-07	2.31E-08	0	5.512E-09	0	0	0.0055	Res
582301.42_4129558.47	582301.42	4129558.47	3.84E-05	1.56E-08	9.34E-09	1.56E-08	1.21E-08	2.82E-08	6.60E-07	2.30E-08	0	5.366E-09	0	0	0.0054	Res
582357.99_4129558.47	582357.99	4129558.47	3.63E-05	1.48E-08	8.85E-09	1.48E-08	1.14E-08	2.68E-08	6.26E-07	2.18E-08	0	5.064E-09	0	0	0.0051	Res
582414.56_4129558.47	582414.56	4129558.47	3.41E-05	1.38E-08	8.30E-09	1.38E-08	1.07E-08	2.51E-08	5.87E-07	2.04E-08	0	4.755E-09	0	0	0.0048	Res
582471.13_4129558.47	582471.13	4129558.47	3.19E-05	1.29E-08	7.76E-09	1.29E-08	1.00E-08	2.35E-08	5.49E-07	1.91E-08	0	4.447E-09	0	0	0.0044	Res
582527.7_4129558.47	582527.7	4129558.47	2.99E-05	1.21E-08	7.25E-09	1.21E-08	9.42E-09	2.19E-08	5.13E-07	1.78E-08	0	4.171E-09	0	0	0.0042	Res
582584.27_4129558.47	582584.27	4129558.47	2.80E-05	1.13E-08	6.77E-09	1.13E-08	8.82E-09	2.05E-08	4.78E-07	1.66E-08	0	3.91E-09	0	0	0.0039	Res
582640.84_4129558.47	582640.84	4129558.47	2.64E-05	1.06E-08	6.36E-09	1.06E-08	8.32E-09	1.92E-08	4.50E-07	1.56E-08	0	3.69E-09	0	0	0.0037	Res
582697.41_4129558.47	582697.41	4129558.47	2.49E-05	9.96E-09	5.98E-09	9.96E-09	7.84E-09	1.80E-08	4.22E-07	1.47E-08	0	3.479E-09	0	0	0.0035	Res
582244.85_4129642.38	582244.85	4129642.38	3.62E-05	1.37E-08	8.24E-09	1.37E-08	1.13E-08	2.48E-08	5.79E-07	2.01E-08	0	5.052E-09	0	0	0.0051	Res

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)								Risk Calculation Part 2, $\sum R1*C_{TAC}$					
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Cobalt	Lead	Nickel	Chromium VI	3rd Trimester	0<2	2<16	16<30	Cancer Risk - 2025 (per million)	Receptor Type
582301.42_4129642.38	582301.42	4129642.38	3.80E-05	1.52E-08	9.10E-09	1.52E-08	1.19E-08	2.75E-08	6.42E-07	2.23E-08	0	5.301E-09	0	0	0.0053	Res
582357.99_4129642.38	582357.99	4129642.38	3.68E-05	1.50E-08	9.00E-09	1.50E-08	1.16E-08	2.72E-08	6.37E-07	2.22E-08	0	5.144E-09	0	0	0.0051	Res
582414.56_4129642.38	582414.56	4129642.38	3.47E-05	1.42E-08	8.50E-09	1.42E-08	1.09E-08	2.57E-08	6.01E-07	2.09E-08	0	4.843E-09	0	0	0.0048	Res
582471.13_4129642.38	582471.13	4129642.38	3.26E-05	1.33E-08	7.97E-09	1.33E-08	1.03E-08	2.41E-08	5.64E-07	1.96E-08	0	4.545E-09	0	0	0.0045	Res
582527.7_4129642.38	582527.7	4129642.38	3.06E-05	1.25E-08	7.48E-09	1.25E-08	9.66E-09	2.26E-08	5.29E-07	1.84E-08	0	4.275E-09	0	0	0.0043	Res
582584.27_4129642.38	582584.27	4129642.38	2.86E-05	1.16E-08	6.95E-09	1.16E-08	9.01E-09	2.10E-08	4.91E-07	1.71E-08	0	3.988E-09	0	0	0.0040	Res
582640.84_4129642.38	582640.84	4129642.38	2.68E-05	1.08E-08	6.48E-09	1.08E-08	8.44E-09	1.96E-08	4.58E-07	1.59E-08	0	3.74E-09	0	0	0.0037	Res
582697.41_4129642.38	582697.41	4129642.38	2.52E-05	1.01E-08	6.06E-09	1.01E-08	7.92E-09	1.83E-08	4.28E-07	1.49E-08	0	3.514E-09	0	0	0.0035	Res
582753.98_4129642.38	582753.98	4129642.38	2.36E-05	9.42E-09	5.65E-09	9.42E-09	7.43E-09	1.71E-08	3.99E-07	1.39E-08	0	3.296E-09	0	0	0.0033	Res
582810.55_4129642.38	582810.55	4129642.38	2.22E-05	8.81E-09	5.28E-09	8.81E-09	6.98E-09	1.60E-08	3.73E-07	1.30E-08	0	3.101E-09	0	0	0.0031	Res
582867.12_4129642.38	582867.12	4129642.38	2.07E-05	8.14E-09	4.88E-09	8.14E-09	6.50E-09	1.47E-08	3.45E-07	1.20E-08	0	2.892E-09	0	0	0.0029	Res
582244.85_4129726.29	582244.85	4129726.29	3.86E-05	1.51E-08	9.08E-09	1.51E-08	1.21E-08	2.74E-08	6.40E-07	2.22E-08	0	5.395E-09	0	0	0.0054	Res
582301.42_4129726.29	582301.42	4129726.29	3.72E-05	1.48E-08	8.85E-09	1.48E-08	1.17E-08	2.67E-08	6.25E-07	2.17E-08	0	5.197E-09	0	0	0.0052	Res
582357.99_4129726.29	582357.99	4129726.29	3.70E-05	1.51E-08	9.07E-09	1.51E-08	1.17E-08	2.74E-08	6.42E-07	2.23E-08	0	5.172E-09	0	0	0.0052	Res
582414.56_4129726.29	582414.56	4129726.29	3.52E-05	1.44E-08	8.67E-09	1.44E-08	1.11E-08	2.62E-08	6.14E-07	2.13E-08	0	4.916E-09	0	0	0.0049	Res
582471.13_4129726.29	582471.13	4129726.29	3.32E-05	1.36E-08	8.17E-09	1.36E-08	1.05E-08	2.47E-08	5.78E-07	2.01E-08	0	4.635E-09	0	0	0.0046	Res
582527.7_4129726.29	582527.7	4129726.29	3.12E-05	1.28E-08	7.68E-09	1.28E-08	9.86E-09	2.32E-08	5.44E-07	1.89E-08	0	4.358E-09	0	0	0.0044	Res
582584.27_4129726.29	582584.27	4129726.29	2.93E-05	1.20E-08	7.18E-09	1.20E-08	9.24E-09	2.17E-08	5.08E-07	1.77E-08	0	4.089E-09	0	0	0.0041	Res
582640.84_4129726.29	582640.84	4129726.29	2.74E-05	1.12E-08	6.69E-09	1.12E-08	8.65E-09	2.02E-08	4.73E-07	1.65E-08	0	3.828E-09	0	0	0.0038	Res
582697.41_4129726.29	582697.41	4129726.29	2.55E-05	1.03E-08	6.18E-09	1.03E-08	8.03E-09	1.87E-08	4.37E-07	1.52E-08	0	3.559E-09	0	0	0.0036	Res
582753.98_4129726.29	582753.98	4129726.29	2.36E-05	9.45E-09	5.67E-09	9.45E-09	7.43E-09	1.71E-08	4.00E-07	1.39E-08	0	3.295E-09	0	0	0.0033	Res
582810.55_4129726.29	582810.55	4129726.29	2.17E-05	8.57E-09	5.14E-09	8.57E-09	6.80E-09	1.55E-08	3.63E-07	1.26E-08	0	3.023E-09	0	0	0.0030	Res
582244.85_4129810.2	582244.85	4129810.2	3.78E-05	1.47E-08	8.82E-09	1.47E-08	1.18E-08	2.66E-08	6.22E-07	2.16E-08	0	5.27E-09	0	0	0.0053	Res
582301.42_4129810.2	582301.42	4129810.2	3.74E-05	1.50E-08	8.98E-09	1.50E-08	1.18E-08	2.71E-08	6.35E-07	2.21E-08	0	5.226E-09	0	0	0.0052	Res
582357.99_4129810.2	582357.99	4129810.2	3.66E-05	1.49E-08	8.95E-09	1.49E-08	1.15E-08	2.71E-08	6.33E-07	2.20E-08	0	5.11E-09	0	0	0.0051	Res
582414.56_4129810.2	582414.56	4129810.2	3.53E-05	1.46E-08	8.73E-09	1.46E-08	1.12E-08	2.64E-08	6.18E-07	2.15E-08	0	4.931E-09	0	0	0.0049	Res
582471.13_4129810.2	582471.13	4129810.2	3.36E-05	1.39E-08	8.34E-09	1.39E-08	1.06E-08	2.52E-08	5.91E-07	2.06E-08	0	4.687E-09	0	0	0.0047	Res
582527.7_4129810.2	582527.7	4129810.2	3.15E-05	1.30E-08	7.81E-09	1.30E-08	9.97E-09	2.36E-08	5.53E-07	1.92E-08	0	4.401E-09	0	0	0.0044	Res
582584.27_4129810.2	582584.27	4129810.2	2.94E-05	1.21E-08	7.26E-09	1.21E-08	9.30E-09	2.20E-08	5.14E-07	1.79E-08	0	4.108E-09	0	0	0.0041	Res
582640.84_4129810.2	582640.84	4129810.2	2.71E-05	1.10E-08	6.62E-09	1.10E-08	8.54E-09	2.00E-08	4.68E-07	1.63E-08	0	3.778E-09	0	0	0.0038	Res
582697.41_4129810.2	582697.41	4129810.2	2.49E-05	1.01E-08	6.04E-09	1.01E-08	7.86E-09	1.83E-08	4.27E-07	1.49E-08	0	3.481E-09	0	0	0.0035	Res
581905.43_4129894.11	581905.43	4129894.11	4.55E-05	1.93E-08	1.16E-08	1.93E-08	1.44E-08	3.51E-08	8.21E-07	2.86E-08	0	6.347E-09	0	0	0.0063	Res
581962_4129894.11	581962	4129894.11	4.85E-05	1.95E-08	1.17E-08	1.95E-08	1.53E-08	3.53E-08	8.25E-07	2.87E-08	0	6.768E-09	0	0	0.0068	Res
582131.71_4129894.11	582131.71	4129894.11	4.31E-05	1.69E-08	1.02E-08	1.69E-08	1.35E-08	3.07E-08	7.17E-07	2.49E-08	0	6.014E-09	0	0	0.0060	Res
582188.28_4129894.11	582188.28	4129894.11	4.11E-05	1.63E-08	9.79E-09	1.63E-08	1.29E-08	2.95E-08	6.91E-07	2.40E-08	0	5.739E-09	0	0	0.0057	Res
582244.85_4129894.11	582244.85	4129894.11	3.97E-05	1.60E-08	9.60E-09	1.60E-08	1.25E-08	2.90E-08	6.79E-07	2.36E-08	0	5.546E-09	0	0	0.0055	Res
582301.42_4129894.11	582301.42	4129894.11	3.80E-05	1.55E-08	9.28E-09	1.55E-08	1.20E-08	2.81E-08	6.57E-07	2.28E-08	0	5.31E-09	0	0	0.0053	Res
582357.99_4129894.11	582357.99	4129894.11	3.61E-05	1.48E-08	8.86E-09	1.48E-08	1.14E-08	2.68E-08	6.27E-07	2.18E-08	0	5.043E-09	0	0	0.0050	Res
582414.56_4129894.11	582414.56	4129894.11	3.60E-05	1.51E-08	9.03E-09	1.51E-08	1.14E-08	2.74E-08	6.40E-07	2.23E-08	0	5.024E-09	0	0	0.0050	Res
582471.13_4129894.11	582471.13	4129894.11	3.37E-05	1.41E-08	8.45E-09	1.41E-08	1.07E-08	2.56E-08	5.99E-07	2.09E-08	0	4.703E-09	0	0	0.0047	Res
582527.7_4129894.11	582527.7	4129894.11	3.12E-05	1.29E-08	7.77E-09	1.29E-08	9.86E-09	2.35E-08	5.51E-07	1.92E-08	0	4.349E-09	0	0	0.0043	Res
582584.27_4129894.11	582584.27	4129894.11	2.87E-05	1.18E-08	7.09E-09	1.18E-08	9.06E-09	2.15E-08	5.02E-07	1.75E-08	0	4.003E-09	0	0	0.0040	Res
582640.84_4129894.11	582640.84	4129894.11	2.63E-05	1.07E-08	6.45E-09	1.07E-08	8.31E-09	1.95E-08	4.56E-07	1.59E-08	0	3.676E-09	0	0	0.0037	Res
582697.41_4129894.11	582697.41	4129894.11	2.41E-05	9.75E-09	5.85E-09	9.75E-09	7.61E-09	1.77E-08	4.14E-07	1.44E-08	0	3.371E-09	0	0	0.0034	Res
581962_4129978.02	581962	4129978.02	5.00E-05	2.03E-08	1.22E-08	2.03E-08	1.58E-08	3.69E-08	8.62E-07	3.00E-08	0	6.987E-09	0	0	0.0070	Res
582018.57_4129978.02	582018.57	4129978.02	4.79E-05	1.91E-08	1.15E-08	1.91E-08	1.51E-08	3.46E-08	8.10E-07	2.82E-08	0	6.684E-09	0	0	0.0067	Res
582075.14_4129978.02	582075.14	4129978.02	4.86E-05	1.98E-08	1.19E-08	1.98E-08	1.53E-08	3.59E-08	8.40E-07	2.92E-08	0	6.786E-09	0	0	0.0068	Res
582131.71_4129978.02	582131.71	4129978.02	4.77E-05	1.98E-08	1.19E-08	1.98E-08	1.51E-08	3.60E-08	8.42E-07	2.93E-08	0	6.658E-09	0	0	0.0067	Res
582188.28_4129978.02	582188.28	4129978.02	4.69E-05	1.98E-08	1.19E-08	1.98E-08	1.49E-08	3.61E-08	8.44E-07	2.94E-08	0	6.543E-09	0	0	0.0065	Res
582244.85_4129978.02	582244.85	4129978.02	4.26E-05	1.79E-08	1.07E-08	1.79E-08	1.35E-08	3.25E-08	7.61E-07	2.65E-08	0	5.95E-09	0	0	0.0059	Res
582301.42_4129978.02	582301.42	4129978.02	4.16E-05	1.77E-08	1.06E-08	1.77E-08	1.32E-08	3.22E-08	7.53E-07	2.63E-08	0	5.802E-09	0	0	0.0058	Res
582357.99_4129978.02	582357.99	4129978.02	3.92E-05	1.67E-08	1.00E-08	1.67E-08	1.25E-08	3.04E-08	7.12E-07	2.48E-08	0	5.472E-09	0	0	0.0055	Res
582414.56_4129978.02	582414.56	4129978.02	3.63E-05	1.54E-08	9.26E-09	1.54E-08	1.15E-08	2.81E-08	6.57E-07	2.29E-08	0	5.072E-09	0	0	0.0051	Res
582471.13_4129978.02	582471.13	4129978.02	3.34E-05	1.41E-08	8.46E-09	1.41E-08	1.06E-08	2.56E-08	6.00E-07	2.09E-08	0	4.665E-09	0	0	0.0047	Res
582527.7_4129978.02	582527.7	4129978.02	3.06E-05	1.28E-08	7.68E-09	1.28E-08	9.69E-09	2.33E-08	5.44E-07	1.90E-08	0	4.27E-09	0	0	0.0043	Res

Risk Calculation Part 2, $\sum R1*C_{TAC}$

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)								3rd Trimester	0<2	2<16	16<30	Cancer Risk - 2025	Receptor Type
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Cobalt	Lead	Nickel	Chromium VI					(per million)	
582584.27_4129978.02	582584.27	4129978.02	2.80E-05	1.16E-08	6.95E-09	1.16E-08	8.85E-09	2.10E-08	4.92E-07	1.71E-08	0	3.904E-09	0	0	0.0039	Res
582640.84_4129978.02	582640.84	4129978.02	2.56E-05	1.05E-08	6.30E-09	1.05E-08	8.09E-09	1.90E-08	4.46E-07	1.55E-08	0	3.575E-09	0	0	0.0036	Res
582697.41_4129978.02	582697.41	4129978.02	2.34E-05	9.49E-09	5.70E-09	9.49E-09	7.39E-09	1.72E-08	4.03E-07	1.40E-08	0	3.273E-09	0	0	0.0033	Res
582753.98_4129978.02	582753.98	4129978.02	2.13E-05	8.51E-09	5.11E-09	8.51E-09	6.71E-09	1.54E-08	3.61E-07	1.25E-08	0	2.976E-09	0	0	0.0030	Res
582810.55_4129978.02	582810.55	4129978.02	1.90E-05	7.46E-09	4.47E-09	7.46E-09	5.97E-09	1.35E-08	3.15E-07	1.09E-08	0	2.656E-09	0	0	0.0027	Res
581905.43_4130061.93	581905.43	4130061.93	6.85E-05	2.97E-08	1.78E-08	2.97E-08	2.18E-08	5.40E-08	1.27E-06	4.42E-08	0	9.558E-09	0	0	0.0096	Res
581962_4130061.93	581962	4130061.93	6.44E-05	2.80E-08	1.68E-08	2.80E-08	2.05E-08	5.09E-08	1.19E-06	4.16E-08	0	8.99E-09	0	0	0.0090	Res
582018.57_4130061.93	582018.57	4130061.93	5.58E-05	2.37E-08	1.42E-08	2.37E-08	1.77E-08	4.31E-08	1.01E-06	3.52E-08	0	7.785E-09	0	0	0.0078	Res
582075.14_4130061.93	582075.14	4130061.93	5.01E-05	2.11E-08	1.26E-08	2.11E-08	1.59E-08	3.83E-08	8.96E-07	3.12E-08	0	7E-09	0	0	0.0070	Res
582131.71_4130061.93	582131.71	4130061.93	4.86E-05	2.07E-08	1.24E-08	2.07E-08	1.54E-08	3.77E-08	8.82E-07	3.07E-08	0	6.789E-09	0	0	0.0068	Res
582188.28_4130061.93	582188.28	4130061.93	4.70E-05	2.02E-08	1.21E-08	2.02E-08	1.50E-08	3.69E-08	8.63E-07	3.01E-08	0	6.566E-09	0	0	0.0066	Res
582244.85_4130061.93	582244.85	4130061.93	4.56E-05	1.99E-08	1.19E-08	1.99E-08	1.45E-08	3.62E-08	8.47E-07	2.96E-08	0	6.37E-09	0	0	0.0064	Res
582301.42_4130061.93	582301.42	4130061.93	4.24E-05	1.84E-08	1.10E-08	1.84E-08	1.35E-08	3.36E-08	7.86E-07	2.74E-08	0	5.919E-09	0	0	0.0059	Res
582357.99_4130061.93	582357.99	4130061.93	3.94E-05	1.70E-08	1.02E-08	1.70E-08	1.25E-08	3.11E-08	7.27E-07	2.54E-08	0	5.497E-09	0	0	0.0055	Res
582414.56_4130061.93	582414.56	4130061.93	3.62E-05	1.56E-08	9.35E-09	1.56E-08	1.15E-08	2.84E-08	6.65E-07	2.32E-08	0	5.055E-09	0	0	0.0051	Res
582471.13_4130061.93	582471.13	4130061.93	3.30E-05	1.41E-08	8.46E-09	1.41E-08	1.05E-08	2.57E-08	6.01E-07	2.10E-08	0	4.609E-09	0	0	0.0046	Res
582527.7_4130061.93	582527.7	4130061.93	3.00E-05	1.27E-08	7.60E-09	1.27E-08	9.51E-09	2.30E-08	5.40E-07	1.88E-08	0	4.186E-09	0	0	0.0042	Res
582584.27_4130061.93	582584.27	4130061.93	2.73E-05	1.14E-08	6.84E-09	1.14E-08	8.64E-09	2.07E-08	4.85E-07	1.69E-08	0	3.807E-09	0	0	0.0038	Res
582640.84_4130061.93	582640.84	4130061.93	2.48E-05	1.02E-08	6.13E-09	1.02E-08	7.83E-09	1.86E-08	4.34E-07	1.51E-08	0	3.456E-09	0	0	0.0035	Res
582697.41_4130061.93	582697.41	4130061.93	2.26E-05	9.19E-09	5.52E-09	9.19E-09	7.12E-09	1.67E-08	3.90E-07	1.36E-08	0	3.15E-09	0	0	0.0031	Res
582753.98_4130061.93	582753.98	4130061.93	2.06E-05	8.30E-09	4.98E-09	8.30E-09	6.50E-09	1.50E-08	3.52E-07	1.22E-08	0	2.881E-09	0	0	0.0029	Res
582810.55_4130061.93	582810.55	4130061.93	1.89E-05	7.49E-09	4.49E-09	7.49E-09	5.93E-09	1.36E-08	3.17E-07	1.10E-08	0	2.635E-09	0	0	0.0026	Res
581962_4130145.84	581962	4130145.84	7.24E-05	3.28E-08	1.97E-08	3.28E-08	2.32E-08	5.99E-08	1.40E-06	4.91E-08	0	1.011E-08	0	0	0.0101	Res
582018.57_4130145.84	582018.57	4130145.84	6.71E-05	3.03E-08	1.82E-08	3.03E-08	2.15E-08	5.54E-08	1.30E-06	4.54E-08	0	9.37E-09	0	0	0.0094	Res
582075.14_4130145.84	582075.14	4130145.84	5.78E-05	2.57E-08	1.54E-08	2.57E-08	1.85E-08	4.69E-08	1.10E-06	3.84E-08	0	8.074E-09	0	0	0.0081	Res
582131.71_4130145.84	582131.71	4130145.84	5.36E-05	2.38E-08	1.43E-08	2.38E-08	1.71E-08	4.34E-08	1.02E-06	3.55E-08	0	7.479E-09	0	0	0.0075	Res
582188.28_4130145.84	582188.28	4130145.84	5.14E-05	2.30E-08	1.38E-08	2.30E-08	1.65E-08	4.20E-08	9.84E-07	3.44E-08	0	7.18E-09	0	0	0.0072	Res
582244.85_4130145.84	582244.85	4130145.84	4.70E-05	2.09E-08	1.26E-08	2.09E-08	1.50E-08	3.82E-08	8.95E-07	3.13E-08	0	6.566E-09	0	0	0.0066	Res
582301.42_4130145.84	582301.42	4130145.84	4.28E-05	1.89E-08	1.14E-08	1.89E-08	1.37E-08	3.46E-08	8.10E-07	2.83E-08	0	5.979E-09	0	0	0.0060	Res
582357.99_4130145.84	582357.99	4130145.84	3.91E-05	1.72E-08	1.03E-08	1.72E-08	1.25E-08	3.14E-08	7.35E-07	2.57E-08	0	5.465E-09	0	0	0.0055	Res
582414.56_4130145.84	582414.56	4130145.84	3.57E-05	1.56E-08	9.34E-09	1.56E-08	1.14E-08	2.84E-08	6.65E-07	2.32E-08	0	4.982E-09	0	0	0.0050	Res
582471.13_4130145.84	582471.13	4130145.84	3.23E-05	1.40E-08	8.37E-09	1.40E-08	1.03E-08	2.54E-08	5.95E-07	2.08E-08	0	4.51E-09	0	0	0.0045	Res
582527.7_4130145.84	582527.7	4130145.84	2.90E-05	1.24E-08	7.44E-09	1.24E-08	9.23E-09	2.26E-08	5.29E-07	1.84E-08	0	4.055E-09	0	0	0.0041	Res
582584.27_4130145.84	582584.27	4130145.84	2.61E-05	1.10E-08	6.60E-09	1.10E-08	8.27E-09	2.00E-08	4.68E-07	1.63E-08	0	3.642E-09	0	0	0.0036	Res
582640.84_4130145.84	582640.84	4130145.84	2.35E-05	9.78E-09	5.87E-09	9.78E-09	7.45E-09	1.78E-08	4.16E-07	1.45E-08	0	3.285E-09	0	0	0.0033	Res
582697.41_4130145.84	582697.41	4130145.84	2.14E-05	8.76E-09	5.25E-09	8.76E-09	6.74E-09	1.59E-08	3.72E-07	1.29E-08	0	2.981E-09	0	0	0.0030	Res
582753.98_4130145.84	582753.98	4130145.84	1.95E-05	7.91E-09	4.74E-09	7.91E-09	6.16E-09	1.43E-08	3.36E-07	1.17E-08	0	2.727E-09	0	0	0.0027	Res
582810.55_4130145.84	582810.55	4130145.84	1.80E-05	7.19E-09	4.32E-09	7.19E-09	5.66E-09	1.30E-08	3.05E-07	1.06E-08	0	2.511E-09	0	0	0.0025	Res
582867.12_4130145.84	582867.12	4130145.84	1.60E-05	6.29E-09	3.77E-09	6.29E-09	5.03E-09	1.14E-08	2.66E-07	9.24E-09	0	2.239E-09	0	0	0.0022	Res
581962_4130229.75	581962	4130229.75	7.35E-05	3.35E-08	2.01E-08	3.35E-08	2.36E-08	6.13E-08	1.44E-06	5.03E-08	0	1.026E-08	0	0	0.0103	Res
582018.57_4130229.75	582018.57	4130229.75	6.98E-05	3.20E-08	1.92E-08	3.20E-08	2.24E-08	5.85E-08	1.37E-06	4.80E-08	0	9.743E-09	0	0	0.0097	Res
582075.14_4130229.75	582075.14	4130229.75	6.48E-05	2.97E-08	1.78E-08	2.97E-08	2.08E-08	5.43E-08	1.27E-06	4.46E-08	0	9.05E-09	0	0	0.0090	Res
582131.71_4130229.75	582131.71	4130229.75	5.85E-05	2.67E-08	1.60E-08	2.67E-08	1.88E-08	4.88E-08	1.14E-06	4.00E-08	0	8.168E-09	0	0	0.0082	Res
582188.28_4130229.75	582188.28	4130229.75	5.24E-05	2.37E-08	1.42E-08	2.37E-08	1.68E-08	4.34E-08	1.02E-06	3.56E-08	0	7.312E-09	0	0	0.0073	Res
582244.85_4130229.75	582244.85	4130229.75	4.70E-05	2.12E-08	1.27E-08	2.12E-08	1.51E-08	3.87E-08	9.06E-07	3.17E-08	0	6.567E-09	0	0	0.0066	Res
582301.42_4130229.75	582301.42	4130229.75	4.25E-05	1.90E-08	1.14E-08	1.90E-08	1.36E-08	3.47E-08	8.13E-07	2.84E-08	0	5.933E-09	0	0	0.0059	Res
582357.99_4130229.75	582357.99	4130229.75	3.85E-05	1.71E-08	1.03E-08	1.71E-08	1.23E-08	3.12E-08	7.31E-07	2.55E-08	0	5.375E-09	0	0	0.0054	Res
582414.56_4130229.75	582414.56	4130229.75	3.46E-05	1.52E-08	9.12E-09	1.52E-08	1.10E-08	2.77E-08	6.49E-07	2.27E-08	0	4.826E-09	0	0	0.0048	Res
582471.13_4130229.75	582471.13	4130229.75	3.08E-05	1.34E-08	8.02E-09	1.34E-08	9.80E-09	2.43E-08	5.70E-07	1.99E-08	0	4.293E-09	0	0	0.0043	Res
582527.7_4130229.75	582527.7	4130229.75	2.74E-05	1.17E-08	7.04E-09	1.17E-08	8.71E-09	2.14E-08	5.01E-07	1.75E-08	0	3.823E-09	0	0	0.0038	Res
582584.27_4130229.75	582584.27	4130229.75	2.45E-05	1.04E-08	6.22E-09	1.04E-08	7.78E-09	1.89E-08	4.41E-07	1.54E-08	0	3.421E-09	0	0	0.0034	Res
582640.84_4130229.75	582640.84	4130229.75	2.21E-05	9.22E-09	5.53E-09	9.22E-09	6.99E-09	1.68E-08	3.92E-07	1.37E-08	0	3.084E-09	0	0	0.0031	Res
582697.41_4130229.75	582697.41	4130229.75	2.01E-05	8.30E-09	4.98E-09	8.30E-09	6.37E-09	1.51E-08	3.53E-07	1.23E-08	0	2.812E-09	0	0	0.0028	Res
582753.98_4130229.75	582753.98	4130229.75	1.85E-05	7.52E-09	4.51E-09	7.52E-09	5.83E-09	1.36E-08	3.19E-07	1.11E-08	0	2.578E-09	0	0	0.0026	Res
582810.55_4130229.75	582810.55	4130229.75	1.71E-05	6.88E-09	4.13E-09	6.88E-09	5.38E-09	1.25E-08	2.92E-07	1.01E-08	0	2.385E-09	0	0	0.0024	Res

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)								Risk Calculation Part 2, $\sum R1*C_{TAC}$					
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Cobalt	Lead	Nickel	Chromium VI	3rd Trimester	0<2	2<16	16<30	Cancer Risk - 2025 (per million)	Receptor Type
582867.12_4130229.75	582867.12	4130229.75	1.59E-05	6.35E-09	3.81E-09	6.35E-09	5.01E-09	1.15E-08	2.69E-07	9.35E-09	0	2.222E-09	0	0	0.0022	Res
582018.57_4130313.66	582018.57	4130313.66	7.45E-05	3.46E-08	2.07E-08	3.46E-08	2.40E-08	6.33E-08	1.48E-06	5.19E-08	0	1.04E-08	0	0	0.0104	Res
582075.14_4130313.66	582075.14	4130313.66	6.89E-05	3.20E-08	1.92E-08	3.20E-08	2.22E-08	5.85E-08	1.37E-06	4.81E-08	0	9.624E-09	0	0	0.0096	Res
582131.71_4130313.66	582131.71	4130313.66	6.06E-05	2.79E-08	1.68E-08	2.79E-08	1.95E-08	5.11E-08	1.20E-06	4.19E-08	0	8.463E-09	0	0	0.0085	Res
582188.28_4130313.66	582188.28	4130313.66	5.33E-05	2.43E-08	1.46E-08	2.43E-08	1.71E-08	4.45E-08	1.04E-06	3.65E-08	0	7.438E-09	0	0	0.0074	Res
582244.85_4130313.66	582244.85	4130313.66	4.73E-05	2.14E-08	1.28E-08	2.14E-08	1.52E-08	3.91E-08	9.17E-07	3.21E-08	0	6.598E-09	0	0	0.0066	Res
582301.42_4130313.66	582301.42	4130313.66	4.22E-05	1.90E-08	1.14E-08	1.90E-08	1.35E-08	3.46E-08	8.11E-07	2.84E-08	0	5.887E-09	0	0	0.0059	Res
582357.99_4130313.66	582357.99	4130313.66	3.73E-05	1.66E-08	9.96E-09	1.66E-08	1.19E-08	3.03E-08	7.10E-07	2.48E-08	0	5.208E-09	0	0	0.0052	Res
582414.56_4130313.66	582414.56	4130313.66	3.28E-05	1.44E-08	8.64E-09	1.44E-08	1.05E-08	2.63E-08	6.15E-07	2.15E-08	0	4.575E-09	0	0	0.0046	Res
582471.13_4130313.66	582471.13	4130313.66	2.89E-05	1.25E-08	7.51E-09	1.25E-08	9.20E-09	2.28E-08	5.34E-07	1.86E-08	0	4.031E-09	0	0	0.0040	Res
582527.7_4130313.66	582527.7	4130313.66	2.57E-05	1.10E-08	6.58E-09	1.10E-08	8.16E-09	2.00E-08	4.68E-07	1.63E-08	0	3.582E-09	0	0	0.0036	Res
582584.27_4130313.66	582584.27	4130313.66	2.30E-05	9.70E-09	5.82E-09	9.70E-09	7.29E-09	1.76E-08	4.13E-07	1.44E-08	0	3.21E-09	0	0	0.0032	Res
582640.84_4130313.66	582640.84	4130313.66	2.08E-05	8.69E-09	5.21E-09	8.69E-09	6.60E-09	1.58E-08	3.70E-07	1.29E-08	0	2.909E-09	0	0	0.0029	Res
582697.41_4130313.66	582697.41	4130313.66	1.90E-05	7.84E-09	4.71E-09	7.84E-09	6.02E-09	1.42E-08	3.33E-07	1.16E-08	0	2.657E-09	0	0	0.0027	Res
582753.98_4130313.66	582753.98	4130313.66	1.75E-05	7.13E-09	4.28E-09	7.13E-09	5.52E-09	1.29E-08	3.03E-07	1.05E-08	0	2.442E-09	0	0	0.0024	Res
582810.55_4130313.66	582810.55	4130313.66	1.61E-05	6.50E-09	3.90E-09	6.50E-09	5.08E-09	1.18E-08	2.76E-07	9.59E-09	0	2.252E-09	0	0	0.0023	Res
582867.12_4130313.66	582867.12	4130313.66	1.49E-05	5.96E-09	3.57E-09	5.96E-09	4.70E-09	1.08E-08	2.52E-07	8.77E-09	0	2.085E-09	0	0	0.0021	Res
581848.86_4130397.57	581848.86	4130397.57	1.01E-04	4.76E-08	2.86E-08	4.76E-08	3.27E-08	8.73E-08	2.05E-06	7.17E-08	0	1.412E-08	0	0	0.0141	Res
581905.43_4130397.57	581905.43	4130397.57	9.77E-05	4.62E-08	2.77E-08	4.62E-08	3.16E-08	8.46E-08	1.98E-06	6.96E-08	0	1.364E-08	0	0	0.0136	Res
581962_4130397.57	581962	4130397.57	9.23E-05	4.37E-08	2.62E-08	4.37E-08	2.98E-08	8.00E-08	1.88E-06	6.58E-08	0	1.288E-08	0	0	0.0129	Res
582018.57_4130397.57	582018.57	4130397.57	8.29E-05	3.91E-08	2.35E-08	3.91E-08	2.68E-08	7.16E-08	1.68E-06	5.88E-08	0	1.158E-08	0	0	0.0116	Res
582075.14_4130397.57	582075.14	4130397.57	7.29E-05	3.41E-08	2.05E-08	3.41E-08	2.35E-08	6.25E-08	1.47E-06	5.14E-08	0	1.018E-08	0	0	0.0102	Res
582131.71_4130397.57	582131.71	4130397.57	6.27E-05	2.91E-08	1.75E-08	2.91E-08	2.02E-08	5.32E-08	1.25E-06	4.37E-08	0	8.756E-09	0	0	0.0088	Res
582188.28_4130397.57	582188.28	4130397.57	5.47E-05	2.52E-08	1.51E-08	2.52E-08	1.76E-08	4.60E-08	1.08E-06	3.78E-08	0	7.641E-09	0	0	0.0076	Res
582244.85_4130397.57	582244.85	4130397.57	4.75E-05	2.16E-08	1.30E-08	2.16E-08	1.52E-08	3.95E-08	9.25E-07	3.24E-08	0	6.629E-09	0	0	0.0066	Res
582301.42_4130397.57	582301.42	4130397.57	4.12E-05	1.85E-08	1.11E-08	1.85E-08	1.32E-08	3.38E-08	7.91E-07	2.77E-08	0	5.747E-09	0	0	0.0057	Res
582357.99_4130397.57	582357.99	4130397.57	3.55E-05	1.57E-08	9.43E-09	1.57E-08	1.14E-08	2.87E-08	6.72E-07	2.35E-08	0	4.957E-09	0	0	0.0050	Res
582414.56_4130397.57	582414.56	4130397.57	3.09E-05	1.35E-08	8.10E-09	1.35E-08	9.87E-09	2.46E-08	5.77E-07	2.01E-08	0	4.32E-09	0	0	0.0043	Res
582471.13_4130397.57	582471.13	4130397.57	2.73E-05	1.18E-08	7.05E-09	1.18E-08	8.69E-09	2.14E-08	5.01E-07	1.75E-08	0	3.812E-09	0	0	0.0038	Res
582527.7_4130397.57	582527.7	4130397.57	2.43E-05	1.03E-08	6.20E-09	1.03E-08	7.72E-09	1.88E-08	4.40E-07	1.53E-08	0	3.396E-09	0	0	0.0034	Res
582584.27_4130397.57	582584.27	4130397.57	2.19E-05	9.17E-09	5.50E-09	9.17E-09	6.93E-09	1.67E-08	3.90E-07	1.36E-08	0	3.052E-09	0	0	0.0031	Res
582640.84_4130397.57	582640.84	4130397.57	1.98E-05	8.21E-09	4.92E-09	8.21E-09	6.27E-09	1.49E-08	3.49E-07	1.21E-08	0	2.766E-09	0	0	0.0028	Res
582697.41_4130397.57	582697.41	4130397.57	1.80E-05	7.35E-09	4.41E-09	7.35E-09	5.68E-09	1.33E-08	3.12E-07	1.09E-08	0	2.511E-09	0	0	0.0025	Res
582753.98_4130397.57	582753.98	4130397.57	1.64E-05	6.64E-09	3.99E-09	6.64E-09	5.18E-09	1.21E-08	2.82E-07	9.80E-09	0	2.296E-09	0	0	0.0023	Res
582810.55_4130397.57	582810.55	4130397.57	1.51E-05	6.04E-09	3.62E-09	6.04E-09	4.76E-09	1.09E-08	2.56E-07	8.89E-09	0	2.112E-09	0	0	0.0021	Res
582867.12_4130397.57	582867.12	4130397.57	1.40E-05	5.51E-09	3.31E-09	5.51E-09	4.39E-09	9.98E-09	2.33E-07	8.10E-09	0	1.95E-09	0	0	0.0019	Res
581848.86_4130481.48	581848.86	4130481.48	1.28E-04	6.20E-08	3.72E-08	6.20E-08	4.15E-08	1.14E-07	2.67E-06	9.36E-08	0	1.784E-08	0	0	0.0178	Res
581905.43_4130481.48	581905.43	4130481.48	1.19E-04	5.74E-08	3.44E-08	5.74E-08	3.85E-08	1.05E-07	2.47E-06	8.67E-08	0	1.655E-08	0	0	0.0166	Res
581962_4130481.48	581962	4130481.48	1.02E-04	4.88E-08	2.93E-08	4.88E-08	3.29E-08	8.94E-08	2.10E-06	7.36E-08	0	1.417E-08	0	0	0.0142	Res
582018.57_4130481.48	582018.57	4130481.48	8.96E-05	4.28E-08	2.57E-08	4.28E-08	2.90E-08	7.85E-08	1.84E-06	6.46E-08	0	1.251E-08	0	0	0.0125	Res
582075.14_4130481.48	582075.14	4130481.48	7.61E-05	3.60E-08	2.16E-08	3.60E-08	2.46E-08	6.60E-08	1.55E-06	5.43E-08	0	1.063E-08	0	0	0.0106	Res
582131.71_4130481.48	582131.71	4130481.48	6.50E-05	3.04E-08	1.82E-08	3.04E-08	2.10E-08	5.57E-08	1.31E-06	4.58E-08	0	9.068E-09	0	0	0.0091	Res
582188.28_4130481.48	582188.28	4130481.48	5.52E-05	2.55E-08	1.53E-08	2.55E-08	1.78E-08	4.67E-08	1.10E-06	3.84E-08	0	7.709E-09	0	0	0.0077	Res
582244.85_4130481.48	582244.85	4130481.48	4.64E-05	2.11E-08	1.27E-08	2.11E-08	1.49E-08	3.86E-08	9.04E-07	3.16E-08	0	6.472E-09	0	0	0.0065	Res
582301.42_4130481.48	582301.42	4130481.48	3.92E-05	1.75E-08	1.05E-08	1.75E-08	1.25E-08	3.20E-08	7.51E-07	2.62E-08	0	5.47E-09	0	0	0.0055	Res
582357.99_4130481.48	582357.99	4130481.48	3.36E-05	1.48E-08	8.89E-09	1.48E-08	1.07E-08	2.70E-08	6.33E-07	2.21E-08	0	4.695E-09	0	0	0.0047	Res
582414.56_4130481.48	582414.56	4130481.48	2.94E-05	1.27E-08	7.65E-09	1.27E-08	9.36E-09	2.32E-08	5.44E-07	1.90E-08	0	4.103E-09	0	0	0.0041	Res
582471.13_4130481.48	582471.13	4130481.48	2.60E-05	1.11E-08	6.65E-09	1.11E-08	8.25E-09	2.02E-08	4.72E-07	1.65E-08	0	3.624E-09	0	0	0.0036	Res
582527.7_4130481.48	582527.7	4130481.48	2.31E-05	9.71E-09	5.82E-09	9.71E-09	7.32E-09	1.77E-08	4.13E-07	1.44E-08	0	3.221E-09	0	0	0.0032	Res
582584.27_4130481.48	582584.27	4130481.48	2.07E-05	8.58E-09	5.15E-09	8.58E-09	6.55E-09	1.56E-08	3.65E-07	1.27E-08	0	2.889E-09	0	0	0.0029	Res
582640.84_4130481.48	582640.84	4130481.48	1.86E-05	7.61E-09	4.57E-09	7.61E-09	5.88E-09	1.38E-08	3.23E-07	1.12E-08	0	2.602E-09	0	0	0.0026	Res
582697.41_4130481.48	582697.41	4130481.48	1.69E-05	6.81E-09	4.09E-09	6.81E-09	5.33E-09	1.23E-08	2.89E-07	1.00E-08	0	2.361E-09	0	0	0.0024	Res
582753.98_4130481.48	582753.98	4130481.48	1.55E-05	6.15E-09	3.69E-09	6.15E-09	4.87E-09	1.11E-08	2.61E-07	9.05E-09	0	2.161E-09	0	0	0.0022	Res
582810.55_4130481.48	582810.55	4130481.48	1.43E-05	5.60E-09	3.36E-09	5.60E-09	4.48E-09	1.01E-08	2.37E-07	8.22E-09	0	1.991E-09	0	0	0.0020	Res
582867.12_4130481.48	582867.12	4130481.48	1.32E-05	5.13E-09	3.08E-09	5.13E-09	4.14E-09	9.27E-09	2.17E-07	7.52E-09	0	1.844E-09	0	0	0.0018	Res
581735.72_4130565.39	581735.72	4130565.39	1.54E-04	7.57E-08	4.54E-08	7.57E-08	5.00E-08	1.39E-07	3.26E-06	1.14E-07	0	2.146E-08	0	0	0.0215	Res
581792.29_4130565.39	581792.29	4130565.39	1.51E-04	7.45E-08	4.47E-08	7.45E-08	4.93E-08	1.37E-07	3.21E-06	1.13E-07	0	2.113E-08	0	0	0.0211	Res

Risk Calculation Part 2, $\sum R1*C_{TAC}$

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)								3rd Trimester	0<2	2<16	16<30	Cancer Risk - 2025	Receptor Type
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Cobalt	Lead	Nickel	Chromium VI					(per million)	
581848.86_4130565.39	581848.86	4130565.39	1.44E-04	7.09E-08	4.25E-08	7.09E-08	4.69E-08	1.30E-07	3.05E-06	1.07E-07	0	2.011E-08	0	0	0.0201	Res
581905.43_4130565.39	581905.43	4130565.39	1.38E-04	6.77E-08	4.06E-08	6.77E-08	4.48E-08	1.24E-07	2.92E-06	1.02E-07	0	1.921E-08	0	0	0.0192	Res
581962_4130565.39	581962	4130565.39	1.19E-04	5.83E-08	3.50E-08	5.83E-08	3.87E-08	1.07E-07	2.51E-06	8.81E-08	0	1.662E-08	0	0	0.0166	Res
582018.57_4130565.39	582018.57	4130565.39	9.68E-05	4.69E-08	2.81E-08	4.69E-08	3.14E-08	8.61E-08	2.02E-06	7.09E-08	0	1.351E-08	0	0	0.0135	Res
582075.14_4130565.39	582075.14	4130565.39	7.91E-05	3.79E-08	2.27E-08	3.79E-08	2.56E-08	6.95E-08	1.63E-06	5.71E-08	0	1.104E-08	0	0	0.0110	Res
582131.71_4130565.39	582131.71	4130565.39	6.53E-05	3.09E-08	1.85E-08	3.09E-08	2.11E-08	5.66E-08	1.33E-06	4.65E-08	0	9.112E-09	0	0	0.0091	Res
582188.28_4130565.39	582188.28	4130565.39	5.29E-05	2.46E-08	1.48E-08	2.46E-08	1.71E-08	4.50E-08	1.06E-06	3.70E-08	0	7.388E-09	0	0	0.0074	Res
582244.85_4130565.39	582244.85	4130565.39	4.34E-05	1.98E-08	1.19E-08	1.98E-08	1.40E-08	3.62E-08	8.49E-07	2.97E-08	0	6.063E-09	0	0	0.0061	Res
582301.42_4130565.39	582301.42	4130565.39	3.69E-05	1.65E-08	9.93E-09	1.65E-08	1.18E-08	3.02E-08	7.08E-07	2.48E-08	0	5.152E-09	0	0	0.0052	Res
582357.99_4130565.39	582357.99	4130565.39	3.16E-05	1.39E-08	8.33E-09	1.39E-08	1.01E-08	2.53E-08	5.93E-07	2.07E-08	0	4.407E-09	0	0	0.0044	Res
582414.56_4130565.39	582414.56	4130565.39	2.74E-05	1.18E-08	7.10E-09	1.18E-08	8.73E-09	2.16E-08	5.05E-07	1.76E-08	0	3.826E-09	0	0	0.0038	Res
582471.13_4130565.39	582471.13	4130565.39	2.41E-05	1.02E-08	6.13E-09	1.02E-08	7.65E-09	1.86E-08	4.35E-07	1.52E-08	0	3.366E-09	0	0	0.0034	Res
582527.7_4130565.39	582527.7	4130565.39	2.14E-05	8.92E-09	5.35E-09	8.92E-09	6.78E-09	1.62E-08	3.79E-07	1.32E-08	0	2.992E-09	0	0	0.0030	Res
582584.27_4130565.39	582584.27	4130565.39	1.93E-05	7.89E-09	4.73E-09	7.89E-09	6.09E-09	1.43E-08	3.35E-07	1.17E-08	0	2.691E-09	0	0	0.0027	Res
582640.84_4130565.39	582640.84	4130565.39	1.74E-05	6.99E-09	4.20E-09	6.99E-09	5.47E-09	1.27E-08	2.97E-07	1.03E-08	0	2.427E-09	0	0	0.0024	Res
582697.41_4130565.39	582697.41	4130565.39	1.59E-05	6.29E-09	3.77E-09	6.29E-09	4.99E-09	1.14E-08	2.66E-07	9.25E-09	0	2.216E-09	0	0	0.0022	Res
582753.98_4130565.39	582753.98	4130565.39	1.46E-05	5.71E-09	3.43E-09	5.71E-09	4.58E-09	1.03E-08	2.41E-07	8.38E-09	0	2.039E-09	0	0	0.0020	Res
582810.55_4130565.39	582810.55	4130565.39	1.36E-05	5.23E-09	3.14E-09	5.23E-09	4.24E-09	9.46E-09	2.21E-07	7.67E-09	0	1.892E-09	0	0	0.0019	Res
582867.12_4130565.39	582867.12	4130565.39	1.27E-05	4.83E-09	2.90E-09	4.83E-09	3.95E-09	8.73E-09	2.04E-07	7.07E-09	0	1.766E-09	0	0	0.0018	Res
581735.72_4130649.3	581735.72	4130649.3	1.66E-04	8.22E-08	4.93E-08	8.22E-08	5.40E-08	1.51E-07	3.54E-06	1.24E-07	0	2.313E-08	0	0	0.0231	Res
581792.29_4130649.3	581792.29	4130649.3	1.60E-04	7.95E-08	4.77E-08	7.95E-08	5.23E-08	1.46E-07	3.43E-06	1.20E-07	0	2.238E-08	0	0	0.0224	Res
581905.43_4130649.3	581905.43	4130649.3	1.60E-04	7.97E-08	4.78E-08	7.97E-08	5.22E-08	1.46E-07	3.43E-06	1.21E-07	0	2.234E-08	0	0	0.0223	Res
581962_4130649.3	581962	4130649.3	1.33E-04	6.59E-08	3.96E-08	6.59E-08	4.34E-08	1.21E-07	2.84E-06	9.98E-08	0	1.859E-08	0	0	0.0186	Res
582018.57_4130649.3	582018.57	4130649.3	1.02E-04	4.98E-08	2.99E-08	4.98E-08	3.30E-08	9.14E-08	2.15E-06	7.53E-08	0	1.418E-08	0	0	0.0142	Res
582075.14_4130649.3	582075.14	4130649.3	7.93E-05	3.84E-08	2.31E-08	3.84E-08	2.57E-08	7.05E-08	1.65E-06	5.80E-08	0	1.107E-08	0	0	0.0111	Res
582131.71_4130649.3	582131.71	4130649.3	6.21E-05	2.96E-08	1.78E-08	2.96E-08	2.01E-08	5.43E-08	1.27E-06	4.47E-08	0	8.664E-09	0	0	0.0087	Res
582188.28_4130649.3	582188.28	4130649.3	4.93E-05	2.31E-08	1.39E-08	2.31E-08	1.59E-08	4.23E-08	9.91E-07	3.47E-08	0	6.876E-09	0	0	0.0069	Res
582244.85_4130649.3	582244.85	4130649.3	4.00E-05	1.84E-08	1.10E-08	1.84E-08	1.29E-08	3.36E-08	7.88E-07	2.76E-08	0	5.585E-09	0	0	0.0056	Res
582301.42_4130649.3	582301.42	4130649.3	3.34E-05	1.50E-08	9.01E-09	1.50E-08	1.07E-08	2.74E-08	6.43E-07	2.25E-08	0	4.66E-09	0	0	0.0047	Res
582357.99_4130649.3	582357.99	4130649.3	2.85E-05	1.26E-08	7.55E-09	1.26E-08	9.12E-09	2.29E-08	5.37E-07	1.88E-08	0	3.985E-09	0	0	0.0040	Res
582414.56_4130649.3	582414.56	4130649.3	2.49E-05	1.08E-08	6.45E-09	1.08E-08	7.93E-09	1.96E-08	4.59E-07	1.60E-08	0	3.478E-09	0	0	0.0035	Res
582471.13_4130649.3	582471.13	4130649.3	2.20E-05	9.28E-09	5.57E-09	9.28E-09	6.97E-09	1.69E-08	3.95E-07	1.38E-08	0	3.066E-09	0	0	0.0031	Res
582527.7_4130649.3	582527.7	4130649.3	1.96E-05	8.13E-09	4.88E-09	8.13E-09	6.21E-09	1.48E-08	3.46E-07	1.20E-08	0	2.741E-09	0	0	0.0027	Res
582584.27_4130649.3	582584.27	4130649.3	1.78E-05	7.23E-09	4.34E-09	7.23E-09	5.61E-09	1.31E-08	3.07E-07	1.07E-08	0	2.483E-09	0	0	0.0025	Res
582640.84_4130649.3	582640.84	4130649.3	1.63E-05	6.52E-09	3.91E-09	6.52E-09	5.13E-09	1.18E-08	2.76E-07	9.60E-09	0	2.275E-09	0	0	0.0023	Res
582697.41_4130649.3	582697.41	4130649.3	1.51E-05	5.94E-09	3.56E-09	5.94E-09	4.73E-09	1.07E-08	2.51E-07	8.72E-09	0	2.102E-09	0	0	0.0021	Res
582753.98_4130649.3	582753.98	4130649.3	1.40E-05	5.47E-09	3.28E-09	5.47E-09	4.40E-09	9.90E-09	2.31E-07	8.02E-09	0	1.961E-09	0	0	0.0020	Res
582810.55_4130649.3	582810.55	4130649.3	1.32E-05	5.09E-09	3.05E-09	5.09E-09	4.13E-09	9.20E-09	2.15E-07	7.45E-09	0	1.844E-09	0	0	0.0018	Res
582867.12_4130649.3	582867.12	4130649.3	1.25E-05	4.75E-09	2.85E-09	4.75E-09	3.89E-09	8.59E-09	2.01E-07	6.95E-09	0	1.739E-09	0	0	0.0017	Res
581848.86_4130733.21	581848.86	4130733.21	2.37E-04	1.19E-07	7.14E-08	1.19E-07	7.73E-08	2.19E-07	5.14E-06	1.81E-07	0	3.302E-08	0	0	0.0330	Res
581905.43_4130733.21	581905.43	4130733.21	2.02E-04	1.01E-07	6.09E-08	1.01E-07	6.60E-08	1.87E-07	4.38E-06	1.54E-07	0	2.82E-08	0	0	0.0282	Res
581962_4130733.21	581962	4130733.21	1.49E-04	7.43E-08	4.46E-08	7.43E-08	4.86E-08	1.37E-07	3.21E-06	1.13E-07	0	2.078E-08	0	0	0.0208	Res
582018.57_4130733.21	582018.57	4130733.21	1.05E-04	5.18E-08	3.11E-08	5.18E-08	3.42E-08	9.52E-08	2.23E-06	7.84E-08	0	1.463E-08	0	0	0.0146	Res
582075.14_4130733.21	582075.14	4130733.21	7.45E-05	3.63E-08	2.18E-08	3.63E-08	2.42E-08	6.66E-08	1.56E-06	5.49E-08	0	1.04E-08	0	0	0.0104	Res
582131.71_4130733.21	582131.71	4130733.21	5.49E-05	2.63E-08	1.58E-08	2.63E-08	1.78E-08	4.82E-08	1.13E-06	3.97E-08	0	7.66E-09	0	0	0.0077	Res
582188.28_4130733.21	582188.28	4130733.21	4.28E-05	2.01E-08	1.21E-08	2.01E-08	1.38E-08	3.69E-08	8.65E-07	3.03E-08	0	5.982E-09	0	0	0.0060	Res
582244.85_4130733.21	582244.85	4130733.21	3.47E-05	1.60E-08	9.61E-09	1.60E-08	1.12E-08	2.93E-08	6.86E-07	2.40E-08	0	4.85E-09	0	0	0.0048	Res
582301.42_4130733.21	582301.42	4130733.21	2.91E-05	1.32E-08	7.89E-09	1.32E-08	9.34E-09	2.40E-08	5.63E-07	1.97E-08	0	4.068E-09	0	0	0.0041	Res
582357.99_4130733.21	582357.99	4130733.21	2.51E-05	1.11E-08	6.66E-09	1.11E-08	8.03E-09	2.03E-08	4.75E-07	1.66E-08	0	3.506E-09	0	0	0.0035	Res
582414.56_4130733.21	582414.56	4130733.21	2.21E-05	9.59E-09	5.75E-09	9.59E-09	7.05E-09	1.75E-08	4.09E-07	1.43E-08	0	3.089E-09	0	0	0.0031	Res
582471.13_4130733.21	582471.13	4130733.21	1.99E-05	8.46E-09	5.08E-09	8.46E-09	6.32E-09	1.54E-08	3.60E-07	1.26E-08	0	2.777E-09	0	0	0.0028	Res
582527.7_4130733.21	582527.7	4130733.21	1.82E-05	7.59E-09	4.55E-09	7.59E-09	5.75E-09	1.38E-08	3.23E-07	1.12E-08	0	2.534E-09	0	0	0.0025	Res
582584.27_4130733.21	582584.27	4130733.21	1.68E-05	6.90E-09	4.14E-09	6.90E-09	5.30E-09	1.25E-08	2.93E-07	1.02E-08	0	2.342E-09	0	0	0.0023	Res
582640.84_4130733.21	582640.84	4130733.21	1.56E-05	6.35E-09	3.81E-09	6.35E-09	4.93E-09	1.15E-08	2.69E-07	9.37E-09	0	2.184E-09	0	0	0.0022	Res
582697.41_4130733.21	582697.41	4130733.21	1.47E-05	5.88E-09	3.53E-09	5.88E-09	4.62E-09	1.07E-08	2.49E-07	8.66E-09	0	2.05E-09	0	0	0.0021	Res
582753.98_4130733.21	582753.98	4130733.21	1.38E-05	5.48E-09	3.29E-09	5.48E-09	4.35E-09	9.92E-09	2.32E-07	8.06E-09	0	1.933E-09	0	0	0.0019	Res
582810.55_4130733.21	582810.55	4130733.21	1.31E-05	5.15E-09	3.09E-09	5.15E-09	4.12E-09	9.32E-09	2.18E-07	7.56E-09	0	1.835E-09	0	0	0.0018	Res

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)								Risk Calculation Part 2, $\sum R1*C_{TAC}$					
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Cobalt	Lead	Nickel	Chromium VI	3rd Trimester	0<2	2<16	16<30	Cancer Risk - 2025 (per million)	Receptor Type
582867.12_4130733.21	582867.12	4130733.21	1.25E-05	4.84E-09	2.90E-09	4.84E-09	3.91E-09	8.75E-09	2.04E-07	7.09E-09	0	1.742E-09	0	0	0.0017	Res
581735.72_4130817.12	581735.72	4130817.12	3.47E-04	1.76E-07	1.05E-07	1.76E-07	1.13E-07	3.23E-07	7.58E-06	2.66E-07	0	4.843E-08	0	0	0.0484	Res
581792.29_4130817.12	581792.29	4130817.12	3.91E-04	1.98E-07	1.19E-07	1.98E-07	1.28E-07	3.65E-07	8.56E-06	3.01E-07	0	5.459E-08	0	0	0.0546	Res
581848.86_4130817.12	581848.86	4130817.12	3.51E-04	1.78E-07	1.07E-07	1.78E-07	1.15E-07	3.27E-07	7.68E-06	2.70E-07	0	4.898E-08	0	0	0.0490	Res
581905.43_4130817.12	581905.43	4130817.12	2.66E-04	1.34E-07	8.05E-08	1.34E-07	8.69E-08	2.47E-07	5.79E-06	2.04E-07	0	3.708E-08	0	0	0.0371	Res
581962_4130817.12	581962	4130817.12	1.62E-04	8.10E-08	4.86E-08	8.10E-08	5.28E-08	1.49E-07	3.50E-06	1.23E-07	0	2.256E-08	0	0	0.0226	Res
582018.57_4130817.12	582018.57	4130817.12	9.73E-05	4.82E-08	2.89E-08	4.82E-08	3.17E-08	8.85E-08	2.08E-06	7.29E-08	0	1.358E-08	0	0	0.0136	Res
582075.14_4130817.12	582075.14	4130817.12	6.34E-05	3.09E-08	1.85E-08	3.09E-08	2.06E-08	5.67E-08	1.33E-06	4.67E-08	0	8.857E-09	0	0	0.0089	Res
582131.71_4130817.12	582131.71	4130817.12	4.61E-05	2.20E-08	1.32E-08	2.20E-08	1.49E-08	4.04E-08	9.47E-07	3.32E-08	0	6.43E-09	0	0	0.0064	Res
582188.28_4130817.12	582188.28	4130817.12	3.60E-05	1.69E-08	1.02E-08	1.69E-08	1.16E-08	3.10E-08	7.27E-07	2.55E-08	0	5.032E-09	0	0	0.0050	Res
582244.85_4130817.12	582244.85	4130817.12	2.97E-05	1.37E-08	8.23E-09	1.37E-08	9.58E-09	2.51E-08	5.88E-07	2.06E-08	0	4.153E-09	0	0	0.0042	Res
582301.42_4130817.12	582301.42	4130817.12	2.56E-05	1.16E-08	6.97E-09	1.16E-08	8.21E-09	2.12E-08	4.97E-07	1.74E-08	0	3.572E-09	0	0	0.0036	Res
582357.99_4130817.12	582357.99	4130817.12	2.27E-05	1.01E-08	6.07E-09	1.01E-08	7.25E-09	1.85E-08	4.33E-07	1.51E-08	0	3.163E-09	0	0	0.0032	Res
582414.56_4130817.12	582414.56	4130817.12	2.04E-05	8.99E-09	5.40E-09	8.99E-09	6.53E-09	1.64E-08	3.84E-07	1.34E-08	0	2.853E-09	0	0	0.0029	Res
582471.13_4130817.12	582471.13	4130817.12	1.88E-05	8.13E-09	4.88E-09	8.13E-09	5.97E-09	1.48E-08	3.47E-07	1.21E-08	0	2.618E-09	0	0	0.0026	Res
582527.7_4130817.12	582527.7	4130817.12	1.73E-05	7.41E-09	4.45E-09	7.41E-09	5.51E-09	1.35E-08	3.16E-07	1.10E-08	0	2.42E-09	0	0	0.0024	Res
582584.27_4130817.12	582584.27	4130817.12	1.62E-05	6.82E-09	4.09E-09	6.82E-09	5.13E-09	1.24E-08	2.90E-07	1.01E-08	0	2.258E-09	0	0	0.0023	Res
582640.84_4130817.12	582640.84	4130817.12	1.52E-05	6.32E-09	3.79E-09	6.32E-09	4.81E-09	1.15E-08	2.69E-07	9.36E-09	0	2.12E-09	0	0	0.0021	Res
582697.41_4130817.12	582697.41	4130817.12	1.43E-05	5.88E-09	3.53E-09	5.88E-09	4.52E-09	1.07E-08	2.50E-07	8.69E-09	0	1.999E-09	0	0	0.0020	Res
582753.98_4130817.12	582753.98	4130817.12	1.35E-05	5.48E-09	3.29E-09	5.48E-09	4.26E-09	9.94E-09	2.33E-07	8.09E-09	0	1.887E-09	0	0	0.0019	Res
582810.55_4130817.12	582810.55	4130817.12	1.28E-05	5.13E-09	3.08E-09	5.13E-09	4.03E-09	9.30E-09	2.17E-07	7.56E-09	0	1.789E-09	0	0	0.0018	Res
582867.12_4130817.12	582867.12	4130817.12	1.22E-05	4.82E-09	2.89E-09	4.82E-09	3.83E-09	8.73E-09	2.04E-07	7.09E-09	0	1.701E-09	0	0	0.0017	Res
581735.72_4130901.03	581735.72	4130901.03	6.87E-04	3.50E-07	2.10E-07	3.50E-07	2.25E-07	6.44E-07	1.51E-05	5.32E-07	0	9.597E-08	0	0	0.0960	Res
581792.29_4130901.03	581792.29	4130901.03	7.34E-04	3.74E-07	2.24E-07	3.74E-07	2.40E-07	6.88E-07	1.62E-05	5.68E-07	0	1.024E-07	0	0	0.1024	Res
581848.86_4130901.03	581848.86	4130901.03	6.54E-04	3.33E-07	2.00E-07	3.33E-07	2.14E-07	6.13E-07	1.44E-05	5.06E-07	0	9.131E-08	0	0	0.0913	Res
581905.43_4130901.03	581905.43	4130901.03	3.44E-04	1.75E-07	1.05E-07	1.75E-07	1.13E-07	3.21E-07	7.54E-06	2.65E-07	0	4.804E-08	0	0	0.0480	Res
581962_4130901.03	581962	4130901.03	1.40E-04	7.03E-08	4.22E-08	7.03E-08	4.59E-08	1.29E-07	3.03E-06	1.07E-07	0	1.961E-08	0	0	0.0196	Res
582018.57_4130901.03	582018.57	4130901.03	7.59E-05	3.73E-08	2.24E-08	3.73E-08	2.47E-08	6.85E-08	1.61E-06	5.65E-08	0	1.06E-08	0	0	0.0106	Res
582075.14_4130901.03	582075.14	4130901.03	5.13E-05	2.48E-08	1.49E-08	2.48E-08	1.66E-08	4.54E-08	1.07E-06	3.74E-08	0	7.162E-09	0	0	0.0072	Res
582131.71_4130901.03	582131.71	4130901.03	3.95E-05	1.88E-08	1.13E-08	1.88E-08	1.28E-08	3.44E-08	8.08E-07	2.83E-08	0	5.514E-09	0	0	0.0055	Res
582188.28_4130901.03	582188.28	4130901.03	3.25E-05	1.53E-08	9.17E-09	1.53E-08	1.05E-08	2.80E-08	6.56E-07	2.30E-08	0	4.542E-09	0	0	0.0045	Res
582244.85_4130901.03	582244.85	4130901.03	2.78E-05	1.29E-08	7.74E-09	1.29E-08	8.95E-09	2.36E-08	5.53E-07	1.94E-08	0	3.88E-09	0	0	0.0039	Res
582301.42_4130901.03	582301.42	4130901.03	2.43E-05	1.11E-08	6.68E-09	1.11E-08	7.81E-09	2.04E-08	4.77E-07	1.67E-08	0	3.392E-09	0	0	0.0034	Res
582357.99_4130901.03	582357.99	4130901.03	2.16E-05	9.79E-09	5.88E-09	9.79E-09	6.94E-09	1.79E-08	4.19E-07	1.47E-08	0	3.02E-09	0	0	0.0030	Res
582414.56_4130901.03	582414.56	4130901.03	1.95E-05	8.72E-09	5.23E-09	8.72E-09	6.24E-09	1.59E-08	3.73E-07	1.30E-08	0	2.722E-09	0	0	0.0027	Res
582471.13_4130901.03	582471.13	4130901.03	1.78E-05	7.86E-09	4.72E-09	7.86E-09	5.69E-09	1.43E-08	3.36E-07	1.17E-08	0	2.484E-09	0	0	0.0025	Res
582527.7_4130901.03	582527.7	4130901.03	1.64E-05	7.14E-09	4.28E-09	7.14E-09	5.22E-09	1.30E-08	3.05E-07	1.06E-08	0	2.287E-09	0	0	0.0023	Res
582584.27_4130901.03	582584.27	4130901.03	1.52E-05	6.56E-09	3.93E-09	6.56E-09	4.85E-09	1.19E-08	2.80E-07	9.76E-09	0	2.126E-09	0	0	0.0021	Res
582640.84_4130901.03	582640.84	4130901.03	1.43E-05	6.06E-09	3.64E-09	6.06E-09	4.53E-09	1.10E-08	2.58E-07	9.01E-09	0	1.992E-09	0	0	0.0020	Res
582697.41_4130901.03	582697.41	4130901.03	1.34E-05	5.64E-09	3.38E-09	5.64E-09	4.26E-09	1.03E-08	2.40E-07	8.36E-09	0	1.877E-09	0	0	0.0019	Res
582753.98_4130901.03	582753.98	4130901.03	1.27E-05	5.27E-09	3.16E-09	5.27E-09	4.02E-09	9.57E-09	2.24E-07	7.79E-09	0	1.775E-09	0	0	0.0018	Res
582810.55_4130901.03	582810.55	4130901.03	1.21E-05	4.93E-09	2.96E-09	4.93E-09	3.81E-09	8.94E-09	2.09E-07	7.28E-09	0	1.683E-09	0	0	0.0017	Res
582867.12_4130901.03	582867.12	4130901.03	1.15E-05	4.64E-09	2.78E-09	4.64E-09	3.62E-09	8.41E-09	1.97E-07	6.84E-09	0	1.604E-09	0	0	0.0016	Res
581735.72_4130984.94	581735.72	4130984.94	1.83E-03	9.35E-07	5.61E-07	9.35E-07	5.99E-07	1.72E-06	4.04E-05	1.42E-06	0	2.553E-07	0	0	0.2553	Res
581792.29_4130984.94	581792.29	4130984.94	2.40E-03	1.23E-06	7.37E-07	1.23E-06	7.87E-07	2.26E-06	5.30E-05	1.87E-06	0	3.351E-07	0	0	0.3351	Res
581848.86_4130984.94	581848.86	4130984.94	2.79E-03	1.43E-06	8.57E-07	1.43E-06	9.15E-07	2.63E-06	6.17E-05	2.17E-06	0	3.898E-07	0	0	0.3898	Res
581905.43_4130984.94	581905.43	4130984.94	2.24E-04	1.13E-07	6.77E-08	1.13E-07	7.31E-08	2.08E-07	4.87E-06	1.71E-07	0	3.122E-08	0	0	0.0312	Res
581962_4130984.94	581962	4130984.94	9.68E-05	4.80E-08	2.88E-08	4.80E-08	3.15E-08	8.81E-08	2.07E-06	7.26E-08	0	1.351E-08	0	0	0.0135	Res
582018.57_4130984.94	582018.57	4130984.94	6.27E-05	3.06E-08	1.84E-08	3.06E-08	2.04E-08	5.61E-08	1.32E-06	4.62E-08	0	8.752E-09	0	0	0.0088	Res
582075.14_4130984.94	582075.14	4130984.94	4.64E-05	2.23E-08	1.34E-08	2.23E-08	1.51E-08	4.10E-08	9.61E-07	3.37E-08	0	6.484E-09	0	0	0.0065	Res
582131.71_4130984.94	582131.71	4130984.94	3.69E-05	1.75E-08	1.05E-08	1.75E-08	1.19E-08	3.21E-08	7.52E-07	2.64E-08	0	5.148E-09	0	0	0.0051	Res
582188.28_4130984.94	582188.28	4130984.94	3.05E-05	1.43E-08	8.58E-09	1.43E-08	9.84E-09	2.62E-08	6.14E-07	2.15E-08	0	4.256E-09	0	0	0.0043	Res
582244.85_4130984.94	582244.85	4130984.94	2.59E-05	1.20E-08	7.22E-09	1.20E-08	8.36E-09	2.20E-08	5.16E-07	1.81E-08	0	3.622E-09	0	0	0.0036	Res
582301.42_4130984.94	582301.42	4130984.94	2.26E-05	1.03E-08	6.21E-09	1.03E-08	7.26E-09	1.89E-08	4.44E-07	1.55E-08	0	3.151E-09	0	0	0.0032	Res
582357.99_4130984.94	582357.99	4130984.94	2.00E-05	9.07E-09	5.44E-09	9.07E-09	6.42E-09	1.66E-08	3.88E-07	1.36E-08	0	2.791E-09	0	0	0.0028	Res
582414.56_4130984.94	582414.56	4130984.94	1.80E-05	8.06E-09	4.84E-09	8.06E-09	5.75E-09	1.47E-08	3.45E-07	1.21E-08	0	2.507E-09	0	0	0.0025	Res
582471.13_4130984.94	582471.13	4130984.94	1.63E-05	7.25E-09	4.35E-09	7.25E-09	5.22E-09	1.32E-08	3.10E-07	1.08E-08	0	2.278E-09	0	0	0.0023	Res

Risk Calculation Part 2, $\sum R1*C_{TAC}$

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)								3rd Trimester	0<2	2<16	16<30	Cancer Risk - 2025	Receptor Type
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Cobalt	Lead	Nickel	Chromium VI					(per million)	
582527.7_4130984.94	582527.7	4130984.94	1.50E-05	6.58E-09	3.95E-09	6.58E-09	4.78E-09	1.20E-08	2.81E-07	9.82E-09	0	2.09E-09	0	0	0.0021	Res
582584.27_4130984.94	582584.27	4130984.94	1.39E-05	6.04E-09	3.62E-09	6.04E-09	4.43E-09	1.10E-08	2.58E-07	9.00E-09	0	1.94E-09	0	0	0.0019	Res
582640.84_4130984.94	582640.84	4130984.94	1.30E-05	5.60E-09	3.36E-09	5.60E-09	4.15E-09	1.02E-08	2.39E-07	8.34E-09	0	1.819E-09	0	0	0.0018	Res
582697.41_4130984.94	582697.41	4130984.94	1.23E-05	5.21E-09	3.12E-09	5.21E-09	3.89E-09	9.48E-09	2.22E-07	7.74E-09	0	1.711E-09	0	0	0.0017	Res
582753.98_4130984.94	582753.98	4130984.94	1.16E-05	4.89E-09	2.93E-09	4.89E-09	3.69E-09	8.88E-09	2.08E-07	7.25E-09	0	1.623E-09	0	0	0.0016	Res
582810.55_4130984.94	582810.55	4130984.94	1.11E-05	4.59E-09	2.76E-09	4.59E-09	3.50E-09	8.34E-09	1.95E-07	6.80E-09	0	1.543E-09	0	0	0.0015	Res
582867.12_4130984.94	582867.12	4130984.94	1.05E-05	4.33E-09	2.60E-09	4.33E-09	3.33E-09	7.86E-09	1.84E-07	6.40E-09	0	1.473E-09	0	0	0.0015	Res
581735.72_4131068.85	581735.72	4131068.85	3.00E-04	1.52E-07	9.12E-08	1.52E-07	9.82E-08	2.79E-07	6.56E-06	2.31E-07	0	4.192E-08	0	0	0.0419	Res
581792.29_4131068.85	581792.29	4131068.85	2.40E-04	1.21E-07	7.26E-08	1.21E-07	7.84E-08	2.23E-07	5.22E-06	1.84E-07	0	3.348E-08	0	0	0.0335	Res
581848.86_4131068.85	581848.86	4131068.85	1.30E-04	6.48E-08	3.89E-08	6.48E-08	4.23E-08	1.19E-07	2.79E-06	9.81E-08	0	1.811E-08	0	0	0.0181	Res
581905.43_4131068.85	581905.43	4131068.85	8.31E-05	4.09E-08	2.46E-08	4.09E-08	2.71E-08	7.52E-08	1.76E-06	6.20E-08	0	1.16E-08	0	0	0.0116	Res
581962_4131068.85	581962	4131068.85	6.05E-05	2.94E-08	1.77E-08	2.94E-08	1.97E-08	5.40E-08	1.27E-06	4.45E-08	0	8.446E-09	0	0	0.0084	Res
582018.57_4131068.85	582018.57	4131068.85	4.61E-05	2.21E-08	1.33E-08	2.21E-08	1.49E-08	4.06E-08	9.52E-07	3.34E-08	0	6.434E-09	0	0	0.0064	Res
582075.14_4131068.85	582075.14	4131068.85	3.67E-05	1.74E-08	1.04E-08	1.74E-08	1.19E-08	3.19E-08	7.48E-07	2.62E-08	0	5.127E-09	0	0	0.0051	Res
582131.71_4131068.85	582131.71	4131068.85	3.04E-05	1.42E-08	8.53E-09	1.42E-08	9.80E-09	2.60E-08	6.10E-07	2.14E-08	0	4.242E-09	0	0	0.0042	Res
582188.28_4131068.85	582188.28	4131068.85	2.57E-05	1.19E-08	7.14E-09	1.19E-08	8.29E-09	2.18E-08	5.11E-07	1.79E-08	0	3.595E-09	0	0	0.0036	Res
582244.85_4131068.85	582244.85	4131068.85	2.23E-05	1.02E-08	6.12E-09	1.02E-08	7.17E-09	1.87E-08	4.37E-07	1.53E-08	0	3.116E-09	0	0	0.0031	Res
582301.42_4131068.85	582301.42	4131068.85	1.97E-05	8.90E-09	5.34E-09	8.90E-09	6.31E-09	1.63E-08	3.81E-07	1.33E-08	0	2.743E-09	0	0	0.0027	Res
582357.99_4131068.85	582357.99	4131068.85	1.75E-05	7.86E-09	4.72E-09	7.86E-09	5.62E-09	1.44E-08	3.36E-07	1.18E-08	0	2.448E-09	0	0	0.0024	Res
582414.56_4131068.85	582414.56	4131068.85	1.58E-05	7.04E-09	4.22E-09	7.04E-09	5.07E-09	1.29E-08	3.01E-07	1.05E-08	0	2.212E-09	0	0	0.0022	Res
582471.13_4131068.85	582471.13	4131068.85	1.45E-05	6.37E-09	3.82E-09	6.37E-09	4.62E-09	1.16E-08	2.72E-07	9.51E-09	0	2.018E-09	0	0	0.0020	Res
582527.7_4131068.85	582527.7	4131068.85	1.33E-05	5.81E-09	3.49E-09	5.81E-09	4.24E-09	1.06E-08	2.48E-07	8.66E-09	0	1.857E-09	0	0	0.0019	Res
582584.27_4131068.85	582584.27	4131068.85	1.23E-05	5.33E-09	3.20E-09	5.33E-09	3.92E-09	9.71E-09	2.27E-07	7.93E-09	0	1.718E-09	0	0	0.0017	Res
582640.84_4131068.85	582640.84	4131068.85	1.16E-05	4.98E-09	2.99E-09	4.98E-09	3.68E-09	9.06E-09	2.12E-07	7.40E-09	0	1.617E-09	0	0	0.0016	Res
582697.41_4131068.85	582697.41	4131068.85	1.09E-05	4.66E-09	2.79E-09	4.66E-09	3.47E-09	8.48E-09	1.98E-07	6.92E-09	0	1.526E-09	0	0	0.0015	Res
582753.98_4131068.85	582753.98	4131068.85	1.04E-05	4.40E-09	2.64E-09	4.40E-09	3.30E-09	8.00E-09	1.87E-07	6.53E-09	0	1.453E-09	0	0	0.0015	Res
582810.55_4131068.85	582810.55	4131068.85	9.96E-06	4.17E-09	2.50E-09	4.17E-09	3.15E-09	7.58E-09	1.77E-07	6.18E-09	0	1.39E-09	0	0	0.0014	Res
582867.12_4131068.85	582867.12	4131068.85	9.48E-06	3.93E-09	2.36E-09	3.93E-09	3.00E-09	7.14E-09	1.67E-07	5.82E-09	0	1.323E-09	0	0	0.0013	Res
582018.57_4131152.76	582018.57	4131152.76	3.12E-05	1.45E-08	8.72E-09	1.45E-08	1.01E-08	2.66E-08	6.24E-07	2.19E-08	0	4.353E-09	0	0	0.0044	Res
582244.85_4131152.76	582244.85	4131152.76	1.90E-05	8.51E-09	5.11E-09	8.51E-09	6.08E-09	1.55E-08	3.64E-07	1.27E-08	0	2.649E-09	0	0	0.0026	Res
582301.42_4131152.76	582301.42	4131152.76	1.71E-05	7.61E-09	4.57E-09	7.61E-09	5.47E-09	1.39E-08	3.25E-07	1.14E-08	0	2.388E-09	0	0	0.0024	Res
582357.99_4131152.76	582357.99	4131152.76	1.55E-05	6.82E-09	4.09E-09	6.82E-09	4.94E-09	1.24E-08	2.91E-07	1.02E-08	0	2.158E-09	0	0	0.0022	Res
582414.56_4131152.76	582414.56	4131152.76	1.41E-05	6.16E-09	3.70E-09	6.16E-09	4.50E-09	1.12E-08	2.63E-07	9.19E-09	0	1.967E-09	0	0	0.0020	Res
582471.13_4131152.76	582471.13	4131152.76	1.28E-05	5.55E-09	3.33E-09	5.55E-09	4.08E-09	1.01E-08	2.37E-07	8.27E-09	0	1.787E-09	0	0	0.0018	Res
582527.7_4131152.76	582527.7	4131152.76	1.18E-05	5.07E-09	3.04E-09	5.07E-09	3.75E-09	9.23E-09	2.16E-07	7.54E-09	0	1.644E-09	0	0	0.0016	Res
582584.27_4131152.76	582584.27	4131152.76	1.09E-05	4.65E-09	2.79E-09	4.65E-09	3.46E-09	8.47E-09	1.98E-07	6.92E-09	0	1.521E-09	0	0	0.0015	Res
582640.84_4131152.76	582640.84	4131152.76	1.02E-05	4.32E-09	2.59E-09	4.32E-09	3.23E-09	7.86E-09	1.84E-07	6.42E-09	0	1.422E-09	0	0	0.0014	Res
582697.41_4131152.76	582697.41	4131152.76	9.59E-06	4.04E-09	2.43E-09	4.04E-09	3.04E-09	7.35E-09	1.72E-07	6.00E-09	0	1.339E-09	0	0	0.0013	Res
582753.98_4131152.76	582753.98	4131152.76	9.15E-06	3.84E-09	2.30E-09	3.84E-09	2.90E-09	6.97E-09	1.63E-07	5.69E-09	0	1.277E-09	0	0	0.0013	Res
582810.55_4131152.76	582810.55	4131152.76	8.75E-06	3.64E-09	2.19E-09	3.64E-09	2.77E-09	6.62E-09	1.55E-07	5.40E-09	0	1.221E-09	0	0	0.0012	Res
582867.12_4131152.76	582867.12	4131152.76	8.32E-06	3.44E-09	2.06E-09	3.44E-09	2.63E-09	6.25E-09	1.46E-07	5.09E-09	0	1.162E-09	0	0	0.0012	Res

HRA Permanente Creek Restoration Project

Construction Year 2026

Emissions Inputs

Construction Activity	Construction Year & Source	DPM Exhaust (tons/year)	PM10 Dust for speciation (tons/year)	Arsenic (tons/year)	Beryllium (tons/year)	Cadmium (tons/year)	Cobalt (tons/year)	Copper (tons/year)	Lead (tons/year)	Mercury (tons/year)	Nickel (tons/year)	Selenium (tons/year)	Chromium VI (tons/year)	Crystalline Silica (tons/year)
Concrete Channel 2024	2024_CONCRTE	0.000	0.00	2.91E-12	1.74E-12	2.91E-12	1.49E-11	3.26E-11	2.91E-12	4.65E-13	5.35E-11	5.81E-12	2.33E-13	8.63E-09
Paved road	2024_PAVED	2.07E-04	0.08	1.04E-07	6.26E-08	1.04E-07	6.68E-08	2.09E-06	1.92E-07	1.17E-08	4.51E-06	2.09E-07	1.59E-07	5.93E-04
Unpaved road	2024_CCP_UNPV	6.27E-05	0.20	2.56E-07	1.54E-07	2.56E-07	1.64E-07	5.12E-06	4.71E-07	2.87E-08	1.11E-05	5.12E-07	3.89E-07	1.46E-03
Channel Widening 2024	2024_CHAN_RCK	0.002	0.16	2.05E-07	1.23E-07	2.05E-07	1.05E-06	2.29E-06	2.05E-07	3.28E-08	3.77E-06	4.09E-07	1.64E-08	6.08E-04
Paved road	2024_PAVED	1.80E-03	2.39	2.99E-06	1.79E-06	2.99E-06	1.91E-06	5.98E-05	5.50E-06	3.35E-07	1.29E-04	5.98E-06	4.54E-06	1.70E-02
Rock Pile Area 2025	2025_CHAN_RCK	0.006	0.25	3.16E-07	1.89E-07	3.16E-07	1.62E-06	3.54E-06	3.16E-07	5.05E-08	5.81E-06	6.31E-07	2.53E-08	9.37E-04
Paved road	2025_PAVED	5.95E-03	2.44	3.05E-06	1.83E-06	3.05E-06	1.95E-06	6.10E-05	5.61E-06	3.41E-07	1.32E-04	6.10E-06	4.63E-06	1.73E-02
Rock Pile Area 2026	2026_CHAN_RCK	0.006	0.25	3.16E-07	1.89E-07	3.16E-07	1.62E-06	3.54E-06	3.16E-07	5.05E-08	5.81E-06	6.31E-07	2.53E-08	9.37E-04
Paved road	2026_PAVED	5.84E-03	2.44	3.05E-06	1.83E-06	3.05E-06	1.95E-06	6.10E-05	5.61E-06	3.41E-07	1.32E-04	6.10E-06	4.63E-06	1.73E-02
Channel Widening 2027	2027_CHAN_RCK	0.002	0.98	1.23E-06	7.36E-07	1.23E-06	6.28E-06	1.37E-05	1.23E-06	1.96E-07	2.26E-05	2.45E-06	9.82E-08	3.64E-03
Paved road	2027_PAVED	5.61E-03	2.39	2.99E-06	1.79E-06	2.99E-06	1.91E-06	5.98E-05	5.50E-06	3.35E-07	1.29E-04	5.98E-06	4.54E-06	1.70E-02
Material Removal 2028	2028_MATRMVL	0.001	0.25	3.15E-07	1.89E-07	3.15E-07	1.62E-06	3.53E-06	3.15E-07	5.05E-08	5.80E-06	6.31E-07	2.52E-08	9.37E-04
Paved road	2028_PAVED	5.57E-03	2.39	2.99E-06	1.80E-06	2.99E-06	1.92E-06	5.98E-05	5.51E-06	3.35E-07	1.29E-04	5.98E-06	4.55E-06	1.70E-02
Unpaved road	2028_UNPAVED	3.40E-03	11.84	1.48E-05	8.88E-06	1.48E-05	9.47E-06	2.96E-04	2.72E-05	1.66E-06	6.40E-04	2.96E-05	2.25E-05	8.41E-02
Material Removal 2029	2029_MATRMVL	0.001	0.25	3.15E-07	1.89E-07	3.15E-07	1.62E-06	3.53E-06	3.15E-07	5.05E-08	5.80E-06	6.31E-07	2.52E-08	9.37E-04
Paved road	2029_PAVED	5.56E-03	2.41	3.01E-06	1.81E-06	3.01E-06	1.93E-06	6.03E-05	5.55E-06	3.38E-07	1.30E-04	6.03E-06	4.58E-06	1.71E-02
Unpaved road	2029_UNPAVED	3.39E-03	11.93	1.49E-05	8.95E-06	1.49E-05	9.55E-06	2.98E-04	2.74E-05	1.67E-06	6.44E-04	2.98E-05	2.27E-05	8.47E-02

Construction Activity	Construction Year	DPM (g/s)	Arsenic (g/s)	Beryllium (g/s)	Cadmium (g/s)	Cobalt (g/s)	Copper (g/s)	Lead (g/s)	Mercury (g/s)	Nickel (g/s)	Selenium (g/s)	Chromium VI (g/s)	Crystalline Silica (g/s)
Concrete Channel 2024	2024_CONCRTE	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Paved road	2024_PAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Unpaved road	2024_CCP_UNPV	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Channel Widening 2024	2024_CHAN_RCK	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Paved road	2024_PAVED	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Rock Pile Area 2025	2025_CHAN_RCK	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Paved road	2025_PAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Rock Pile Area 2026	2026_CHAN_RCK	1.698E-04	9.08E-09	5.45E-09	9.08E-09	4.65E-08	1.02E-07	9.08E-09	1.45E-09	1.67E-07	1.82E-08	7.26E-10	2.70E-05
Paved road	2026_PAVED	1.681E-04	8.77E-08	5.26E-08	8.77E-08	5.61E-08	1.75E-06	1.61E-07	9.82E-09	3.79E-06	1.75E-07	1.33E-07	4.98E-04
Channel Widening 2027	2027_CHAN_RCK	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Paved road	2027_PAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Material Removal 2028	2028_MATRMVL	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Paved road	2028_PAVED	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Unpaved road	2028_UNPAVED	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Material Removal 2029	2029_MATRMVL	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Paved road	2029_PAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Unpaved road	2029_UNPAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

N/A = not including PM10 on-site dust in HRA calculation; it is only for speciating metals.

Exposure Duration, ED

	Exposure Start	3rd Trimester	0<2	2<16	16<30
Years	1/1/2026	0	0.25	0.75	0

Risk Factors

	Abbreviation	UOM	3rd Trimester	0<2	2<16	16<30
Daily Breathing Rate (95th %'ile)	DBR	L/kg-day	361	1090	572	261
Fraction Of Time At Home [a]	FAH	unitless	0.85	0.85	0.72	0.73
Exposure Frequency	EF	days/year	0.96	0.96	0.96	0.96
Age Sensitivity Factor	ASF	unitless	10	10	3	1
Inhalation Absorption Factor	A	unitless	1	1	1	1
Conversion Factor	CF_1	m^3/L	0.001	0.001	0.001	0.001
Conversion Factor	CF_2	$\mu g/m^3$	0.001	0.001	0.001	0.001
Averaging Time (for residential exposure)	AT	years	70.00	70.00	70.00	70.00

[a] assume school or daycare will have cancer risk of >1 per million

Cancer Potency Factor, CPF

TAC	UOM	
DPM	$mg/kg\text{-}day^{-1}$	1.1
Arsenic	$mg/kg\text{-}day^{-1}$	12
Beryllium	$mg/kg\text{-}day^{-1}$	8.4
Cadmium	$mg/kg\text{-}day^{-1}$	15
Cobalt	$mg/kg\text{-}day^{-1}$	27
Lead	$mg/kg\text{-}day^{-1}$	0.04
Nickel	$mg/kg\text{-}day^{-1}$	0.91
Chromium VI	$mg/kg\text{-}day^{-1}$	510

Intake Factor for Inhalation, IF (m^3/kg-day)

Equation	3rd Trimester	0<2	2<16	16<30
DBR*FAH*EF*ED*ASF*A*CF/AT	0.000	0.032	0.013	0.000

Risk Calculation Part 1, R1

	TAC	3rd Trimester	0<2	2<16	16<30
IF*CPF*CF	DPM	0.00E+00	3.49E-05	1.40E-05	0.00E+00
	Arsenic	0.00E+00	3.81E-04	1.52E-04	0.00E+00
	Beryllium	0.00E+00	2.67E-04	1.07E-04	0.00E+00
	Cadmium	0.00E+00	4.76E-04	1.91E-04	0.00E+00
	Cobalt	0.00E+00	8.57E-04	3.43E-04	0.00E+00
	Lead	0.00E+00	1.27E-06	5.08E-07	0.00E+00
	Nickel	0.00E+00	2.89E-05	1.16E-05	0.00E+00
	Chromium VI	0.00E+00	1.62E-02	6.48E-03	0.00E+00

Risk Calculation Part 2, $\sum R1*C_{TAC}$

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)								3rd Trimester	0<2	2<16	16<30	Cancer Risk - 2026	Receptor Type
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Cobalt	Lead	Nickel	Chromium VI					(per million)	
581336.22_4131207.48	581336.22	4131207.48	1.96E-04	1.01E-07	6.05E-08	1.01E-07	6.54E-08	1.85E-07	4.35E-06	1.53E-07	0	6.858E-09	2.74656E-09	0	0.0096	CT House
581554.22_4130688.06	581554.22	4130688.06	1.35E-04	6.70E-08	4.02E-08	6.70E-08	4.46E-08	1.23E-07	2.88E-06	1.01E-07	0	4.71E-09	1.88641E-09	0	0.0066	Res
579793.36_4131503.29	579793.36	4131503.29	1.24E-05	3.69E-09	2.21E-09	3.69E-09	3.78E-09	6.52E-09	1.51E-07	5.15E-09	0	4.321E-10	1.73051E-10	0	0.0006	Acute
580488.37_4131517.71	580488.37	4131517.71	1.56E-05	6.54E-09	3.92E-09	6.54E-09	5.01E-09	1.19E-08	2.78E-07	9.68E-09	0	5.449E-10	2.18225E-10	0	0.0008	Acute
581678.43_4131040.03	581678.43	4131040.03	6.23E-04	3.23E-07	1.94E-07	3.23E-07	2.08E-07	5.94E-07	1.39E-05	4.91E-07	0	2.175E-08	8.71051E-09	0	0.0305	Res
581635.43_4130978.54	581635.43	4130978.54	1.26E-03	6.55E-07	3.93E-07	6.55E-07	4.20E-07	1.20E-06	2.83E-05	9.95E-07	0	4.397E-08	1.76109E-08	0	0.0616	Res
581830.06_4131027.55	581830.06	4131027.55	5.74E-04	2.97E-07	1.78E-07	2.97E-07	1.91E-07	5.47E-07	1.28E-05	4.52E-07	0	2.003E-08	8.02109E-09	0	0.0280	Res
581727.48_4130976.54	581727.48	4130976.54	1.52E-03	7.93E-07	4.76E-07	7.93E-07	5.09E-07	1.46E-06	3.43E-05	1.21E-06	0	5.32E-08	2.13092E-08	0	0.0745	Res
581789.11_4130419.65	581789.11	4130419.65	1.05E-04	5.04E-08	3.02E-08	5.04E-08	3.45E-08	9.23E-08	2.16E-06	7.59E-08	0	3.666E-09	1.46821E-09	0	0.0051	Res
581700.32_4130781.89	581700.32	4130781.89	3.04E-04	1.56E-07	9.37E-08	1.56E-07	1.01E-07	2.87E-07	6.74E-06	2.37E-07	0	1.061E-08	4.25103E-09	0	0.0149	Res
581426.07_4131299.01	581426.07	4131299.01	7.16E-05	3.59E-08	2.15E-08	3.59E-08	2.37E-08	6.59E-08	1.55E-06	5.43E-08	0	2.5E-09	1.00133E-09	0	0.0035	Acute
582301.42_4129474.56	582301.42	4129474.56	3.74E-05	1.55E-08	9.29E-09	1.55E-08	1.20E-08	2.81E-08	6.57E-07	2.29E-08	0	1.306E-09	5.23128E-10	0	0.0018	Res
582357.99_4129474.56	582357.99	4129474.56	3.50E-05	1.45E-08	8.67E-09	1.45E-08	1.12E-08	2.62E-08	6.14E-07	2.13E-08	0	1.223E-09	4.89859E-10	0	0.0017	Res
582414.56_4129474.56	582414.56	4129474.56	3.29E-05	1.35E-08	8.11E-09	1.35E-08	1.05E-08	2.45E-08	5.74E-07	2.00E-08	0	1.148E-09	4.5977E-10	0	0.0016	Res
582471.13_4129474.56	582471.13	4129474.56	3.09E-05	1.27E-08	7.61E-09	1.27E-08	9.88E-09	2.30E-08	5.38E-07	1.87E-08	0	1.08E-09	4.32409E-10	0	0.0015	Res
582527.7_4129474.56	582527.7	4129474.56	2.92E-05	1.20E-08	7.18E-09	1.20E-08	9.34E-09	2.17E-08	5.08E-07	1.76E-08	0	1.021E-09	4.08839E-10	0	0.0014	Res
582584.27_4129474.56	582584.27	4129474.56	2.75E-05	1.12E-08	6.74E-09	1.12E-08	8.79E-09	2.04E-08	4.77E-07	1.66E-08	0	9.611E-10	3.84938E-10	0	0.0013	Res
582640.84_4129474.56	582640.84	4129474.56	2.58E-05	1.05E-08	6.27E-09	1.05E-08	8.22E-09	1.90E-08	4.43E-07	1.54E-08	0	8.99E-10	3.60054E-10	0	0.0013	Res
582244.85_4129558.47	582244.85	4129558.47	3.90E-05	1.57E-08	9.41E-09	1.57E-08	1.24E-08	2.84E-08	6.64E-07	2.31E-08	0	1.36E-09	5.44622E-10	0	0.0019	Res
582301.42_4129558.47	582301.42	4129558.47	3.79E-05	1.56E-08	9.34E-09	1.56E-08	1.21E-08	2.82E-08	6.60E-07	2.30E-08	0	1.323E-09	5.30044E-10	0	0.0019	Res
582357.99_4129558.47	582357.99	4129558.47	3.58E-05	1.48E-08	8.85E-09	1.48E-08	1.14E-08	2.68E-08	6.26E-07	2.18E-08	0	1.249E-09	5.00153E-10	0	0.0017	Res
582414.56_4129558.47	582414.56	4129558.47	3.36E-05	1.38E-08	8.30E-09	1.38E-08	1.07E-08	2.51E-08	5.87E-07	2.04E-08	0	1.173E-09	4.69705E-10	0	0.0016	Res
582471.13_4129558.47	582471.13	4129558.47	3.14E-05	1.29E-08	7.76E-09	1.29E-08	1.00E-08	2.35E-08	5.49E-07	1.91E-08	0	1.097E-09	4.39274E-10	0	0.0015	Res
582527.7_4129558.47	582527.7	4129558.47	2.95E-05	1.21E-08	7.25E-09	1.21E-08	9.42E-09	2.19E-08	5.13E-07	1.78E-08	0	1.029E-09	4.11964E-10	0	0.0014	Res
582584.27_4129558.47	582584.27	4129558.47	2.76E-05	1.13E-08	6.77E-09	1.13E-08	8.82E-09	2.05E-08	4.78E-07	1.66E-08	0	9.643E-10	3.86232E-10	0	0.0014	Res
582640.84_4129558.47	582640.84	4129558.47	2.61E-05	1.06E-08	6.36E-09	1.06E-08	8.32E-09	1.92E-08	4.50E-07	1.56E-08	0	9.101E-10	3.64501E-10	0	0.0013	Res
582697.41_4129558.47	582697.41	4129558.47	2.46E-05	9.96E-09	5.98E-09	9.96E-09	7.84E-09	1.80E-08	4.22E-07	1.47E-08	0	8.582E-10	3.43712E-10	0	0.0012	Res
582244.85_4129642.38	582244.85	4129642.38	3.57E-05	1.37E-08	8.24E-09	1.37E-08	1.13E-08	2.48E-08	5.79E-07	2.01E-08	0	1.247E-09	4.99487E-10	0	0.0017	Res

Risk Calculation Part 2, $\sum R1*C_{TAC}$

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)								3rd Trimester	0<2	2<16	16<30	Cancer Risk - 2026	Receptor Type
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Cobalt	Lead	Nickel	Chromium VI					(per million)	
582301.42_4129642.38	582301.42	4129642.38	3.75E-05	1.52E-08	9.10E-09	1.52E-08	1.19E-08	2.75E-08	6.42E-07	2.23E-08	0	1.308E-09	5.23724E-10	0	0.0018	Res
582357.99_4129642.38	582357.99	4129642.38	3.63E-05	1.50E-08	9.00E-09	1.50E-08	1.16E-08	2.72E-08	6.37E-07	2.22E-08	0	1.268E-09	5.08016E-10	0	0.0018	Res
582414.56_4129642.38	582414.56	4129642.38	3.42E-05	1.42E-08	8.50E-09	1.42E-08	1.09E-08	2.57E-08	6.01E-07	2.09E-08	0	1.194E-09	4.78303E-10	0	0.0017	Res
582471.13_4129642.38	582471.13	4129642.38	3.21E-05	1.33E-08	7.97E-09	1.33E-08	1.03E-08	2.41E-08	5.64E-07	1.96E-08	0	1.121E-09	4.48889E-10	0	0.0016	Res
582527.7_4129642.38	582527.7	4129642.38	3.02E-05	1.25E-08	7.48E-09	1.25E-08	9.66E-09	2.26E-08	5.29E-07	1.84E-08	0	1.054E-09	4.22233E-10	0	0.0015	Res
582584.27_4129642.38	582584.27	4129642.38	2.82E-05	1.16E-08	6.95E-09	1.16E-08	9.01E-09	2.10E-08	4.91E-07	1.71E-08	0	9.836E-10	3.93961E-10	0	0.0014	Res
582640.84_4129642.38	582640.84	4129642.38	2.64E-05	1.08E-08	6.48E-09	1.08E-08	8.44E-09	1.96E-08	4.58E-07	1.59E-08	0	9.224E-10	3.69454E-10	0	0.0013	Res
582697.41_4129642.38	582697.41	4129642.38	2.48E-05	1.01E-08	6.06E-09	1.01E-08	7.92E-09	1.83E-08	4.28E-07	1.49E-08	0	8.667E-10	3.47114E-10	0	0.0012	Res
582753.98_4129642.38	582753.98	4129642.38	2.33E-05	9.42E-09	5.65E-09	9.42E-09	7.43E-09	1.71E-08	3.99E-07	1.39E-08	0	8.131E-10	3.25648E-10	0	0.0011	Res
582810.55_4129642.38	582810.55	4129642.38	2.19E-05	8.81E-09	5.28E-09	8.81E-09	6.98E-09	1.60E-08	3.73E-07	1.30E-08	0	7.651E-10	3.06417E-10	0	0.0011	Res
582867.12_4129642.38	582867.12	4129642.38	2.04E-05	8.14E-09	4.88E-09	8.14E-09	6.50E-09	1.47E-08	3.45E-07	1.20E-08	0	7.135E-10	2.85754E-10	0	0.0010	Res
582244.85_4129726.29	582244.85	4129726.29	3.81E-05	1.51E-08	9.08E-09	1.51E-08	1.21E-08	2.74E-08	6.40E-07	2.22E-08	0	1.331E-09	5.33143E-10	0	0.0019	Res
582301.42_4129726.29	582301.42	4129726.29	3.67E-05	1.48E-08	8.85E-09	1.48E-08	1.17E-08	2.67E-08	6.25E-07	2.17E-08	0	1.282E-09	5.13532E-10	0	0.0018	Res
582357.99_4129726.29	582357.99	4129726.29	3.65E-05	1.51E-08	9.07E-09	1.51E-08	1.17E-08	2.74E-08	6.42E-07	2.23E-08	0	1.275E-09	5.10764E-10	0	0.0018	Res
582414.56_4129726.29	582414.56	4129726.29	3.47E-05	1.44E-08	8.67E-09	1.44E-08	1.11E-08	2.62E-08	6.14E-07	2.13E-08	0	1.212E-09	4.85491E-10	0	0.0017	Res
582471.13_4129726.29	582471.13	4129726.29	3.27E-05	1.36E-08	8.17E-09	1.36E-08	1.05E-08	2.47E-08	5.78E-07	2.01E-08	0	1.143E-09	4.57722E-10	0	0.0016	Res
582527.7_4129726.29	582527.7	4129726.29	3.08E-05	1.28E-08	7.68E-09	1.28E-08	9.86E-09	2.32E-08	5.44E-07	1.89E-08	0	1.075E-09	4.3038E-10	0	0.0015	Res
582584.27_4129726.29	582584.27	4129726.29	2.89E-05	1.20E-08	7.18E-09	1.20E-08	9.24E-09	2.17E-08	5.08E-07	1.77E-08	0	1.008E-09	4.038E-10	0	0.0014	Res
582640.84_4129726.29	582640.84	4129726.29	2.70E-05	1.12E-08	6.69E-09	1.12E-08	8.65E-09	2.02E-08	4.73E-07	1.65E-08	0	9.44E-10	3.78072E-10	0	0.0013	Res
582697.41_4129726.29	582697.41	4129726.29	2.51E-05	1.03E-08	6.18E-09	1.03E-08	8.03E-09	1.87E-08	4.37E-07	1.52E-08	0	8.777E-10	3.51525E-10	0	0.0012	Res
582753.98_4129726.29	582753.98	4129726.29	2.33E-05	9.45E-09	5.67E-09	9.45E-09	7.43E-09	1.71E-08	4.00E-07	1.39E-08	0	8.127E-10	3.25497E-10	0	0.0011	Res
582810.55_4129726.29	582810.55	4129726.29	2.14E-05	8.57E-09	5.14E-09	8.57E-09	6.80E-09	1.55E-08	3.63E-07	1.26E-08	0	7.459E-10	2.98741E-10	0	0.0010	Res
582244.85_4129810.2	582244.85	4129810.2	3.73E-05	1.47E-08	8.82E-09	1.47E-08	1.18E-08	2.66E-08	6.22E-07	2.16E-08	0	1.301E-09	5.20889E-10	0	0.0018	Res
582301.42_4129810.2	582301.42	4129810.2	3.69E-05	1.50E-08	8.98E-09	1.50E-08	1.18E-08	2.71E-08	6.35E-07	2.21E-08	0	1.289E-09	5.16319E-10	0	0.0018	Res
582357.99_4129810.2	582357.99	4129810.2	3.61E-05	1.49E-08	8.95E-09	1.49E-08	1.15E-08	2.71E-08	6.33E-07	2.20E-08	0	1.26E-09	5.04717E-10	0	0.0018	Res
582414.56_4129810.2	582414.56	4129810.2	3.48E-05	1.46E-08	8.73E-09	1.46E-08	1.12E-08	2.64E-08	6.18E-07	2.15E-08	0	1.216E-09	4.86955E-10	0	0.0017	Res
582471.13_4129810.2	582471.13	4129810.2	3.31E-05	1.39E-08	8.34E-09	1.39E-08	1.06E-08	2.52E-08	5.91E-07	2.06E-08	0	1.156E-09	4.62843E-10	0	0.0016	Res
582527.7_4129810.2	582527.7	4129810.2	3.11E-05	1.30E-08	7.81E-09	1.30E-08	9.97E-09	2.36E-08	5.53E-07	1.92E-08	0	1.085E-09	4.34593E-10	0	0.0015	Res
582584.27_4129810.2	582584.27	4129810.2	2.90E-05	1.21E-08	7.26E-09	1.21E-08	9.30E-09	2.20E-08	5.14E-07	1.79E-08	0	1.013E-09	4.05663E-10	0	0.0014	Res
582640.84_4129810.2	582640.84	4129810.2	2.67E-05	1.10E-08	6.62E-09	1.10E-08	8.54E-09	2.00E-08	4.68E-07	1.63E-08	0	9.315E-10	3.73094E-10	0	0.0013	Res
582697.41_4129810.2	582697.41	4129810.2	2.46E-05	1.01E-08	6.04E-09	1.01E-08	7.86E-09	1.83E-08	4.27E-07	1.49E-08	0	8.584E-10	3.43821E-10	0	0.0012	Res
581905.43_4129894.11	581905.43	4129894.11	4.48E-05	1.93E-08	1.16E-08	1.93E-08	1.44E-08	3.51E-08	8.21E-07	2.86E-08	0	1.564E-09	6.26477E-10	0	0.0022	Res
581962_4129894.11	581962	4129894.11	4.78E-05	1.95E-08	1.17E-08	1.95E-08	1.53E-08	3.53E-08	8.25E-07	2.87E-08	0	1.669E-09	6.6862E-10	0	0.0023	Res
582131.71_4129894.11	582131.71	4129894.11	4.25E-05	1.69E-08	1.02E-08	1.69E-08	1.35E-08	3.07E-08	7.17E-07	2.49E-08	0	1.484E-09	5.94288E-10	0	0.0021	Res
582188.28_4129894.11	582188.28	4129894.11	4.06E-05	1.63E-08	9.79E-09	1.63E-08	1.29E-08	2.95E-08	6.91E-07	2.40E-08	0	1.416E-09	5.67078E-10	0	0.0020	Res
582244.85_4129894.11	582244.85	4129894.11	3.92E-05	1.60E-08	9.60E-09	1.60E-08	1.25E-08	2.90E-08	6.79E-07	2.36E-08	0	1.368E-09	5.47876E-10	0	0.0019	Res
582301.42_4129894.11	582301.42	4129894.11	3.75E-05	1.55E-08	9.28E-09	1.55E-08	1.20E-08	2.81E-08	6.57E-07	2.28E-08	0	1.309E-09	5.24463E-10	0	0.0018	Res
582357.99_4129894.11	582357.99	4129894.11	3.56E-05	1.48E-08	8.86E-09	1.48E-08	1.14E-08	2.68E-08	6.27E-07	2.18E-08	0	1.243E-09	4.98034E-10	0	0.0017	Res
582414.56_4129894.11	582414.56	4129894.11	3.55E-05	1.51E-08	9.03E-09	1.51E-08	1.14E-08	2.74E-08	6.40E-07	2.23E-08	0	1.238E-09	4.95978E-10	0	0.0017	Res
582471.13_4129894.11	582471.13	4129894.11	3.32E-05	1.41E-08	8.45E-09	1.41E-08	1.07E-08	2.56E-08	5.99E-07	2.09E-08	0	1.159E-09	4.64283E-10	0	0.0016	Res
582527.7_4129894.11	582527.7	4129894.11	3.07E-05	1.29E-08	7.77E-09	1.29E-08	9.86E-09	2.35E-08	5.51E-07	1.92E-08	0	1.072E-09	4.29385E-10	0	0.0015	Res
582584.27_4129894.11	582584.27	4129894.11	2.83E-05	1.18E-08	7.09E-09	1.18E-08	9.06E-09	2.15E-08	5.02E-07	1.75E-08	0	9.87E-10	3.95314E-10	0	0.0014	Res
582640.84_4129894.11	582640.84	4129894.11	2.60E-05	1.07E-08	6.45E-09	1.07E-08	8.31E-09	1.95E-08	4.56E-07	1.59E-08	0	9.064E-10	3.63009E-10	0	0.0013	Res
582697.41_4129894.11	582697.41	4129894.11	2.38E-05	9.75E-09	5.85E-09	9.75E-09	7.61E-09	1.77E-08	4.14E-07	1.44E-08	0	8.314E-10	3.32987E-10	0	0.0012	Res
581962_4129978.02	581962	4129978.02	4.94E-05	2.03E-08	1.22E-08	2.03E-08	1.58E-08	3.69E-08	8.62E-07	3.00E-08	0	1.723E-09	6.90157E-10	0	0.0024	Res
582018.57_4129978.02	582018.57	4129978.02	4.72E-05	1.91E-08	1.15E-08	1.91E-08	1.51E-08	3.46E-08	8.10E-07	2.82E-08	0	1.649E-09	6.60313E-10	0	0.0023	Res
582075.14_4129978.02	582075.14	4129978.02	4.79E-05	1.98E-08	1.19E-08	1.98E-08	1.53E-08	3.59E-08	8.40E-07	2.92E-08	0	1.673E-09	6.70258E-10	0	0.0023	Res
582131.71_4129978.02	582131.71	4129978.02	4.70E-05	1.98E-08	1.19E-08	1.98E-08	1.51E-08	3.60E-08	8.42E-07	2.93E-08	0	1.641E-09	6.57423E-10	0	0.0023	Res
582188.28_4129978.02	582188.28	4129978.02	4.62E-05	1.98E-08	1.19E-08	1.98E-08	1.49E-08	3.61E-08	8.44E-07	2.94E-08	0	1.612E-09	6.45796E-10	0	0.0023	Res
582244.85_4129978.02	582244.85	4129978.02	4.20E-05	1.79E-08	1.07E-08	1.79E-08	1.35E-08	3.25E-08	7.61E-07	2.65E-08	0	1.467E-09	5.87379E-10	0	0.0021	Res
582301.42_4129978.02	582301.42	4129978.02	4.10E-05	1.77E-08	1.06E-08	1.77E-08	1.32E-08	3.22E-08	7.53E-07	2.63E-08	0	1.43E-09	5.72656E-10	0	0.0020	Res
582357.99_4129978.02	582357.99	4129978.02	3.86E-05	1.67E-08	1.00E-08	1.67E-08	1.25E-08	3.04E-08	7.12E-07	2.48E-08	0	1.348E-09	5.40082E-10	0	0.0019	Res
582414.56_4129978.02	582414.56	4129978.02	3.58E-05	1.54E-08	9.26E-09	1.54E-08	1.15E-08	2.81E-08	6.57E-07	2.29E-08	0	1.25E-09	5.0064E-10	0	0.0018	Res
582471.13_4129978.02	582471.13	4129978.02	3.29E-05	1.41E-08	8.46E-09	1.41E-08	1.06E-08	2.56E-08	6.00E-07	2.09E-08	0	1.15E-09	4.60477E-10	0	0.0016	Res
582527.7_4129978.02	582527.7	4129978.02	3.02E-05	1.28E-08	7.68E-09	1.28E-08	9.69E-09	2.33E-08	5.44E-07	1.90E-08	0	1.053E-09	4.21565E-10	0	0.0015	Res

Risk Calculation Part 2, $\sum R1*C_{TAC}$

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)								3rd Trimester	0<2	2<16	16<30	Cancer Risk - 2026	Receptor Type
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Cobalt	Lead	Nickel	Chromium VI					(per million)	
582584.27_4129978.02	582584.27	4129978.02	2.76E-05	1.16E-08	6.95E-09	1.16E-08	8.85E-09	2.10E-08	4.92E-07	1.71E-08	0	9.626E-10	3.85524E-10	0	0.0013	Res
582640.84_4129978.02	582640.84	4129978.02	2.53E-05	1.05E-08	6.30E-09	1.05E-08	8.09E-09	1.90E-08	4.46E-07	1.55E-08	0	8.816E-10	3.53105E-10	0	0.0012	Res
582697.41_4129978.02	582697.41	4129978.02	2.31E-05	9.49E-09	5.70E-09	9.49E-09	7.39E-09	1.72E-08	4.03E-07	1.40E-08	0	8.071E-10	3.2325E-10	0	0.0011	Res
582753.98_4129978.02	582753.98	4129978.02	2.10E-05	8.51E-09	5.11E-09	8.51E-09	6.71E-09	1.54E-08	3.61E-07	1.25E-08	0	7.341E-10	2.94006E-10	0	0.0010	Res
582810.55_4129978.02	582810.55	4129978.02	1.88E-05	7.46E-09	4.47E-09	7.46E-09	5.97E-09	1.35E-08	3.15E-07	1.09E-08	0	6.552E-10	2.62434E-10	0	0.0009	Res
581905.43_4130061.93	581905.43	4130061.93	6.75E-05	2.97E-08	1.78E-08	2.97E-08	2.18E-08	5.40E-08	1.27E-06	4.42E-08	0	2.355E-09	9.43046E-10	0	0.0033	Res
581962_4130061.93	581962	4130061.93	6.35E-05	2.80E-08	1.68E-08	2.80E-08	2.05E-08	5.09E-08	1.19E-06	4.16E-08	0	2.215E-09	8.87024E-10	0	0.0031	Res
582018.57_4130061.93	582018.57	4130061.93	5.50E-05	2.37E-08	1.42E-08	2.37E-08	1.77E-08	4.31E-08	1.01E-06	3.52E-08	0	1.918E-09	7.68354E-10	0	0.0027	Res
582075.14_4130061.93	582075.14	4130061.93	4.94E-05	2.11E-08	1.26E-08	2.11E-08	1.59E-08	3.83E-08	8.96E-07	3.12E-08	0	1.725E-09	6.91077E-10	0	0.0024	Res
582131.71_4130061.93	582131.71	4130061.93	4.79E-05	2.07E-08	1.24E-08	2.07E-08	1.54E-08	3.77E-08	8.82E-07	3.07E-08	0	1.673E-09	6.70012E-10	0	0.0023	Res
582188.28_4130061.93	582188.28	4130061.93	4.64E-05	2.02E-08	1.21E-08	2.02E-08	1.50E-08	3.69E-08	8.63E-07	3.01E-08	0	1.618E-09	6.4793E-10	0	0.0023	Res
582244.85_4130061.93	582244.85	4130061.93	4.50E-05	1.99E-08	1.19E-08	1.99E-08	1.45E-08	3.62E-08	8.47E-07	2.96E-08	0	1.569E-09	6.28442E-10	0	0.0022	Res
582301.42_4130061.93	582301.42	4130061.93	4.18E-05	1.84E-08	1.10E-08	1.84E-08	1.35E-08	3.36E-08	7.86E-07	2.74E-08	0	1.458E-09	5.83987E-10	0	0.0020	Res
582357.99_4130061.93	582357.99	4130061.93	3.88E-05	1.70E-08	1.02E-08	1.70E-08	1.25E-08	3.11E-08	7.27E-07	2.54E-08	0	1.354E-09	5.42336E-10	0	0.0019	Res
582414.56_4130061.93	582414.56	4130061.93	3.57E-05	1.56E-08	9.35E-09	1.56E-08	1.15E-08	2.84E-08	6.65E-07	2.32E-08	0	1.246E-09	4.98859E-10	0	0.0017	Res
582471.13_4130061.93	582471.13	4130061.93	3.25E-05	1.41E-08	8.46E-09	1.41E-08	1.05E-08	2.57E-08	6.01E-07	2.10E-08	0	1.136E-09	4.54894E-10	0	0.0016	Res
582527.7_4130061.93	582527.7	4130061.93	2.96E-05	1.27E-08	7.60E-09	1.27E-08	9.51E-09	2.30E-08	5.40E-07	1.88E-08	0	1.032E-09	4.13166E-10	0	0.0014	Res
582584.27_4130061.93	582584.27	4130061.93	2.69E-05	1.14E-08	6.84E-09	1.14E-08	8.64E-09	2.07E-08	4.85E-07	1.69E-08	0	9.384E-10	3.7586E-10	0	0.0013	Res
582640.84_4130061.93	582640.84	4130061.93	2.44E-05	1.02E-08	6.13E-09	1.02E-08	7.83E-09	1.86E-08	4.34E-07	1.51E-08	0	8.521E-10	3.41282E-10	0	0.0012	Res
582697.41_4130061.93	582697.41	4130061.93	2.23E-05	9.19E-09	5.52E-09	9.19E-09	7.12E-09	1.67E-08	3.90E-07	1.36E-08	0	7.767E-10	3.11102E-10	0	0.0011	Res
582753.98_4130061.93	582753.98	4130061.93	2.04E-05	8.30E-09	4.98E-09	8.30E-09	6.50E-09	1.50E-08	3.52E-07	1.22E-08	0	7.106E-10	2.84589E-10	0	0.0010	Res
582810.55_4130061.93	582810.55	4130061.93	1.86E-05	7.49E-09	4.49E-09	7.49E-09	5.93E-09	1.36E-08	3.17E-07	1.10E-08	0	6.501E-10	2.6038E-10	0	0.0009	Res
581962_4130145.84	581962	4130145.84	7.13E-05	3.28E-08	1.97E-08	3.28E-08	2.32E-08	5.99E-08	1.40E-06	4.91E-08	0	2.489E-09	9.96953E-10	0	0.0035	Res
582018.57_4130145.84	582018.57	4130145.84	6.61E-05	3.03E-08	1.82E-08	3.03E-08	2.15E-08	5.54E-08	1.30E-06	4.54E-08	0	2.307E-09	9.23806E-10	0	0.0032	Res
582075.14_4130145.84	582075.14	4130145.84	5.70E-05	2.57E-08	1.54E-08	2.57E-08	1.85E-08	4.69E-08	1.10E-06	3.84E-08	0	1.988E-09	7.96307E-10	0	0.0028	Res
582131.71_4130145.84	582131.71	4130145.84	5.28E-05	2.38E-08	1.43E-08	2.38E-08	1.71E-08	4.34E-08	1.02E-06	3.55E-08	0	1.842E-09	7.37664E-10	0	0.0026	Res
582188.28_4130145.84	582188.28	4130145.84	5.06E-05	2.30E-08	1.38E-08	2.30E-08	1.65E-08	4.20E-08	9.84E-07	3.44E-08	0	1.768E-09	7.08032E-10	0	0.0025	Res
582244.85_4130145.84	582244.85	4130145.84	4.63E-05	2.09E-08	1.26E-08	2.09E-08	1.50E-08	3.82E-08	8.95E-07	3.13E-08	0	1.617E-09	6.47579E-10	0	0.0023	Res
582301.42_4130145.84	582301.42	4130145.84	4.22E-05	1.89E-08	1.14E-08	1.89E-08	1.37E-08	3.46E-08	8.10E-07	2.83E-08	0	1.472E-09	5.89721E-10	0	0.0021	Res
582357.99_4130145.84	582357.99	4130145.84	3.86E-05	1.72E-08	1.03E-08	1.72E-08	1.25E-08	3.14E-08	7.35E-07	2.57E-08	0	1.346E-09	5.39081E-10	0	0.0019	Res
582414.56_4130145.84	582414.56	4130145.84	3.52E-05	1.56E-08	9.34E-09	1.56E-08	1.14E-08	2.84E-08	6.65E-07	2.32E-08	0	1.227E-09	4.91452E-10	0	0.0017	Res
582471.13_4130145.84	582471.13	4130145.84	3.18E-05	1.40E-08	8.37E-09	1.40E-08	1.03E-08	2.54E-08	5.95E-07	2.08E-08	0	1.111E-09	4.44979E-10	0	0.0016	Res
582527.7_4130145.84	582527.7	4130145.84	2.86E-05	1.24E-08	7.44E-09	1.24E-08	9.23E-09	2.26E-08	5.29E-07	1.84E-08	0	9.991E-10	4.00153E-10	0	0.0014	Res
582584.27_4130145.84	582584.27	4130145.84	2.57E-05	1.10E-08	6.60E-09	1.10E-08	8.27E-09	2.00E-08	4.68E-07	1.63E-08	0	8.976E-10	3.59513E-10	0	0.0013	Res
582640.84_4130145.84	582640.84	4130145.84	2.32E-05	9.78E-09	5.87E-09	9.78E-09	7.45E-09	1.78E-08	4.16E-07	1.45E-08	0	8.098E-10	3.24351E-10	0	0.0011	Res
582697.41_4130145.84	582697.41	4130145.84	2.11E-05	8.76E-09	5.25E-09	8.76E-09	6.74E-09	1.59E-08	3.72E-07	1.29E-08	0	7.351E-10	2.94408E-10	0	0.0010	Res
582753.98_4130145.84	582753.98	4130145.84	1.93E-05	7.91E-09	4.74E-09	7.91E-09	6.16E-09	1.43E-08	3.36E-07	1.17E-08	0	6.725E-10	2.69356E-10	0	0.0009	Res
582810.55_4130145.84	582810.55	4130145.84	1.77E-05	7.19E-09	4.32E-09	7.19E-09	5.66E-09	1.30E-08	3.05E-07	1.06E-08	0	6.195E-10	2.48112E-10	0	0.0009	Res
582867.12_4130145.84	582867.12	4130145.84	1.58E-05	6.29E-09	3.77E-09	6.29E-09	5.03E-09	1.14E-08	2.66E-07	9.24E-09	0	5.523E-10	2.21222E-10	0	0.0008	Res
581962_4130229.75	581962	4130229.75	7.23E-05	3.35E-08	2.01E-08	3.35E-08	2.36E-08	6.13E-08	1.44E-06	5.03E-08	0	2.525E-09	1.01112E-09	0	0.0035	Res
582018.57_4130229.75	582018.57	4130229.75	6.87E-05	3.20E-08	1.92E-08	3.20E-08	2.24E-08	5.85E-08	1.37E-06	4.80E-08	0	2.398E-09	9.60333E-10	0	0.0034	Res
582075.14_4130229.75	582075.14	4130229.75	6.38E-05	2.97E-08	1.78E-08	2.97E-08	2.08E-08	5.43E-08	1.27E-06	4.46E-08	0	2.227E-09	8.92006E-10	0	0.0031	Res
582131.71_4130229.75	582131.71	4130229.75	5.76E-05	2.67E-08	1.60E-08	2.67E-08	1.88E-08	4.88E-08	1.14E-06	4.00E-08	0	2.01E-09	8.05133E-10	0	0.0028	Res
582188.28_4130229.75	582188.28	4130229.75	5.16E-05	2.37E-08	1.42E-08	2.37E-08	1.68E-08	4.34E-08	1.02E-06	3.56E-08	0	1.8E-09	7.20924E-10	0	0.0025	Res
582244.85_4130229.75	582244.85	4130229.75	4.63E-05	2.12E-08	1.27E-08	2.12E-08	1.51E-08	3.87E-08	9.06E-07	3.17E-08	0	1.617E-09	6.47531E-10	0	0.0023	Res
582301.42_4130229.75	582301.42	4130229.75	4.19E-05	1.90E-08	1.14E-08	1.90E-08	1.36E-08	3.47E-08	8.13E-07	2.84E-08	0	1.461E-09	5.85093E-10	0	0.0020	Res
582357.99_4130229.75	582357.99	4130229.75	3.79E-05	1.71E-08	1.03E-08	1.71E-08	1.23E-08	3.12E-08	7.31E-07	2.55E-08	0	1.324E-09	5.30132E-10	0	0.0019	Res
582414.56_4130229.75	582414.56	4130229.75	3.41E-05	1.52E-08	9.12E-09	1.52E-08	1.10E-08	2.77E-08	6.49E-07	2.27E-08	0	1.189E-09	4.76021E-10	0	0.0017	Res
582471.13_4130229.75	582471.13	4130229.75	3.03E-05	1.34E-08	8.02E-09	1.34E-08	9.80E-09	2.43E-08	5.70E-07	1.99E-08	0	1.058E-09	4.23605E-10	0	0.0015	Res
582527.7_4130229.75	582527.7	4130229.75	2.70E-05	1.17E-08	7.04E-09	1.17E-08	8.71E-09	2.14E-08	5.01E-07	1.75E-08	0	9.42E-10	3.77278E-10	0	0.0013	Res
582584.27_4130229.75	582584.27	4130229.75	2.42E-05	1.04E-08	6.22E-09	1.04E-08	7.78E-09	1.89E-08	4.41E-07	1.54E-08	0	8.432E-10	3.37721E-10	0	0.0012	Res
582640.84_4130229.75	582640.84	4130229.75	2.18E-05	9.22E-09	5.53E-09	9.22E-09	6.99E-09	1.68E-08	3.92E-07	1.37E-08	0	7.601E-10	3.04442E-10	0	0.0011	Res
582697.41_4130229.75	582697.41	4130229.75	1.99E-05	8.30E-09	4.98E-09	8.30E-09	6.37E-09	1.51E-08	3.53E-07	1.23E-08	0	6.932E-10	2.77651E-10	0	0.0010	Res
582753.98_4130229.75	582753.98	4130229.75	1.82E-05	7.52E-09	4.51E-09	7.52E-09	5.83E-09	1.36E-08	3.19E-07	1.11E-08	0	6.356E-10	2.54573E-10	0	0.0009	Res
582810.55_4130229.75	582810.55	4130229.75	1.69E-05	6.88E-09	4.13E-09	6.88E-09	5.38E-09	1.25E-08	2.92E-07	1.01E-08	0	5.881E-10	2.35564E-10	0	0.0008	Res

Risk Calculation Part 2, $\sum R1*C_{TAC}$

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)								3rd Trimester	0<2	2<16	16<30	Cancer Risk - 2026	Receptor Type
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Cobalt	Lead	Nickel	Chromium VI					(per million)	
582867.12_4130229.75	582867.12	4130229.75	1.57E-05	6.35E-09	3.81E-09	6.35E-09	5.01E-09	1.15E-08	2.69E-07	9.35E-09	0	5.481E-10	2.19517E-10	0	0.0008	Res
582018.57_4130313.66	582018.57	4130313.66	7.33E-05	3.46E-08	2.07E-08	3.46E-08	2.40E-08	6.33E-08	1.48E-06	5.19E-08	0	2.559E-09	1.02474E-09	0	0.0036	Res
582075.14_4130313.66	582075.14	4130313.66	6.78E-05	3.20E-08	1.92E-08	3.20E-08	2.22E-08	5.85E-08	1.37E-06	4.81E-08	0	2.368E-09	9.48403E-10	0	0.0033	Res
582131.71_4130313.66	582131.71	4130313.66	5.97E-05	2.79E-08	1.68E-08	2.79E-08	1.95E-08	5.11E-08	1.20E-06	4.19E-08	0	2.083E-09	8.34135E-10	0	0.0029	Res
582188.28_4130313.66	582188.28	4130313.66	5.24E-05	2.43E-08	1.46E-08	2.43E-08	1.71E-08	4.45E-08	1.04E-06	3.65E-08	0	1.831E-09	7.33198E-10	0	0.0026	Res
582244.85_4130313.66	582244.85	4130313.66	4.65E-05	2.14E-08	1.28E-08	2.14E-08	1.52E-08	3.91E-08	9.17E-07	3.21E-08	0	1.624E-09	6.50454E-10	0	0.0023	Res
582301.42_4130313.66	582301.42	4130313.66	4.15E-05	1.90E-08	1.14E-08	1.90E-08	1.35E-08	3.46E-08	8.11E-07	2.84E-08	0	1.449E-09	5.80521E-10	0	0.0020	Res
582357.99_4130313.66	582357.99	4130313.66	3.67E-05	1.66E-08	9.96E-09	1.66E-08	1.19E-08	3.03E-08	7.10E-07	2.48E-08	0	1.282E-09	5.13623E-10	0	0.0018	Res
582414.56_4130313.66	582414.56	4130313.66	3.23E-05	1.44E-08	8.64E-09	1.44E-08	1.05E-08	2.63E-08	6.15E-07	2.15E-08	0	1.127E-09	4.51334E-10	0	0.0016	Res
582471.13_4130313.66	582471.13	4130313.66	2.84E-05	1.25E-08	7.51E-09	1.25E-08	9.20E-09	2.28E-08	5.34E-07	1.86E-08	0	9.93E-10	3.97696E-10	0	0.0014	Res
582527.7_4130313.66	582527.7	4130313.66	2.53E-05	1.10E-08	6.58E-09	1.10E-08	8.16E-09	2.00E-08	4.68E-07	1.63E-08	0	8.827E-10	3.53532E-10	0	0.0012	Res
582584.27_4130313.66	582584.27	4130313.66	2.27E-05	9.70E-09	5.82E-09	9.70E-09	7.29E-09	1.76E-08	4.13E-07	1.44E-08	0	7.911E-10	3.16866E-10	0	0.0011	Res
582640.84_4130313.66	582640.84	4130313.66	2.05E-05	8.69E-09	5.21E-09	8.69E-09	6.60E-09	1.58E-08	3.70E-07	1.29E-08	0	7.171E-10	2.87229E-10	0	0.0010	Res
582697.41_4130313.66	582697.41	4130313.66	1.88E-05	7.84E-09	4.71E-09	7.84E-09	6.02E-09	1.42E-08	3.33E-07	1.16E-08	0	6.551E-10	2.62365E-10	0	0.0009	Res
582753.98_4130313.66	582753.98	4130313.66	1.73E-05	7.13E-09	4.28E-09	7.13E-09	5.52E-09	1.29E-08	3.03E-07	1.05E-08	0	6.022E-10	2.41192E-10	0	0.0008	Res
582810.55_4130313.66	582810.55	4130313.66	1.59E-05	6.50E-09	3.90E-09	6.50E-09	5.08E-09	1.18E-08	2.76E-07	9.59E-09	0	5.553E-10	2.22418E-10	0	0.0008	Res
582867.12_4130313.66	582867.12	4130313.66	1.47E-05	5.96E-09	3.57E-09	5.96E-09	4.70E-09	1.08E-08	2.52E-07	8.77E-09	0	5.143E-10	2.05972E-10	0	0.0007	Res
581848.86_4130397.57	581848.86	4130397.57	9.95E-05	4.76E-08	2.86E-08	4.76E-08	3.27E-08	8.73E-08	2.05E-06	7.17E-08	0	3.472E-09	1.39064E-09	0	0.0049	Res
581905.43_4130397.57	581905.43	4130397.57	9.62E-05	4.62E-08	2.77E-08	4.62E-08	3.16E-08	8.46E-08	1.98E-06	6.96E-08	0	3.356E-09	1.34419E-09	0	0.0047	Res
581962_4130397.57	581962	4130397.57	9.08E-05	4.37E-08	2.62E-08	4.37E-08	2.98E-08	8.00E-08	1.88E-06	6.58E-08	0	3.169E-09	1.26905E-09	0	0.0044	Res
582018.57_4130397.57	582018.57	4130397.57	8.16E-05	3.91E-08	2.35E-08	3.91E-08	2.68E-08	7.16E-08	1.68E-06	5.88E-08	0	2.847E-09	1.14044E-09	0	0.0040	Res
582075.14_4130397.57	582075.14	4130397.57	7.17E-05	3.41E-08	2.05E-08	3.41E-08	2.35E-08	6.25E-08	1.47E-06	5.14E-08	0	2.504E-09	1.00279E-09	0	0.0035	Res
582131.71_4130397.57	582131.71	4130397.57	6.17E-05	2.91E-08	1.75E-08	2.91E-08	2.02E-08	5.32E-08	1.25E-06	4.37E-08	0	2.154E-09	8.62895E-10	0	0.0030	Res
582188.28_4130397.57	582188.28	4130397.57	5.39E-05	2.52E-08	1.51E-08	2.52E-08	1.76E-08	4.60E-08	1.08E-06	3.78E-08	0	1.88E-09	7.53103E-10	0	0.0026	Res
582244.85_4130397.57	582244.85	4130397.57	4.67E-05	2.16E-08	1.30E-08	2.16E-08	1.52E-08	3.95E-08	9.25E-07	3.24E-08	0	1.632E-09	6.53514E-10	0	0.0023	Res
582301.42_4130397.57	582301.42	4130397.57	4.05E-05	1.85E-08	1.11E-08	1.85E-08	1.32E-08	3.38E-08	7.91E-07	2.77E-08	0	1.415E-09	5.66711E-10	0	0.0020	Res
582357.99_4130397.57	582357.99	4130397.57	3.50E-05	1.57E-08	9.43E-09	1.57E-08	1.14E-08	2.87E-08	6.72E-07	2.35E-08	0	1.221E-09	4.88887E-10	0	0.0017	Res
582414.56_4130397.57	582414.56	4130397.57	3.05E-05	1.35E-08	8.10E-09	1.35E-08	9.87E-09	2.46E-08	5.77E-07	2.01E-08	0	1.064E-09	4.26199E-10	0	0.0015	Res
582471.13_4130397.57	582471.13	4130397.57	2.69E-05	1.18E-08	7.05E-09	1.18E-08	8.69E-09	2.14E-08	5.01E-07	1.75E-08	0	9.391E-10	3.76111E-10	0	0.0013	Res
582527.7_4130397.57	582527.7	4130397.57	2.40E-05	1.03E-08	6.20E-09	1.03E-08	7.72E-09	1.88E-08	4.40E-07	1.53E-08	0	8.368E-10	3.35166E-10	0	0.0012	Res
582584.27_4130397.57	582584.27	4130397.57	2.16E-05	9.17E-09	5.50E-09	9.17E-09	6.93E-09	1.67E-08	3.90E-07	1.36E-08	0	7.524E-10	3.01343E-10	0	0.0011	Res
582640.84_4130397.57	582640.84	4130397.57	1.95E-05	8.21E-09	4.92E-09	8.21E-09	6.27E-09	1.49E-08	3.49E-07	1.21E-08	0	6.819E-10	2.73116E-10	0	0.0010	Res
582697.41_4130397.57	582697.41	4130397.57	1.77E-05	7.35E-09	4.41E-09	7.35E-09	5.68E-09	1.33E-08	3.12E-07	1.09E-08	0	6.191E-10	2.47969E-10	0	0.0009	Res
582753.98_4130397.57	582753.98	4130397.57	1.62E-05	6.64E-09	3.99E-09	6.64E-09	5.18E-09	1.21E-08	2.82E-07	9.80E-09	0	5.664E-10	2.26843E-10	0	0.0008	Res
582810.55_4130397.57	582810.55	4130397.57	1.49E-05	6.04E-09	3.62E-09	6.04E-09	4.76E-09	1.09E-08	2.56E-07	8.89E-09	0	5.209E-10	2.08633E-10	0	0.0007	Res
582867.12_4130397.57	582867.12	4130397.57	1.38E-05	5.51E-09	3.31E-09	5.51E-09	4.39E-09	9.98E-09	2.33E-07	8.10E-09	0	4.81E-10	1.92656E-10	0	0.0007	Res
581848.86_4130481.48	581848.86	4130481.48	1.26E-04	6.20E-08	3.72E-08	6.20E-08	4.15E-08	1.14E-07	2.67E-06	9.36E-08	0	4.385E-09	1.75642E-09	0	0.0061	Res
581905.43_4130481.48	581905.43	4130481.48	1.17E-04	5.74E-08	3.44E-08	5.74E-08	3.85E-08	1.05E-07	2.47E-06	8.67E-08	0	4.07E-09	1.63E-09	0	0.0057	Res
581962_4130481.48	581962	4130481.48	9.99E-05	4.88E-08	2.93E-08	4.88E-08	3.29E-08	8.94E-08	2.10E-06	7.36E-08	0	3.485E-09	1.39585E-09	0	0.0049	Res
582018.57_4130481.48	582018.57	4130481.48	8.82E-05	4.28E-08	2.57E-08	4.28E-08	2.90E-08	7.85E-08	1.84E-06	6.46E-08	0	3.078E-09	1.23264E-09	0	0.0043	Res
582075.14_4130481.48	582075.14	4130481.48	7.49E-05	3.60E-08	2.16E-08	3.60E-08	2.46E-08	6.60E-08	1.55E-06	5.43E-08	0	2.615E-09	1.04721E-09	0	0.0037	Res
582131.71_4130481.48	582131.71	4130481.48	6.39E-05	3.04E-08	1.82E-08	3.04E-08	2.10E-08	5.57E-08	1.31E-06	4.58E-08	0	2.231E-09	8.93487E-10	0	0.0031	Res
582188.28_4130481.48	582188.28	4130481.48	5.43E-05	2.55E-08	1.53E-08	2.55E-08	1.78E-08	4.67E-08	1.10E-06	3.84E-08	0	1.897E-09	7.59737E-10	0	0.0027	Res
582244.85_4130481.48	582244.85	4130481.48	4.56E-05	2.11E-08	1.27E-08	2.11E-08	1.49E-08	3.86E-08	9.04E-07	3.16E-08	0	1.593E-09	6.38021E-10	0	0.0022	Res
582301.42_4130481.48	582301.42	4130481.48	3.86E-05	1.75E-08	1.05E-08	1.75E-08	1.25E-08	3.20E-08	7.51E-07	2.62E-08	0	1.347E-09	5.39358E-10	0	0.0019	Res
582357.99_4130481.48	582357.99	4130481.48	3.31E-05	1.48E-08	8.89E-09	1.48E-08	1.07E-08	2.70E-08	6.33E-07	2.21E-08	0	1.156E-09	4.63068E-10	0	0.0016	Res
582414.56_4130481.48	582414.56	4130481.48	2.90E-05	1.27E-08	7.65E-09	1.27E-08	9.36E-09	2.32E-08	5.44E-07	1.90E-08	0	1.011E-09	4.0478E-10	0	0.0014	Res
582471.13_4130481.48	582471.13	4130481.48	2.56E-05	1.11E-08	6.65E-09	1.11E-08	8.25E-09	2.02E-08	4.72E-07	1.65E-08	0	8.929E-10	3.57633E-10	0	0.0013	Res
582527.7_4130481.48	582527.7	4130481.48	2.27E-05	9.71E-09	5.82E-09	9.71E-09	7.32E-09	1.77E-08	4.13E-07	1.44E-08	0	7.94E-10	3.18006E-10	0	0.0011	Res
582584.27_4130481.48	582584.27	4130481.48	2.04E-05	8.58E-09	5.15E-09	8.58E-09	6.55E-09	1.56E-08	3.65E-07	1.27E-08	0	7.123E-10	2.8529E-10	0	0.0010	Res
582640.84_4130481.48	582640.84	4130481.48	1.84E-05	7.61E-09	4.57E-09	7.61E-09	5.88E-09	1.38E-08	3.23E-07	1.12E-08	0	6.417E-10	2.57016E-10	0	0.0009	Res
582697.41_4130481.48	582697.41	4130481.48	1.67E-05	6.81E-09	4.09E-09	6.81E-09	5.33E-09	1.23E-08	2.89E-07	1.00E-08	0	5.823E-10	2.3321E-10	0	0.0008	Res
582753.98_4130481.48	582753.98	4130481.48	1.53E-05	6.15E-09	3.69E-09	6.15E-09	4.87E-09	1.11E-08	2.61E-07	9.05E-09	0	5.332E-10	2.13541E-10	0	0.0007	Res
582810.55_4130481.48	582810.55	4130481.48	1.41E-05	5.60E-09	3.36E-09	5.60E-09	4.48E-09	1.01E-08	2.37E-07	8.22E-09	0	4.913E-10	1.96764E-10	0	0.0007	Res
582867.12_4130481.48	582867.12	4130481.48	1.30E-05	5.13E-09	3.08E-09	5.13E-09	4.14E-09	9.27E-09	2.17E-07	7.52E-09	0	4.55E-10	1.8222E-10	0	0.0006	Res
581735.72_4130565.39	581735.72	4130565.39	1.51E-04	7.57E-08	4.54E-08	7.57E-08	5.00E-08	1.39E-07	3.26E-06	1.14E-07	0	5.274E-09	2.1124E-09	0	0.0074	Res
581792.29_4130565.39	581792.29	4130565.39	1.49E-04	7.45E-08	4.47E-08	7.45E-08	4.93E-08	1.37E-07	3.21E-06	1.13E-07	0	5.193E-09	2.07971E-09	0	0.0073	Res

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)								Risk Calculation Part 2, $\sum R1*C_{TAC}$					
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Cobalt	Lead	Nickel	Chromium VI	3rd Trimester	0<2	2<16	16<30	Cancer Risk - 2026 (per million)	Receptor Type
581848.86_4130565.39	581848.86	4130565.39	1.42E-04	7.09E-08	4.25E-08	7.09E-08	4.69E-08	1.30E-07	3.05E-06	1.07E-07	0	4.942E-09	1.9795E-09	0	0.0069	Res
581905.43_4130565.39	581905.43	4130565.39	1.35E-04	6.77E-08	4.06E-08	6.77E-08	4.48E-08	1.24E-07	2.92E-06	1.02E-07	0	4.721E-09	1.89104E-09	0	0.0066	Res
581962_4130565.39	581962	4130565.39	1.17E-04	5.83E-08	3.50E-08	5.83E-08	3.87E-08	1.07E-07	2.51E-06	8.81E-08	0	4.086E-09	1.63638E-09	0	0.0057	Res
582018.57_4130565.39	582018.57	4130565.39	9.52E-05	4.69E-08	2.81E-08	4.69E-08	3.14E-08	8.61E-08	2.02E-06	7.09E-08	0	3.323E-09	1.33077E-09	0	0.0047	Res
582075.14_4130565.39	582075.14	4130565.39	7.78E-05	3.79E-08	2.27E-08	3.79E-08	2.56E-08	6.95E-08	1.63E-06	5.71E-08	0	2.714E-09	1.08717E-09	0	0.0038	Res
582131.71_4130565.39	582131.71	4130565.39	6.42E-05	3.09E-08	1.85E-08	3.09E-08	2.11E-08	5.66E-08	1.33E-06	4.65E-08	0	2.241E-09	8.97648E-10	0	0.0031	Res
582188.28_4130565.39	582188.28	4130565.39	5.21E-05	2.46E-08	1.48E-08	2.46E-08	1.71E-08	4.50E-08	1.06E-06	3.70E-08	0	1.818E-09	7.2803E-10	0	0.0025	Res
582244.85_4130565.39	582244.85	4130565.39	4.28E-05	1.98E-08	1.19E-08	1.98E-08	1.40E-08	3.62E-08	8.49E-07	2.97E-08	0	1.492E-09	5.97703E-10	0	0.0021	Res
582301.42_4130565.39	582301.42	4130565.39	3.63E-05	1.65E-08	9.93E-09	1.65E-08	1.18E-08	3.02E-08	7.08E-07	2.48E-08	0	1.268E-09	5.07981E-10	0	0.0018	Res
582357.99_4130565.39	582357.99	4130565.39	3.11E-05	1.39E-08	8.33E-09	1.39E-08	1.01E-08	2.53E-08	5.93E-07	2.07E-08	0	1.085E-09	4.34663E-10	0	0.0015	Res
582414.56_4130565.39	582414.56	4130565.39	2.70E-05	1.18E-08	7.10E-09	1.18E-08	8.73E-09	2.16E-08	5.05E-07	1.76E-08	0	9.426E-10	3.77536E-10	0	0.0013	Res
582471.13_4130565.39	582471.13	4130565.39	2.38E-05	1.02E-08	6.13E-09	1.02E-08	7.65E-09	1.86E-08	4.35E-07	1.52E-08	0	8.294E-10	3.32205E-10	0	0.0012	Res
582527.7_4130565.39	582527.7	4130565.39	2.11E-05	8.92E-09	5.35E-09	8.92E-09	6.78E-09	1.62E-08	3.79E-07	1.32E-08	0	7.375E-10	2.95382E-10	0	0.0010	Res
582584.27_4130565.39	582584.27	4130565.39	1.90E-05	7.89E-09	4.73E-09	7.89E-09	6.09E-09	1.43E-08	3.35E-07	1.17E-08	0	6.636E-10	2.65773E-10	0	0.0009	Res
582640.84_4130565.39	582640.84	4130565.39	1.72E-05	6.99E-09	4.20E-09	6.99E-09	5.47E-09	1.27E-08	2.97E-07	1.03E-08	0	5.986E-10	2.3976E-10	0	0.0008	Res
582697.41_4130565.39	582697.41	4130565.39	1.57E-05	6.29E-09	3.77E-09	6.29E-09	4.99E-09	1.14E-08	2.66E-07	9.25E-09	0	5.467E-10	2.18965E-10	0	0.0008	Res
582753.98_4130565.39	582753.98	4130565.39	1.44E-05	5.71E-09	3.43E-09	5.71E-09	4.58E-09	1.03E-08	2.41E-07	8.38E-09	0	5.032E-10	2.01531E-10	0	0.0007	Res
582810.55_4130565.39	582810.55	4130565.39	1.34E-05	5.23E-09	3.14E-09	5.23E-09	4.24E-09	9.46E-09	2.21E-07	7.67E-09	0	4.669E-10	1.87012E-10	0	0.0007	Res
582867.12_4130565.39	582867.12	4130565.39	1.25E-05	4.83E-09	2.90E-09	4.83E-09	3.95E-09	8.73E-09	2.04E-07	7.07E-09	0	4.36E-10	1.74608E-10	0	0.0006	Res
581735.72_4130649.3	581735.72	4130649.3	1.63E-04	8.22E-08	4.93E-08	8.22E-08	5.40E-08	1.51E-07	3.54E-06	1.24E-07	0	5.683E-09	2.27632E-09	0	0.0080	Res
581792.29_4130649.3	581792.29	4130649.3	1.58E-04	7.95E-08	4.77E-08	7.95E-08	5.23E-08	1.46E-07	3.43E-06	1.20E-07	0	5.499E-09	2.20249E-09	0	0.0077	Res
581905.43_4130649.3	581905.43	4130649.3	1.57E-04	7.97E-08	4.78E-08	7.97E-08	5.22E-08	1.46E-07	3.43E-06	1.21E-07	0	5.49E-09	2.19875E-09	0	0.0077	Res
581962_4130649.3	581962	4130649.3	1.31E-04	6.59E-08	3.96E-08	6.59E-08	4.34E-08	1.21E-07	2.84E-06	9.98E-08	0	4.568E-09	1.8295E-09	0	0.0064	Res
582018.57_4130649.3	582018.57	4130649.3	9.99E-05	4.98E-08	2.99E-08	4.98E-08	3.30E-08	9.14E-08	2.15E-06	7.53E-08	0	3.486E-09	1.39606E-09	0	0.0049	Res
582075.14_4130649.3	582075.14	4130649.3	7.80E-05	3.84E-08	2.31E-08	3.84E-08	2.57E-08	7.05E-08	1.65E-06	5.80E-08	0	2.722E-09	1.09024E-09	0	0.0038	Res
582131.71_4130649.3	582131.71	4130649.3	6.10E-05	2.96E-08	1.78E-08	2.96E-08	2.01E-08	5.43E-08	1.27E-06	4.47E-08	0	2.131E-09	8.53376E-10	0	0.0030	Res
582188.28_4130649.3	582188.28	4130649.3	4.85E-05	2.31E-08	1.39E-08	2.31E-08	1.59E-08	4.23E-08	9.91E-07	3.47E-08	0	1.692E-09	6.77494E-10	0	0.0024	Res
582244.85_4130649.3	582244.85	4130649.3	3.94E-05	1.84E-08	1.10E-08	1.84E-08	1.29E-08	3.36E-08	7.88E-07	2.76E-08	0	1.374E-09	5.50492E-10	0	0.0019	Res
582301.42_4130649.3	582301.42	4130649.3	3.29E-05	1.50E-08	9.01E-09	1.50E-08	1.07E-08	2.74E-08	6.43E-07	2.25E-08	0	1.147E-09	4.59536E-10	0	0.0016	Res
582357.99_4130649.3	582357.99	4130649.3	2.81E-05	1.26E-08	7.55E-09	1.26E-08	9.12E-09	2.29E-08	5.37E-07	1.88E-08	0	9.815E-10	3.93092E-10	0	0.0014	Res
582414.56_4130649.3	582414.56	4130649.3	2.46E-05	1.08E-08	6.45E-09	1.08E-08	7.93E-09	1.96E-08	4.59E-07	1.60E-08	0	8.569E-10	3.4319E-10	0	0.0012	Res
582471.13_4130649.3	582471.13	4130649.3	2.16E-05	9.28E-09	5.57E-09	9.28E-09	6.97E-09	1.69E-08	3.95E-07	1.38E-08	0	7.556E-10	3.02616E-10	0	0.0011	Res
582527.7_4130649.3	582527.7	4130649.3	1.94E-05	8.13E-09	4.88E-09	8.13E-09	6.21E-09	1.48E-08	3.46E-07	1.20E-08	0	6.757E-10	2.70619E-10	0	0.0009	Res
582584.27_4130649.3	582584.27	4130649.3	1.75E-05	7.23E-09	4.34E-09	7.23E-09	5.61E-09	1.31E-08	3.07E-07	1.07E-08	0	6.122E-10	2.45201E-10	0	0.0009	Res
582640.84_4130649.3	582640.84	4130649.3	1.61E-05	6.52E-09	3.91E-09	6.52E-09	5.13E-09	1.18E-08	2.76E-07	9.60E-09	0	5.611E-10	2.24718E-10	0	0.0008	Res
582697.41_4130649.3	582697.41	4130649.3	1.49E-05	5.94E-09	3.56E-09	5.94E-09	4.73E-09	1.07E-08	2.51E-07	8.72E-09	0	5.186E-10	2.07712E-10	0	0.0007	Res
582753.98_4130649.3	582753.98	4130649.3	1.39E-05	5.47E-09	3.28E-09	5.47E-09	4.40E-09	9.90E-09	2.31E-07	8.02E-09	0	4.84E-10	1.93832E-10	0	0.0007	Res
582810.55_4130649.3	582810.55	4130649.3	1.30E-05	5.09E-09	3.05E-09	5.09E-09	4.13E-09	9.20E-09	2.15E-07	7.45E-09	0	4.551E-10	1.82279E-10	0	0.0006	Res
582867.12_4130649.3	582867.12	4130649.3	1.23E-05	4.75E-09	2.85E-09	4.75E-09	3.89E-09	8.59E-09	2.01E-07	6.95E-09	0	4.292E-10	1.719E-10	0	0.0006	Res
581848.86_4130733.21	581848.86	4130733.21	2.32E-04	1.19E-07	7.14E-08	1.19E-07	7.73E-08	2.19E-07	5.14E-06	1.81E-07	0	8.112E-09	3.24894E-09	0	0.0114	Res
581905.43_4130733.21	581905.43	4130733.21	1.99E-04	1.01E-07	6.09E-08	1.01E-07	6.60E-08	1.87E-07	4.38E-06	1.54E-07	0	6.929E-09	2.77503E-09	0	0.0097	Res
581962_4130733.21	581962	4130733.21	1.46E-04	7.43E-08	4.46E-08	7.43E-08	4.86E-08	1.37E-07	3.21E-06	1.13E-07	0	5.106E-09	2.04503E-09	0	0.0072	Res
582018.57_4130733.21	582018.57	4130733.21	1.03E-04	5.18E-08	3.11E-08	5.18E-08	3.42E-08	9.52E-08	2.23E-06	7.84E-08	0	3.597E-09	1.44051E-09	0	0.0050	Res
582075.14_4130733.21	582075.14	4130733.21	7.33E-05	3.63E-08	2.18E-08	3.63E-08	2.42E-08	6.66E-08	1.56E-06	5.49E-08	0	2.557E-09	1.02412E-09	0	0.0036	Res
582131.71_4130733.21	582131.71	4130733.21	5.40E-05	2.63E-08	1.58E-08	2.63E-08	1.78E-08	4.82E-08	1.13E-06	3.97E-08	0	1.884E-09	7.54477E-10	0	0.0026	Res
582188.28_4130733.21	582188.28	4130733.21	4.22E-05	2.01E-08	1.21E-08	2.01E-08	1.38E-08	3.69E-08	8.65E-07	3.03E-08	0	1.472E-09	5.89383E-10	0	0.0021	Res
582244.85_4130733.21	582244.85	4130733.21	3.42E-05	1.60E-08	9.61E-09	1.60E-08	1.12E-08	2.93E-08	6.86E-07	2.40E-08	0	1.193E-09	4.77988E-10	0	0.0017	Res
582301.42_4130733.21	582301.42	4130733.21	2.87E-05	1.32E-08	7.89E-09	1.32E-08	9.34E-09	2.40E-08	5.63E-07	1.97E-08	0	1.001E-09	4.01069E-10	0	0.0014	Res
582357.99_4130733.21	582357.99	4130733.21	2.47E-05	1.11E-08	6.66E-09	1.11E-08	8.03E-09	2.03E-08	4.75E-07	1.66E-08	0	8.634E-10	3.45793E-10	0	0.0012	Res
582414.56_4130733.21	582414.56	4130733.21	2.18E-05	9.59E-09	5.75E-09	9.59E-09	7.05E-09	1.75E-08	4.09E-07	1.43E-08	0	7.61E-10	3.04805E-10	0	0.0011	Res
582471.13_4130733.21	582471.13	4130733.21	1.96E-05	8.46E-09	5.08E-09	8.46E-09	6.32E-09	1.54E-08	3.60E-07	1.26E-08	0	6.843E-10	2.74062E-10	0	0.0010	Res
582527.7_4130733.21	582527.7	4130733.21	1.79E-05	7.59E-09	4.55E-09	7.59E-09	5.75E-09	1.38E-08	3.23E-07	1.12E-08	0	6.247E-10	2.50204E-10	0	0.0009	Res
582584.27_4130733.21	582584.27	4130733.21	1.65E-05	6.90E-09	4.14E-09	6.90E-09	5.30E-09	1.25E-08	2.93E-07	1.02E-08	0	5.775E-10	2.3128E-10	0	0.0008	Res
582640.84_4130733.21	582640.84	4130733.21	1.54E-05	6.35E-09	3.81E-09	6.35E-09	4.93E-09	1.15E-08	2.69E-07	9.37E-09	0	5.386E-10	2.15716E-10	0	0.0008	Res
582697.41_4130733.21	582697.41	4130733.21	1.45E-05	5.88E-09	3.53E-09	5.88E-09	4.62E-09	1.07E-08	2.49E-07	8.66E-09	0	5.057E-10	2.02548E-10	0	0.0007	Res
582753.98_4130733.21	582753.98	4130733.21	1.37E-05	5.48E-09	3.29E-09	5.48E-09	4.35E-09	9.92E-09	2.32E-07	8.06E-09	0	4.769E-10	1.91001E-10	0	0.0007	Res
582810.55_4130733.21	582810.55	4130733.21	1.30E-05	5.15E-09	3.09E-09	5.15E-09	4.12E-09	9.32E-09	2.18E-07	7.56E-09	0	4.528E-10	1.81358E-10	0	0.0006	Res

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)								Risk Calculation Part 2, $\sum R1*C_{TAC}$					
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Cobalt	Lead	Nickel	Chromium VI	3rd Trimester	0<2	2<16	16<30	Cancer Risk - 2026 (per million)	Receptor Type
582867.12_4130733.21	582867.12	4130733.21	1.23E-05	4.84E-09	2.90E-09	4.84E-09	3.91E-09	8.75E-09	2.04E-07	7.09E-09	0	4.298E-10	1.7216E-10	0	0.0006	Res
581735.72_4130817.12	581735.72	4130817.12	3.41E-04	1.76E-07	1.05E-07	1.76E-07	1.13E-07	3.23E-07	7.58E-06	2.66E-07	0	1.19E-08	4.76529E-09	0	0.0167	Res
581792.29_4130817.12	581792.29	4130817.12	3.84E-04	1.98E-07	1.19E-07	1.98E-07	1.28E-07	3.65E-07	8.56E-06	3.01E-07	0	1.341E-08	5.37078E-09	0	0.0188	Res
581848.86_4130817.12	581848.86	4130817.12	3.45E-04	1.78E-07	1.07E-07	1.78E-07	1.15E-07	3.27E-07	7.68E-06	2.70E-07	0	1.203E-08	4.81871E-09	0	0.0168	Res
581905.43_4130817.12	581905.43	4130817.12	2.61E-04	1.34E-07	8.05E-08	1.34E-07	8.69E-08	2.47E-07	5.79E-06	2.04E-07	0	9.108E-09	3.64777E-09	0	0.0128	Res
581962_4130817.12	581962	4130817.12	1.59E-04	8.10E-08	4.86E-08	8.10E-08	5.28E-08	1.49E-07	3.50E-06	1.23E-07	0	5.543E-09	2.21989E-09	0	0.0078	Res
582018.57_4130817.12	582018.57	4130817.12	9.56E-05	4.82E-08	2.89E-08	4.82E-08	3.17E-08	8.85E-08	2.08E-06	7.29E-08	0	3.338E-09	1.33707E-09	0	0.0047	Res
582075.14_4130817.12	582075.14	4130817.12	6.24E-05	3.09E-08	1.85E-08	3.09E-08	2.06E-08	5.67E-08	1.33E-06	4.67E-08	0	2.177E-09	8.72103E-10	0	0.0030	Res
582131.71_4130817.12	582131.71	4130817.12	4.53E-05	2.20E-08	1.32E-08	2.20E-08	1.49E-08	4.04E-08	9.47E-07	3.32E-08	0	1.581E-09	6.33283E-10	0	0.0022	Res
582188.28_4130817.12	582188.28	4130817.12	3.55E-05	1.69E-08	1.02E-08	1.69E-08	1.16E-08	3.10E-08	7.27E-07	2.55E-08	0	1.238E-09	4.95751E-10	0	0.0017	Res
582244.85_4130817.12	582244.85	4130817.12	2.93E-05	1.37E-08	8.23E-09	1.37E-08	9.58E-09	2.51E-08	5.88E-07	2.06E-08	0	1.022E-09	4.0931E-10	0	0.0014	Res
582301.42_4130817.12	582301.42	4130817.12	2.52E-05	1.16E-08	6.97E-09	1.16E-08	8.21E-09	2.12E-08	4.97E-07	1.74E-08	0	8.793E-10	3.52177E-10	0	0.0012	Res
582357.99_4130817.12	582357.99	4130817.12	2.23E-05	1.01E-08	6.07E-09	1.01E-08	7.25E-09	1.85E-08	4.33E-07	1.51E-08	0	7.787E-10	3.1187E-10	0	0.0011	Res
582414.56_4130817.12	582414.56	4130817.12	2.01E-05	8.99E-09	5.40E-09	8.99E-09	6.53E-09	1.64E-08	3.84E-07	1.34E-08	0	7.027E-10	2.81459E-10	0	0.0010	Res
582471.13_4130817.12	582471.13	4130817.12	1.85E-05	8.13E-09	4.88E-09	8.13E-09	5.97E-09	1.48E-08	3.47E-07	1.21E-08	0	6.449E-10	2.58286E-10	0	0.0009	Res
582527.7_4130817.12	582527.7	4130817.12	1.71E-05	7.41E-09	4.45E-09	7.41E-09	5.51E-09	1.35E-08	3.16E-07	1.10E-08	0	5.962E-10	2.3878E-10	0	0.0008	Res
582584.27_4130817.12	582584.27	4130817.12	1.59E-05	6.82E-09	4.09E-09	6.82E-09	5.13E-09	1.24E-08	2.90E-07	1.01E-08	0	5.565E-10	2.22893E-10	0	0.0008	Res
582640.84_4130817.12	582640.84	4130817.12	1.50E-05	6.32E-09	3.79E-09	6.32E-09	4.81E-09	1.15E-08	2.69E-07	9.36E-09	0	5.226E-10	2.09308E-10	0	0.0007	Res
582697.41_4130817.12	582697.41	4130817.12	1.41E-05	5.88E-09	3.53E-09	5.88E-09	4.52E-09	1.07E-08	2.50E-07	8.69E-09	0	4.928E-10	1.97369E-10	0	0.0007	Res
582753.98_4130817.12	582753.98	4130817.12	1.33E-05	5.48E-09	3.29E-09	5.48E-09	4.26E-09	9.94E-09	2.33E-07	8.09E-09	0	4.653E-10	1.86344E-10	0	0.0007	Res
582810.55_4130817.12	582810.55	4130817.12	1.26E-05	5.13E-09	3.08E-09	5.13E-09	4.03E-09	9.30E-09	2.17E-07	7.56E-09	0	4.412E-10	1.76706E-10	0	0.0006	Res
582867.12_4130817.12	582867.12	4130817.12	1.20E-05	4.82E-09	2.89E-09	4.82E-09	3.83E-09	8.73E-09	2.04E-07	7.09E-09	0	4.197E-10	1.68101E-10	0	0.0006	Res
581735.72_4130901.03	581735.72	4130901.03	6.75E-04	3.50E-07	2.10E-07	3.50E-07	2.25E-07	6.44E-07	1.51E-05	5.32E-07	0	2.357E-08	9.44094E-09	0	0.0330	Res
581792.29_4130901.03	581792.29	4130901.03	7.21E-04	3.74E-07	2.24E-07	3.74E-07	2.40E-07	6.88E-07	1.62E-05	5.68E-07	0	2.516E-08	1.00776E-08	0	0.0352	Res
581848.86_4130901.03	581848.86	4130901.03	6.43E-04	3.33E-07	2.00E-07	3.33E-07	2.14E-07	6.13E-07	1.44E-05	5.06E-07	0	2.243E-08	8.98255E-09	0	0.0314	Res
581905.43_4130901.03	581905.43	4130901.03	3.38E-04	1.75E-07	1.05E-07	1.75E-07	1.13E-07	3.21E-07	7.54E-06	2.65E-07	0	1.18E-08	4.72602E-09	0	0.0165	Res
581962_4130901.03	581962	4130901.03	1.38E-04	7.03E-08	4.22E-08	7.03E-08	4.59E-08	1.29E-07	3.03E-06	1.07E-07	0	4.818E-09	1.92954E-09	0	0.0067	Res
582018.57_4130901.03	582018.57	4130901.03	7.46E-05	3.73E-08	2.24E-08	3.73E-08	2.47E-08	6.85E-08	1.61E-06	5.65E-08	0	2.605E-09	1.04331E-09	0	0.0036	Res
582075.14_4130901.03	582075.14	4130901.03	5.05E-05	2.48E-08	1.49E-08	2.48E-08	1.66E-08	4.54E-08	1.07E-06	3.74E-08	0	1.761E-09	7.05242E-10	0	0.0025	Res
582131.71_4130901.03	582131.71	4130901.03	3.89E-05	1.88E-08	1.13E-08	1.88E-08	1.28E-08	3.44E-08	8.08E-07	2.83E-08	0	1.356E-09	5.43191E-10	0	0.0019	Res
582188.28_4130901.03	582188.28	4130901.03	3.20E-05	1.53E-08	9.17E-09	1.53E-08	1.05E-08	2.80E-08	6.56E-07	2.30E-08	0	1.117E-09	4.47459E-10	0	0.0016	Res
582244.85_4130901.03	582244.85	4130901.03	2.74E-05	1.29E-08	7.74E-09	1.29E-08	8.95E-09	2.36E-08	5.53E-07	1.94E-08	0	9.548E-10	3.82398E-10	0	0.0013	Res
582301.42_4130901.03	582301.42	4130901.03	2.39E-05	1.11E-08	6.68E-09	1.11E-08	7.81E-09	2.04E-08	4.77E-07	1.67E-08	0	8.347E-10	3.34307E-10	0	0.0012	Res
582357.99_4130901.03	582357.99	4130901.03	2.13E-05	9.79E-09	5.88E-09	9.79E-09	6.94E-09	1.79E-08	4.19E-07	1.47E-08	0	7.433E-10	2.9771E-10	0	0.0010	Res
582414.56_4130901.03	582414.56	4130901.03	1.92E-05	8.72E-09	5.23E-09	8.72E-09	6.24E-09	1.59E-08	3.73E-07	1.30E-08	0	6.701E-10	2.684E-10	0	0.0009	Res
582471.13_4130901.03	582471.13	4130901.03	1.75E-05	7.86E-09	4.72E-09	7.86E-09	5.69E-09	1.43E-08	3.36E-07	1.17E-08	0	6.118E-10	2.45037E-10	0	0.0009	Res
582527.7_4130901.03	582527.7	4130901.03	1.61E-05	7.14E-09	4.28E-09	7.14E-09	5.22E-09	1.30E-08	3.05E-07	1.06E-08	0	5.632E-10	2.25577E-10	0	0.0008	Res
582584.27_4130901.03	582584.27	4130901.03	1.50E-05	6.56E-09	3.93E-09	6.56E-09	4.85E-09	1.19E-08	2.80E-07	9.76E-09	0	5.239E-10	2.09832E-10	0	0.0007	Res
582640.84_4130901.03	582640.84	4130901.03	1.41E-05	6.06E-09	3.64E-09	6.06E-09	4.53E-09	1.10E-08	2.58E-07	9.01E-09	0	4.91E-10	1.96648E-10	0	0.0007	Res
582697.41_4130901.03	582697.41	4130901.03	1.33E-05	5.64E-09	3.38E-09	5.64E-09	4.26E-09	1.03E-08	2.40E-07	8.36E-09	0	4.626E-10	1.85274E-10	0	0.0006	Res
582753.98_4130901.03	582753.98	4130901.03	1.25E-05	5.27E-09	3.16E-09	5.27E-09	4.02E-09	9.57E-09	2.24E-07	7.79E-09	0	4.377E-10	1.75311E-10	0	0.0006	Res
582810.55_4130901.03	582810.55	4130901.03	1.19E-05	4.93E-09	2.96E-09	4.93E-09	3.81E-09	8.94E-09	2.09E-07	7.28E-09	0	4.151E-10	1.66264E-10	0	0.0006	Res
582867.12_4130901.03	582867.12	4130901.03	1.13E-05	4.64E-09	2.78E-09	4.64E-09	3.62E-09	8.41E-09	1.97E-07	6.84E-09	0	3.956E-10	1.58462E-10	0	0.0006	Res
581735.72_4130984.94	581735.72	4130984.94	1.80E-03	9.35E-07	5.61E-07	9.35E-07	5.99E-07	1.72E-06	4.04E-05	1.42E-06	0	6.271E-08	2.51156E-08	0	0.0878	Res
581792.29_4130984.94	581792.29	4130984.94	2.36E-03	1.23E-06	7.37E-07	1.23E-06	7.87E-07	2.26E-06	5.30E-05	1.87E-06	0	8.23E-08	3.29622E-08	0	0.1153	Res
581848.86_4130984.94	581848.86	4130984.94	2.74E-03	1.43E-06	8.57E-07	1.43E-06	9.15E-07	2.63E-06	6.17E-05	2.17E-06	0	9.573E-08	3.83416E-08	0	0.1341	Res
581905.43_4130984.94	581905.43	4130984.94	2.20E-04	1.13E-07	6.77E-08	1.13E-07	7.31E-08	2.08E-07	4.87E-06	1.71E-07	0	7.67E-09	3.07203E-09	0	0.0107	Res
581962_4130984.94	581962	4130984.94	9.51E-05	4.80E-08	2.88E-08	4.80E-08	3.15E-08	8.81E-08	2.07E-06	7.26E-08	0	3.319E-09	1.32948E-09	0	0.0046	Res
582018.57_4130984.94	582018.57	4130984.94	6.16E-05	3.06E-08	1.84E-08	3.06E-08	2.04E-08	5.61E-08	1.32E-06	4.62E-08	0	2.151E-09	8.61663E-10	0	0.0030	Res
582075.14_4130984.94	582075.14	4130984.94	4.57E-05	2.23E-08	1.34E-08	2.23E-08	1.51E-08	4.10E-08	9.61E-07	3.37E-08	0	1.594E-09	6.38556E-10	0	0.0022	Res
582131.71_4130984.94	582131.71	4130984.94	3.63E-05	1.75E-08	1.05E-08	1.75E-08	1.19E-08	3.21E-08	7.52E-07	2.64E-08	0	1.266E-09	5.07076E-10	0	0.0018	Res
582188.28_4130984.94	582188.28	4130984.94	3.00E-05	1.43E-08	8.58E-09	1.43E-08	9.84E-09	2.62E-08	6.14E-07	2.15E-08	0	1.047E-09	4.19332E-10	0	0.0015	Res
582244.85_4130984.94	582244.85	4130984.94	2.55E-05	1.20E-08	7.22E-09	1.20E-08	8.36E-09	2.20E-08	5.16E-07	1.81E-08	0	8.911E-10	3.56899E-10	0	0.0012	Res
582301.42_4130984.94	582301.42	4130984.94	2.22E-05	1.03E-08	6.21E-09	1.03E-08	7.26E-09	1.89E-08	4.44E-07	1.55E-08	0	7.754E-10	3.10566E-10	0	0.0011	Res
582357.99_4130984.94	582357.99	4130984.94	1.97E-05	9.07E-09	5.44E-09	9.07E-09	6.42E-09	1.66E-08	3.88E-07	1.36E-08	0	6.87E-10	2.75162E-10	0	0.0010	Res
582414.56_4130984.94	582414.56	4130984.94	1.77E-05	8.06E-09	4.84E-09	8.06E-09	5.75E-09	1.47E-08	3.45E-07	1.21E-08	0	6.172E-10	2.47211E-10	0	0.0009	Res
582471.13_4130984.94	582471.13	4130984.94	1.61E-05	7.25E-09	4.35E-09	7.25E-09	5.22E-09	1.32E-08	3.10E-07	1.08E-08	0	5.61E-10	2.2469E-10	0	0.0008	Res

Risk Calculation Part 2, $\sum R1*C_{TAC}$

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)								3rd Trimester	0<2	2<16	16<30	Cancer Risk - 2026	Receptor Type
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Cobalt	Lead	Nickel	Chromium VI					(per million)	
582527.7_4130984.94	582527.7	4130984.94	1.47E-05	6.58E-09	3.95E-09	6.58E-09	4.78E-09	1.20E-08	2.81E-07	9.82E-09	0	5.148E-10	2.06189E-10	0	0.0007	Res
582584.27_4130984.94	582584.27	4130984.94	1.37E-05	6.04E-09	3.62E-09	6.04E-09	4.43E-09	1.10E-08	2.58E-07	9.00E-09	0	4.779E-10	1.91404E-10	0	0.0007	Res
582640.84_4130984.94	582640.84	4130984.94	1.28E-05	5.60E-09	3.36E-09	5.60E-09	4.15E-09	1.02E-08	2.39E-07	8.34E-09	0	4.482E-10	1.79511E-10	0	0.0006	Res
582697.41_4130984.94	582697.41	4130984.94	1.21E-05	5.21E-09	3.12E-09	5.21E-09	3.89E-09	9.48E-09	2.22E-07	7.74E-09	0	4.216E-10	1.68841E-10	0	0.0006	Res
582753.98_4130984.94	582753.98	4130984.94	1.15E-05	4.89E-09	2.93E-09	4.89E-09	3.69E-09	8.88E-09	2.08E-07	7.25E-09	0	4E-10	1.60217E-10	0	0.0006	Res
582810.55_4130984.94	582810.55	4130984.94	1.09E-05	4.59E-09	2.76E-09	4.59E-09	3.50E-09	8.34E-09	1.95E-07	6.80E-09	0	3.805E-10	1.52392E-10	0	0.0005	Res
582867.12_4130984.94	582867.12	4130984.94	1.04E-05	4.33E-09	2.60E-09	4.33E-09	3.33E-09	7.86E-09	1.84E-07	6.40E-09	0	3.631E-10	1.45437E-10	0	0.0005	Res
581735.72_4131068.85	581735.72	4131068.85	2.95E-04	1.52E-07	9.12E-08	1.52E-07	9.82E-08	2.79E-07	6.56E-06	2.31E-07	0	1.03E-08	4.12481E-09	0	0.0144	Res
581792.29_4131068.85	581792.29	4131068.85	2.36E-04	1.21E-07	7.26E-08	1.21E-07	7.84E-08	2.23E-07	5.22E-06	1.84E-07	0	8.224E-09	3.29366E-09	0	0.0115	Res
581848.86_4131068.85	581848.86	4131068.85	1.28E-04	6.48E-08	3.89E-08	6.48E-08	4.23E-08	1.19E-07	2.79E-06	9.81E-08	0	4.45E-09	1.78238E-09	0	0.0062	Res
581905.43_4131068.85	581905.43	4131068.85	8.17E-05	4.09E-08	2.46E-08	4.09E-08	2.71E-08	7.52E-08	1.76E-06	6.20E-08	0	2.851E-09	1.14195E-09	0	0.0040	Res
581962_4131068.85	581962	4131068.85	5.95E-05	2.94E-08	1.77E-08	2.94E-08	1.97E-08	5.40E-08	1.27E-06	4.45E-08	0	2.076E-09	8.31568E-10	0	0.0029	Res
582018.57_4131068.85	582018.57	4131068.85	4.53E-05	2.21E-08	1.33E-08	2.21E-08	1.49E-08	4.06E-08	9.52E-07	3.34E-08	0	1.582E-09	6.33654E-10	0	0.0022	Res
582075.14_4131068.85	582075.14	4131068.85	3.61E-05	1.74E-08	1.04E-08	1.74E-08	1.19E-08	3.19E-08	7.48E-07	2.62E-08	0	1.261E-09	5.05018E-10	0	0.0018	Res
582131.71_4131068.85	582131.71	4131068.85	2.99E-05	1.42E-08	8.53E-09	1.42E-08	9.80E-09	2.60E-08	6.10E-07	2.14E-08	0	1.043E-09	4.17931E-10	0	0.0015	Res
582188.28_4131068.85	582188.28	4131068.85	2.53E-05	1.19E-08	7.14E-09	1.19E-08	8.29E-09	2.18E-08	5.11E-07	1.79E-08	0	8.846E-10	3.54298E-10	0	0.0012	Res
582244.85_4131068.85	582244.85	4131068.85	2.20E-05	1.02E-08	6.12E-09	1.02E-08	7.17E-09	1.87E-08	4.37E-07	1.53E-08	0	7.668E-10	3.07116E-10	0	0.0011	Res
582301.42_4131068.85	582301.42	4131068.85	1.93E-05	8.90E-09	5.34E-09	8.90E-09	6.31E-09	1.63E-08	3.81E-07	1.33E-08	0	6.753E-10	2.70486E-10	0	0.0009	Res
582357.99_4131068.85	582357.99	4131068.85	1.73E-05	7.86E-09	4.72E-09	7.86E-09	5.62E-09	1.44E-08	3.36E-07	1.18E-08	0	6.027E-10	2.41378E-10	0	0.0008	Res
582414.56_4131068.85	582414.56	4131068.85	1.56E-05	7.04E-09	4.22E-09	7.04E-09	5.07E-09	1.29E-08	3.01E-07	1.05E-08	0	5.447E-10	2.1817E-10	0	0.0008	Res
582471.13_4131068.85	582471.13	4131068.85	1.42E-05	6.37E-09	3.82E-09	6.37E-09	4.62E-09	1.16E-08	2.72E-07	9.51E-09	0	4.97E-10	1.99076E-10	0	0.0007	Res
582527.7_4131068.85	582527.7	4131068.85	1.31E-05	5.81E-09	3.49E-09	5.81E-09	4.24E-09	1.06E-08	2.48E-07	8.66E-09	0	4.573E-10	1.83156E-10	0	0.0006	Res
582584.27_4131068.85	582584.27	4131068.85	1.21E-05	5.33E-09	3.20E-09	5.33E-09	3.92E-09	9.71E-09	2.27E-07	7.93E-09	0	4.232E-10	1.69494E-10	0	0.0006	Res
582640.84_4131068.85	582640.84	4131068.85	1.14E-05	4.98E-09	2.99E-09	4.98E-09	3.68E-09	9.06E-09	2.12E-07	7.40E-09	0	3.984E-10	1.59548E-10	0	0.0006	Res
582697.41_4131068.85	582697.41	4131068.85	1.08E-05	4.66E-09	2.79E-09	4.66E-09	3.47E-09	8.48E-09	1.98E-07	6.92E-09	0	3.76E-10	1.5059E-10	0	0.0005	Res
582753.98_4131068.85	582753.98	4131068.85	1.03E-05	4.40E-09	2.64E-09	4.40E-09	3.30E-09	8.00E-09	1.87E-07	6.53E-09	0	3.582E-10	1.43467E-10	0	0.0005	Res
582810.55_4131068.85	582810.55	4131068.85	9.82E-06	4.17E-09	2.50E-09	4.17E-09	3.15E-09	7.58E-09	1.77E-07	6.18E-09	0	3.426E-10	1.37215E-10	0	0.0005	Res
582867.12_4131068.85	582867.12	4131068.85	9.35E-06	3.93E-09	2.36E-09	3.93E-09	3.00E-09	7.14E-09	1.67E-07	5.82E-09	0	3.262E-10	1.30658E-10	0	0.0005	Res
582018.57_4131152.76	582018.57	4131152.76	3.07E-05	1.45E-08	8.72E-09	1.45E-08	1.01E-08	2.66E-08	6.24E-07	2.19E-08	0	1.071E-09	4.28907E-10	0	0.0015	Res
582244.85_4131152.76	582244.85	4131152.76	1.87E-05	8.51E-09	5.11E-09	8.51E-09	6.08E-09	1.55E-08	3.64E-07	1.27E-08	0	6.521E-10	2.6119E-10	0	0.0009	Res
582301.42_4131152.76	582301.42	4131152.76	1.68E-05	7.61E-09	4.57E-09	7.61E-09	5.47E-09	1.39E-08	3.25E-07	1.14E-08	0	5.88E-10	2.35489E-10	0	0.0008	Res
582357.99_4131152.76	582357.99	4131152.76	1.52E-05	6.82E-09	4.09E-09	6.82E-09	4.94E-09	1.24E-08	2.91E-07	1.02E-08	0	5.315E-10	2.12867E-10	0	0.0007	Res
582414.56_4131152.76	582414.56	4131152.76	1.39E-05	6.16E-09	3.70E-09	6.16E-09	4.50E-09	1.12E-08	2.63E-07	9.19E-09	0	4.845E-10	1.94052E-10	0	0.0007	Res
582471.13_4131152.76	582471.13	4131152.76	1.26E-05	5.55E-09	3.33E-09	5.55E-09	4.08E-09	1.01E-08	2.37E-07	8.27E-09	0	4.403E-10	1.76343E-10	0	0.0006	Res
582527.7_4131152.76	582527.7	4131152.76	1.16E-05	5.07E-09	3.04E-09	5.07E-09	3.75E-09	9.23E-09	2.16E-07	7.54E-09	0	4.05E-10	1.62207E-10	0	0.0006	Res
582584.27_4131152.76	582584.27	4131152.76	1.07E-05	4.65E-09	2.79E-09	4.65E-09	3.46E-09	8.47E-09	1.98E-07	6.92E-09	0	3.747E-10	1.50093E-10	0	0.0005	Res
582640.84_4131152.76	582640.84	4131152.76	1.00E-05	4.32E-09	2.59E-09	4.32E-09	3.23E-09	7.86E-09	1.84E-07	6.42E-09	0	3.505E-10	1.40378E-10	0	0.0005	Res
582697.41_4131152.76	582697.41	4131152.76	9.45E-06	4.04E-09	2.43E-09	4.04E-09	3.04E-09	7.35E-09	1.72E-07	6.00E-09	0	3.299E-10	1.32145E-10	0	0.0005	Res
582753.98_4131152.76	582753.98	4131152.76	9.02E-06	3.84E-09	2.30E-09	3.84E-09	2.90E-09	6.97E-09	1.63E-07	5.69E-09	0	3.148E-10	1.26076E-10	0	0.0004	Res
582810.55_4131152.76	582810.55	4131152.76	8.62E-06	3.64E-09	2.19E-09	3.64E-09	2.77E-09	6.62E-09	1.55E-07	5.40E-09	0	3.01E-10	1.20549E-10	0	0.0004	Res
582867.12_4131152.76	582867.12	4131152.76	8.20E-06	3.44E-09	2.06E-09	3.44E-09	2.63E-09	6.25E-09	1.46E-07	5.09E-09	0	2.864E-10	1.14693E-10	0	0.0004	Res

HRA Permanente Creek Restoration Project

Construction Year 2027

Emissions Inputs

Construction Activity	Construction Year & Source	DPM Exhaust (tons/year)	PM10 Dust for speciation (tons/year)	Arsenic (tons/year)	Beryllium (tons/year)	Cadmium (tons/year)	Cobalt (tons/year)	Copper (tons/year)	Lead (tons/year)	Mercury (tons/year)	Nickel (tons/year)	Selenium (tons/year)	Chromium VI (tons/year)	Crystalline Silica (tons/year)
Concrete Channel 2024	2024_CONCRTE	0.000	0.00	2.91E-12	1.74E-12	2.91E-12	1.49E-11	3.26E-11	2.91E-12	4.65E-13	5.35E-11	5.81E-12	2.33E-13	8.63E-09
Paved road	2024_PAVED	2.07E-04	0.08	1.04E-07	6.26E-08	1.04E-07	6.68E-08	2.09E-06	1.92E-07	1.17E-08	4.51E-06	2.09E-07	1.59E-07	5.93E-04
Unpaved road	2024_CCP_UNPV	6.27E-05	0.20	2.56E-07	1.54E-07	2.56E-07	1.64E-07	5.12E-06	4.71E-07	2.87E-08	1.11E-05	5.12E-07	3.89E-07	1.46E-03
Channel Widening 2024	2024_CHAN_RCK	0.002	0.16	2.05E-07	1.23E-07	2.05E-07	1.05E-06	2.29E-06	2.05E-07	3.28E-08	3.77E-06	4.09E-07	1.64E-08	6.08E-04
Paved road	2024_PAVED	1.80E-03	2.39	2.99E-06	1.79E-06	2.99E-06	1.91E-06	5.98E-05	5.50E-06	3.35E-07	1.29E-04	5.98E-06	4.54E-06	1.70E-02
Rock Pile Area 2025	2025_CHAN_RCK	0.006	0.25	3.16E-07	1.89E-07	3.16E-07	1.62E-06	3.54E-06	3.16E-07	5.05E-08	5.81E-06	6.31E-07	2.53E-08	9.37E-04
Paved road	2025_PAVED	5.95E-03	2.44	3.05E-06	1.83E-06	3.05E-06	1.95E-06	6.10E-05	5.61E-06	3.41E-07	1.32E-04	6.10E-06	4.63E-06	1.73E-02
Rock Pile Area 2026	2026_CHAN_RCK	0.006	0.25	3.16E-07	1.89E-07	3.16E-07	1.62E-06	3.54E-06	3.16E-07	5.05E-08	5.81E-06	6.31E-07	2.53E-08	9.37E-04
Paved road	2026_PAVED	5.84E-03	2.44	3.05E-06	1.83E-06	3.05E-06	1.95E-06	6.10E-05	5.61E-06	3.41E-07	1.32E-04	6.10E-06	4.63E-06	1.73E-02
Channel Widening 2027	2027_CHAN_RCK	0.002	0.98	1.23E-06	7.36E-07	1.23E-06	6.28E-06	1.37E-05	1.23E-06	1.96E-07	2.26E-05	2.45E-06	9.82E-08	3.64E-03
Paved road	2027_PAVED	5.61E-03	2.39	2.99E-06	1.79E-06	2.99E-06	1.91E-06	5.98E-05	5.50E-06	3.35E-07	1.29E-04	5.98E-06	4.54E-06	1.70E-02
Material Removal 2028	2028_MATRMVL	0.001	0.25	3.15E-07	1.89E-07	3.15E-07	1.62E-06	3.53E-06	3.15E-07	5.05E-08	5.80E-06	6.31E-07	2.52E-08	9.37E-04
Paved road	2028_PAVED	5.57E-03	2.39	2.99E-06	1.80E-06	2.99E-06	1.92E-06	5.98E-05	5.51E-06	3.35E-07	1.29E-04	5.98E-06	4.55E-06	1.70E-02
Unpaved road	2028_UNPAVED	3.40E-03	11.84	1.48E-05	8.88E-06	1.48E-05	9.47E-06	2.96E-04	2.72E-05	1.66E-06	6.40E-04	2.96E-05	2.25E-05	8.41E-02
Material Removal 2029	2029_MATRMVL	0.001	0.25	3.15E-07	1.89E-07	3.15E-07	1.62E-06	3.53E-06	3.15E-07	5.05E-08	5.80E-06	6.31E-07	2.52E-08	9.37E-04
Paved road	2029_PAVED	5.56E-03	2.41	3.01E-06	1.81E-06	3.01E-06	1.93E-06	6.03E-05	5.55E-06	3.38E-07	1.30E-04	6.03E-06	4.58E-06	1.71E-02
Unpaved road	2029_UNPAVED	3.39E-03	11.93	1.49E-05	8.95E-06	1.49E-05	9.55E-06	2.98E-04	2.74E-05	1.67E-06	6.44E-04	2.98E-05	2.27E-05	8.47E-02

Construction Activity	Construction Year	DPM (g/s)	Arsenic (g/s)	Beryllium (g/s)	Cadmium (g/s)	Cobalt (g/s)	Copper (g/s)	Lead (g/s)	Mercury (g/s)	Nickel (g/s)	Selenium (g/s)	Chromium VI (g/s)	Crystalline Silica (g/s)
Concrete Channel 2024	2024_CONCRTE	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Paved road	2024_PAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Unpaved road	2024_CCP_UNPV	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Channel Widening 2024	2024_CHAN_RCK	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Paved road	2024_PAVED	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Rock Pile Area 2025	2025_CHAN_RCK	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Paved road	2025_PAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Rock Pile Area 2026	2026_CHAN_RCK	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Paved road	2026_PAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Channel Widening 2027	2027_CHAN_RCK	5.566E-05	3.53E-08	2.12E-08	3.53E-08	1.81E-07	3.95E-07	3.53E-08	5.65E-09	6.49E-07	7.06E-08	2.82E-09	1.05E-04
Paved road	2027_PAVED	1.614E-04	8.60E-08	5.16E-08	8.60E-08	5.50E-08	1.72E-06	1.58E-07	9.63E-09	3.71E-06	1.72E-07	1.31E-07	4.88E-04
Material Removal 2028	2028_MATRMVL	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Paved road	2028_PAVED	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Unpaved road	2028_UNPAVED	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Material Removal 2029	2029_MATRMVL	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Paved road	2029_PAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Unpaved road	2029_UNPAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

N/A = not including PM10 on-site dust in HRA calculation; it is only for speciating metals.

Exposure Duration, ED

	Exposure Start	3rd Trimester	0<2	2<16	16<30
Years	1/1/2027	0	0	1	0

Risk Factors

	Abbreviation	UOM	3rd Trimester	0<2	2<16	16<30
Daily Breathing Rate (95th %'ile)	DBR	L/kg-day	361	1090	572	261
Fraction Of Time At Home [a]	FAH	unitless	0.85	0.85	0.72	0.73
Exposure Frequency	EF	days/year	0.96	0.96	0.96	0.96
Age Sensitivity Factor	ASF	unitless	10	10	3	1
Inhalation Absorption Factor	A	unitless	1	1	1	1
Conversion Factor	CF_1	m^3/L	0.001	0.001	0.001	0.001
Conversion Factor	CF_2	$\mu g/m^3$	0.001	0.001	0.001	0.001
Averaging Time (for residential exposure)	AT	years	70.00	70.00	70.00	70.00

[a] assume school or daycare will have cancer risk of >1 per million

Cancer Potency Factor, CPF

TAC	UOM	
DPM	$mg/kg\text{-}day^{-1}$	1.1
Arsenic	$mg/kg\text{-}day^{-1}$	12
Beryllium	$mg/kg\text{-}day^{-1}$	8.4
Cadmium	$mg/kg\text{-}day^{-1}$	15
Cobalt	$mg/kg\text{-}day^{-1}$	27
Lead	$mg/kg\text{-}day^{-1}$	0.04
Nickel	$mg/kg\text{-}day^{-1}$	0.91
Chromium VI	$mg/kg\text{-}day^{-1}$	510

Intake Factor for Inhalation, IF (m^3/kg-day)

Equation	3rd Trimester	0<2	2<16	16<30
DBR*FAH*EF*ED*ASF*A*CF/AT	0.000	0.000	0.017	0.000

Risk Calculation Part 1, R1

	TAC	3rd Trimester	0<2	2<16	16<30
IF*CPF*CF	DPM	0.00E+00	0.00E+00	1.86E-05	0.00E+00
	Arsenic	0.00E+00	0.00E+00	2.03E-04	0.00E+00
	Beryllium	0.00E+00	0.00E+00	1.42E-04	0.00E+00
	Cadmium	0.00E+00	0.00E+00	2.54E-04	0.00E+00
	Cobalt	0.00E+00	0.00E+00	4.57E-04	0.00E+00
	Lead	0.00E+00	0.00E+00	6.78E-07	0.00E+00
	Nickel	0.00E+00	0.00E+00	1.54E-05	0.00E+00
	Chromium VI	0.00E+00	0.00E+00	8.64E-03	0.00E+00

Risk Calculation Part 2, $\sum R1*C_{TAC}$

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)								3rd Trimester	0<2	2<16	16<30	Cancer Risk - 2027	Receptor Type
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Cobalt	Lead	Nickel	Chromium VI					(per million)	
581336.22_4131207.48	581336.22	4131207.48	1.86E-04	9.94E-08	5.96E-08	9.94E-08	6.70E-08	1.82E-07	4.28E-06	1.50E-07	0	0	3.47384E-09	0	0.0035	CT House
581554.22_4130688.06	581554.22	4130688.06	1.25E-04	6.68E-08	4.01E-08	6.68E-08	4.96E-08	1.22E-07	2.85E-06	9.93E-08	0	0	2.32887E-09	0	0.0023	Res
579793.36_4131503.29	579793.36	4131503.29	8.15E-06	4.54E-09	2.72E-09	4.54E-09	8.41E-09	7.31E-09	1.65E-07	5.12E-09	0	0	1.51817E-10	0	0.0002	Acute
580488.37_4131517.71	580488.37	4131517.71	1.28E-05	6.94E-09	4.17E-09	6.94E-09	7.63E-09	1.22E-08	2.82E-07	9.53E-09	0	0	2.39007E-10	0	0.0002	Acute
581678.43_4131040.03	581678.43	4131040.03	5.96E-04	3.17E-07	1.90E-07	3.17E-07	2.07E-07	5.83E-07	1.37E-05	4.81E-07	0	0	1.10995E-08	0	0.0111	Res
581635.43_4130978.54	581635.43	4130978.54	1.21E-03	6.43E-07	3.86E-07	6.43E-07	4.16E-07	1.18E-06	2.77E-05	9.76E-07	0	0	2.24885E-08	0	0.0225	Res
581830.06_4131027.55	581830.06	4131027.55	5.48E-04	2.92E-07	1.75E-07	2.92E-07	1.91E-07	5.37E-07	1.26E-05	4.43E-07	0	0	1.02231E-08	0	0.0102	Res
581727.48_4130976.54	581727.48	4130976.54	1.46E-03	7.78E-07	4.67E-07	7.78E-07	5.02E-07	1.43E-06	3.36E-05	1.18E-06	0	0	2.72283E-08	0	0.0272	Res
581789.11_4130419.65	581789.11	4130419.65	9.49E-05	5.09E-08	3.05E-08	5.09E-08	4.13E-08	9.20E-08	2.15E-06	7.45E-08	0	0	1.76904E-09	0	0.0018	Res
581700.32_4130781.89	581700.32	4130781.89	2.89E-04	1.54E-07	9.24E-08	1.54E-07	1.03E-07	2.82E-07	6.62E-06	2.32E-07	0	0	5.38163E-09	0	0.0054	Res
581426.07_4131299.01	581426.07	4131299.01	6.68E-05	3.57E-08	2.14E-08	3.57E-08	2.58E-08	6.51E-08	1.52E-06	5.33E-08	0	0	1.24457E-09	0	0.0012	Acute
582301.42_4129474.56	582301.42	4129474.56	3.05E-05	1.65E-08	9.91E-09	1.65E-08	1.86E-08	2.89E-08	6.69E-07	2.25E-08	0	0	5.68127E-10	0	0.0006	Res
582357.99_4129474.56	582357.99	4129474.56	2.85E-05	1.54E-08	9.27E-09	1.54E-08	1.75E-08	2.70E-08	6.25E-07	2.10E-08	0	0	5.309E-10	0	0.0005	Res
582414.56_4129474.56	582414.56	4129474.56	2.67E-05	1.45E-08	8.68E-09	1.45E-08	1.65E-08	2.53E-08	5.85E-07	1.97E-08	0	0	4.97202E-10	0	0.0005	Res
582471.13_4129474.56	582471.13	4129474.56	2.50E-05	1.36E-08	8.15E-09	1.36E-08	1.56E-08	2.37E-08	5.49E-07	1.84E-08	0	0	4.66738E-10	0	0.0005	Res
582527.7_4129474.56	582527.7	4129474.56	2.36E-05	1.28E-08	7.69E-09	1.28E-08	1.48E-08	2.24E-08	5.18E-07	1.74E-08	0	0	4.40565E-10	0	0.0004	Res
582584.27_4129474.56	582584.27	4129474.56	2.22E-05	1.21E-08	7.23E-09	1.21E-08	1.39E-08	2.10E-08	4.86E-07	1.63E-08	0	0	4.1407E-10	0	0.0004	Res
582640.84_4129474.56	582640.84	4129474.56	2.07E-05	1.12E-08	6.75E-09	1.12E-08	1.31E-08	1.96E-08	4.53E-07	1.52E-08	0	0	3.85976E-10	0	0.0004	Res
582244.85_4129558.47	582244.85	4129558.47	3.11E-05	1.69E-08	1.01E-08	1.69E-08	2.01E-08	2.94E-08	6.80E-07	2.27E-08	0	0	5.80355E-10	0	0.0006	Res
582301.42_4129558.47	582301.42	4129558.47	3.07E-05	1.67E-08	9.99E-09	1.67E-08	1.91E-08	2.91E-08	6.73E-07	2.26E-08	0	0	5.72378E-10	0	0.0006	Res
582357.99_4129558.47	582357.99	4129558.47	2.91E-05	1.58E-08	9.46E-09	1.58E-08	1.79E-08	2.76E-08	6.38E-07	2.15E-08	0	0	5.42017E-10	0	0.0005	Res
582414.56_4129558.47	582414.56	4129558.47	2.73E-05	1.48E-08	8.87E-09	1.48E-08	1.68E-08	2.58E-08	5.98E-07	2.01E-08	0	0	5.0836E-10	0	0.0005	Res
582471.13_4129558.47	582471.13	4129558.47	2.55E-05	1.38E-08	8.30E-09	1.38E-08	1.57E-08	2.42E-08	5.59E-07	1.88E-08	0	0	4.75266E-10	0	0.0005	Res
582527.7_4129558.47	582527.7	4129558.47	2.39E-05	1.29E-08	7.76E-09	1.29E-08	1.48E-08	2.26E-08	5.23E-07	1.76E-08	0	0	4.44606E-10	0	0.0004	Res
582584.27_4129558.47	582584.27	4129558.47	2.23E-05	1.21E-08	7.26E-09	1.21E-08	1.40E-08	2.11E-08	4.88E-07	1.64E-08	0	0	4.15607E-10	0	0.0004	Res
582640.84_4129558.47	582640.84	4129558.47	2.10E-05	1.14E-08	6.84E-09	1.14E-08	1.32E-08	1.98E-08	4.59E-07	1.54E-08	0	0	3.91229E-10	0	0.0004	Res
582697.41_4129558.47	582697.41	4129558.47	1.97E-05	1.07E-08	6.43E-09	1.07E-08	1.26E-08	1.86E-08	4.31E-07	1.45E-08	0	0	3.67877E-10	0	0.0004	Res
582244.85_4129642.38	582244.85	4129642.38	2.77E-05	1.51E-08	9.05E-09	1.51E-08	1.94E-08	2.59E-08	5.98E-07	1.98E-08	0	0	5.15849E-10	0	0.0005	Res

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)								Risk Calculation Part 2, $\sum R1*C_{TAC}$					
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Cobalt	Lead	Nickel	Chromium VI	3rd Trimester	0<2	2<16	16<30	Cancer Risk - 2027 (per million)	Receptor Type
582301.42_4129642.38	582301.42	4129642.38	3.01E-05	1.63E-08	9.79E-09	1.63E-08	1.92E-08	2.84E-08	6.57E-07	2.20E-08	0	0	5.60165E-10	0	0.0006	Res
582357.99_4129642.38	582357.99	4129642.38	2.96E-05	1.60E-08	9.62E-09	1.60E-08	1.81E-08	2.80E-08	6.49E-07	2.18E-08	0	0	5.50942E-10	0	0.0006	Res
582414.56_4129642.38	582414.56	4129642.38	2.79E-05	1.51E-08	9.07E-09	1.51E-08	1.70E-08	2.64E-08	6.12E-07	2.06E-08	0	0	5.19628E-10	0	0.0005	Res
582471.13_4129642.38	582471.13	4129642.38	2.61E-05	1.42E-08	8.50E-09	1.42E-08	1.60E-08	2.48E-08	5.74E-07	1.93E-08	0	0	4.87335E-10	0	0.0005	Res
582527.7_4129642.38	582527.7	4129642.38	2.46E-05	1.33E-08	7.99E-09	1.33E-08	1.51E-08	2.33E-08	5.39E-07	1.81E-08	0	0	4.57733E-10	0	0.0005	Res
582584.27_4129642.38	582584.27	4129642.38	2.28E-05	1.24E-08	7.43E-09	1.24E-08	1.41E-08	2.16E-08	5.01E-07	1.68E-08	0	0	4.25721E-10	0	0.0004	Res
582640.84_4129642.38	582640.84	4129642.38	2.14E-05	1.16E-08	6.95E-09	1.16E-08	1.33E-08	2.02E-08	4.68E-07	1.57E-08	0	0	3.9801E-10	0	0.0004	Res
582697.41_4129642.38	582697.41	4129642.38	2.00E-05	1.09E-08	6.51E-09	1.09E-08	1.26E-08	1.89E-08	4.37E-07	1.47E-08	0	0	3.72693E-10	0	0.0004	Res
582753.98_4129642.38	582753.98	4129642.38	1.87E-05	1.01E-08	6.09E-09	1.01E-08	1.19E-08	1.76E-08	4.08E-07	1.37E-08	0	0	3.48173E-10	0	0.0003	Res
582810.55_4129642.38	582810.55	4129642.38	1.75E-05	9.51E-09	5.70E-09	9.51E-09	1.13E-08	1.65E-08	3.82E-07	1.28E-08	0	0	3.26176E-10	0	0.0003	Res
582867.12_4129642.38	582867.12	4129642.38	1.62E-05	8.82E-09	5.29E-09	8.82E-09	1.07E-08	1.53E-08	3.53E-07	1.18E-08	0	0	3.02343E-10	0	0.0003	Res
582244.85_4129726.29	582244.85	4129726.29	3.02E-05	1.64E-08	9.85E-09	1.64E-08	2.00E-08	2.84E-08	6.57E-07	2.19E-08	0	0	5.62597E-10	0	0.0006	Res
582301.42_4129726.29	582301.42	4129726.29	2.93E-05	1.59E-08	9.56E-09	1.59E-08	1.90E-08	2.77E-08	6.40E-07	2.14E-08	0	0	5.46477E-10	0	0.0005	Res
582357.99_4129726.29	582357.99	4129726.29	2.98E-05	1.61E-08	9.68E-09	1.61E-08	1.82E-08	2.82E-08	6.53E-07	2.20E-08	0	0	5.5456E-10	0	0.0006	Res
582414.56_4129726.29	582414.56	4129726.29	2.84E-05	1.54E-08	9.23E-09	1.54E-08	1.71E-08	2.69E-08	6.24E-07	2.10E-08	0	0	5.2909E-10	0	0.0005	Res
582471.13_4129726.29	582471.13	4129726.29	2.68E-05	1.45E-08	8.70E-09	1.45E-08	1.62E-08	2.54E-08	5.88E-07	1.98E-08	0	0	4.98863E-10	0	0.0005	Res
582527.7_4129726.29	582527.7	4129726.29	2.52E-05	1.36E-08	8.18E-09	1.36E-08	1.52E-08	2.39E-08	5.53E-07	1.86E-08	0	0	4.68843E-10	0	0.0005	Res
582584.27_4129726.29	582584.27	4129726.29	2.35E-05	1.28E-08	7.66E-09	1.28E-08	1.43E-08	2.23E-08	5.17E-07	1.74E-08	0	0	4.38938E-10	0	0.0004	Res
582640.84_4129726.29	582640.84	4129726.29	2.20E-05	1.19E-08	7.15E-09	1.19E-08	1.35E-08	2.08E-08	4.82E-07	1.62E-08	0	0	4.09623E-10	0	0.0004	Res
582697.41_4129726.29	582697.41	4129726.29	2.03E-05	1.10E-08	6.62E-09	1.10E-08	1.27E-08	1.92E-08	4.45E-07	1.50E-08	0	0	3.78979E-10	0	0.0004	Res
582753.98_4129726.29	582753.98	4129726.29	1.87E-05	1.02E-08	6.10E-09	1.02E-08	1.19E-08	1.77E-08	4.09E-07	1.37E-08	0	0	3.48781E-10	0	0.0003	Res
582810.55_4129726.29	582810.55	4129726.29	1.70E-05	9.26E-09	5.56E-09	9.26E-09	1.10E-08	1.61E-08	3.72E-07	1.24E-08	0	0	3.17649E-10	0	0.0003	Res
582244.85_4129810.2	582244.85	4129810.2	2.94E-05	1.60E-08	9.59E-09	1.60E-08	1.96E-08	2.77E-08	6.39E-07	2.13E-08	0	0	5.4783E-10	0	0.0005	Res
582301.42_4129810.2	582301.42	4129810.2	2.97E-05	1.61E-08	9.66E-09	1.61E-08	1.88E-08	2.80E-08	6.49E-07	2.17E-08	0	0	5.52926E-10	0	0.0006	Res
582357.99_4129810.2	582357.99	4129810.2	2.94E-05	1.59E-08	9.55E-09	1.59E-08	1.80E-08	2.78E-08	6.45E-07	2.17E-08	0	0	5.4742E-10	0	0.0005	Res
582414.56_4129810.2	582414.56	4129810.2	2.86E-05	1.55E-08	9.28E-09	1.55E-08	1.71E-08	2.71E-08	6.29E-07	2.12E-08	0	0	5.32385E-10	0	0.0005	Res
582471.13_4129810.2	582471.13	4129810.2	2.72E-05	1.47E-08	8.85E-09	1.47E-08	1.62E-08	2.59E-08	6.00E-07	2.03E-08	0	0	5.07561E-10	0	0.0005	Res
582527.7_4129810.2	582527.7	4129810.2	2.55E-05	1.38E-08	8.29E-09	1.38E-08	1.52E-08	2.42E-08	5.62E-07	1.90E-08	0	0	4.75697E-10	0	0.0005	Res
582584.27_4129810.2	582584.27	4129810.2	2.38E-05	1.29E-08	7.72E-09	1.29E-08	1.43E-08	2.25E-08	5.22E-07	1.76E-08	0	0	4.42784E-10	0	0.0004	Res
582640.84_4129810.2	582640.84	4129810.2	2.17E-05	1.18E-08	7.07E-09	1.18E-08	1.33E-08	2.06E-08	4.77E-07	1.61E-08	0	0	4.04911E-10	0	0.0004	Res
582697.41_4129810.2	582697.41	4129810.2	1.99E-05	1.08E-08	6.47E-09	1.08E-08	1.24E-08	1.88E-08	4.36E-07	1.46E-08	0	0	3.70758E-10	0	0.0004	Res
581905.43_4129894.11	581905.43	4129894.11	3.75E-05	2.03E-08	1.22E-08	2.03E-08	2.11E-08	3.57E-08	8.30E-07	2.82E-08	0	0	6.98773E-10	0	0.0007	Res
581962_4129894.11	581962	4129894.11	3.85E-05	2.09E-08	1.25E-08	2.09E-08	2.43E-08	3.64E-08	8.43E-07	2.83E-08	0	0	7.18025E-10	0	0.0007	Res
582131.71_4129894.11	582131.71	4129894.11	3.37E-05	1.83E-08	1.10E-08	1.83E-08	2.22E-08	3.18E-08	7.35E-07	2.45E-08	0	0	6.29048E-10	0	0.0006	Res
582188.28_4129894.11	582188.28	4129894.11	3.24E-05	1.76E-08	1.06E-08	1.76E-08	2.09E-08	3.06E-08	7.07E-07	2.37E-08	0	0	6.0392E-10	0	0.0006	Res
582244.85_4129894.11	582244.85	4129894.11	3.16E-05	1.72E-08	1.03E-08	1.72E-08	1.98E-08	2.99E-08	6.93E-07	2.33E-08	0	0	5.89603E-10	0	0.0006	Res
582301.42_4129894.11	582301.42	4129894.11	3.05E-05	1.65E-08	9.92E-09	1.65E-08	1.87E-08	2.89E-08	6.69E-07	2.25E-08	0	0	5.68215E-10	0	0.0006	Res
582357.99_4129894.11	582357.99	4129894.11	2.91E-05	1.58E-08	9.45E-09	1.58E-08	1.77E-08	2.76E-08	6.38E-07	2.15E-08	0	0	5.41665E-10	0	0.0005	Res
582414.56_4129894.11	582414.56	4129894.11	2.94E-05	1.59E-08	9.54E-09	1.59E-08	1.71E-08	2.80E-08	6.49E-07	2.20E-08	0	0	5.47959E-10	0	0.0005	Res
582471.13_4129894.11	582471.13	4129894.11	2.75E-05	1.49E-08	8.93E-09	1.49E-08	1.60E-08	2.62E-08	6.07E-07	2.06E-08	0	0	5.12866E-10	0	0.0005	Res
582527.7_4129894.11	582527.7	4129894.11	2.53E-05	1.37E-08	8.23E-09	1.37E-08	1.49E-08	2.41E-08	5.59E-07	1.89E-08	0	0	4.72272E-10	0	0.0005	Res
582584.27_4129894.11	582584.27	4129894.11	2.32E-05	1.26E-08	7.54E-09	1.26E-08	1.39E-08	2.20E-08	5.10E-07	1.72E-08	0	0	4.32277E-10	0	0.0004	Res
582640.84_4129894.11	582640.84	4129894.11	2.12E-05	1.15E-08	6.88E-09	1.15E-08	1.29E-08	2.01E-08	4.65E-07	1.56E-08	0	0	3.94282E-10	0	0.0004	Res
582697.41_4129894.11	582697.41	4129894.11	1.93E-05	1.04E-08	6.27E-09	1.04E-08	1.20E-08	1.82E-08	4.22E-07	1.42E-08	0	0	3.58969E-10	0	0.0004	Res
581962_4129978.02	581962	4129978.02	4.01E-05	2.17E-08	1.30E-08	2.17E-08	2.47E-08	3.79E-08	8.79E-07	2.95E-08	0	0	7.46697E-10	0	0.0007	Res
582018.57_4129978.02	582018.57	4129978.02	3.79E-05	2.06E-08	1.23E-08	2.06E-08	2.41E-08	3.58E-08	8.28E-07	2.78E-08	0	0	7.06389E-10	0	0.0007	Res
582075.14_4129978.02	582075.14	4129978.02	3.90E-05	2.11E-08	1.27E-08	2.11E-08	2.39E-08	3.70E-08	8.56E-07	2.88E-08	0	0	7.26785E-10	0	0.0007	Res
582131.71_4129978.02	582131.71	4129978.02	3.88E-05	2.10E-08	1.26E-08	2.10E-08	2.28E-08	3.69E-08	8.55E-07	2.89E-08	0	0	7.22642E-10	0	0.0007	Res
582188.28_4129978.02	582188.28	4129978.02	3.86E-05	2.09E-08	1.25E-08	2.09E-08	2.18E-08	3.68E-08	8.54E-07	2.90E-08	0	0	7.19303E-10	0	0.0007	Res
582244.85_4129978.02	582244.85	4129978.02	3.49E-05	1.89E-08	1.13E-08	1.89E-08	2.01E-08	3.32E-08	7.71E-07	2.61E-08	0	0	6.50201E-10	0	0.0007	Res
582301.42_4129978.02	582301.42	4129978.02	3.44E-05	1.86E-08	1.11E-08	1.86E-08	1.92E-08	3.28E-08	7.61E-07	2.59E-08	0	0	6.40358E-10	0	0.0006	Res
582357.99_4129978.02	582357.99	4129978.02	3.25E-05	1.75E-08	1.05E-08	1.75E-08	1.81E-08	3.10E-08	7.20E-07	2.45E-08	0	0	6.04921E-10	0	0.0006	Res
582414.56_4129978.02	582414.56	4129978.02	3.00E-05	1.62E-08	9.73E-09	1.62E-08	1.68E-08	2.86E-08	6.65E-07	2.26E-08	0	0	5.59171E-10	0	0.0006	Res
582471.13_4129978.02	582471.13	4129978.02	2.75E-05	1.48E-08	8.91E-09	1.48E-08	1.56E-08	2.62E-08	6.08E-07	2.06E-08	0	0	5.11936E-10	0	0.0005	Res
582527.7_4129978.02	582527.7	4129978.02	2.50E-05	1.35E-08	8.11E-09	1.35E-08	1.45E-08	2.38E-08	5.52E-07	1.87E-08	0	0	4.65783E-10	0	0.0005	Res

Risk Calculation Part 2, $\sum R1*C_{TAC}$

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)								3rd Trimester	0<2	2<16	16<30	Cancer Risk - 2027	Receptor Type
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Cobalt	Lead	Nickel	Chromium VI					(per million)	
582584.27_4129978.02	582584.27	4129978.02	2.27E-05	1.23E-08	7.37E-09	1.23E-08	1.34E-08	2.16E-08	5.00E-07	1.69E-08	0	0	4.22985E-10	0	0.0004	Res
582640.84_4129978.02	582640.84	4129978.02	2.06E-05	1.12E-08	6.71E-09	1.12E-08	1.25E-08	1.96E-08	4.53E-07	1.53E-08	0	0	3.84524E-10	0	0.0004	Res
582697.41_4129978.02	582697.41	4129978.02	1.87E-05	1.02E-08	6.10E-09	1.02E-08	1.16E-08	1.77E-08	4.11E-07	1.38E-08	0	0	3.49165E-10	0	0.0003	Res
582753.98_4129978.02	582753.98	4129978.02	1.69E-05	9.16E-09	5.50E-09	9.16E-09	1.08E-08	1.59E-08	3.69E-07	1.24E-08	0	0	3.1455E-10	0	0.0003	Res
582810.55_4129978.02	582810.55	4129978.02	1.49E-05	8.09E-09	4.85E-09	8.09E-09	9.82E-09	1.40E-08	3.24E-07	1.08E-08	0	0	2.77152E-10	0	0.0003	Res
581905.43_4130061.93	581905.43	4130061.93	5.73E-05	3.09E-08	1.85E-08	3.09E-08	3.08E-08	5.48E-08	1.27E-06	4.34E-08	0	0	1.06792E-09	0	0.0011	Res
581962_4130061.93	581962	4130061.93	5.40E-05	2.91E-08	1.75E-08	2.91E-08	2.89E-08	5.17E-08	1.20E-06	4.10E-08	0	0	1.00603E-09	0	0.0010	Res
582018.57_4130061.93	582018.57	4130061.93	4.60E-05	2.49E-08	1.49E-08	2.49E-08	2.59E-08	4.39E-08	1.02E-06	3.46E-08	0	0	8.57751E-10	0	0.0009	Res
582075.14_4130061.93	582075.14	4130061.93	4.11E-05	2.22E-08	1.33E-08	2.22E-08	2.36E-08	3.91E-08	9.08E-07	3.07E-08	0	0	7.65585E-10	0	0.0008	Res
582131.71_4130061.93	582131.71	4130061.93	4.02E-05	2.17E-08	1.30E-08	2.17E-08	2.25E-08	3.84E-08	8.91E-07	3.03E-08	0	0	7.49364E-10	0	0.0007	Res
582188.28_4130061.93	582188.28	4130061.93	3.92E-05	2.12E-08	1.27E-08	2.12E-08	2.14E-08	3.75E-08	8.70E-07	2.96E-08	0	0	7.3042E-10	0	0.0007	Res
582244.85_4130061.93	582244.85	4130061.93	3.83E-05	2.07E-08	1.24E-08	2.07E-08	2.04E-08	3.67E-08	8.53E-07	2.91E-08	0	0	7.14017E-10	0	0.0007	Res
582301.42_4130061.93	582301.42	4130061.93	3.55E-05	1.92E-08	1.15E-08	1.92E-08	1.90E-08	3.40E-08	7.91E-07	2.70E-08	0	0	6.62549E-10	0	0.0007	Res
582357.99_4130061.93	582357.99	4130061.93	3.29E-05	1.78E-08	1.07E-08	1.78E-08	1.77E-08	3.15E-08	7.33E-07	2.50E-08	0	0	6.1401E-10	0	0.0006	Res
582414.56_4130061.93	582414.56	4130061.93	3.02E-05	1.63E-08	9.77E-09	1.63E-08	1.64E-08	2.88E-08	6.70E-07	2.28E-08	0	0	5.62454E-10	0	0.0006	Res
582471.13_4130061.93	582471.13	4130061.93	2.74E-05	1.48E-08	8.87E-09	1.48E-08	1.52E-08	2.61E-08	6.07E-07	2.06E-08	0	0	5.09931E-10	0	0.0005	Res
582527.7_4130061.93	582527.7	4130061.93	2.47E-05	1.33E-08	8.00E-09	1.33E-08	1.40E-08	2.35E-08	5.46E-07	1.85E-08	0	0	4.59794E-10	0	0.0005	Res
582584.27_4130061.93	582584.27	4130061.93	2.23E-05	1.20E-08	7.23E-09	1.20E-08	1.29E-08	2.12E-08	4.91E-07	1.66E-08	0	0	4.15017E-10	0	0.0004	Res
582640.84_4130061.93	582640.84	4130061.93	2.00E-05	1.09E-08	6.51E-09	1.09E-08	1.20E-08	1.90E-08	4.41E-07	1.49E-08	0	0	3.73571E-10	0	0.0004	Res
582697.41_4130061.93	582697.41	4130061.93	1.81E-05	9.82E-09	5.89E-09	9.82E-09	1.11E-08	1.72E-08	3.97E-07	1.34E-08	0	0	3.37496E-10	0	0.0003	Res
582753.98_4130061.93	582753.98	4130061.93	1.64E-05	8.91E-09	5.34E-09	8.91E-09	1.03E-08	1.55E-08	3.59E-07	1.21E-08	0	0	3.05936E-10	0	0.0003	Res
582810.55_4130061.93	582810.55	4130061.93	1.49E-05	8.08E-09	4.85E-09	8.08E-09	9.60E-09	1.40E-08	3.25E-07	1.09E-08	0	0	2.77285E-10	0	0.0003	Res
581962_4130145.84	581962	4130145.84	6.25E-05	3.36E-08	2.02E-08	3.36E-08	3.03E-08	6.02E-08	1.40E-06	4.83E-08	0	0	1.16509E-09	0	0.0012	Res
582018.57_4130145.84	582018.57	4130145.84	5.79E-05	3.11E-08	1.87E-08	3.11E-08	2.81E-08	5.57E-08	1.30E-06	4.47E-08	0	0	1.07875E-09	0	0.0011	Res
582075.14_4130145.84	582075.14	4130145.84	4.93E-05	2.65E-08	1.59E-08	2.65E-08	2.50E-08	4.73E-08	1.10E-06	3.78E-08	0	0	9.18551E-10	0	0.0009	Res
582131.71_4130145.84	582131.71	4130145.84	4.56E-05	2.46E-08	1.47E-08	2.46E-08	2.32E-08	4.38E-08	1.02E-06	3.50E-08	0	0	8.50321E-10	0	0.0009	Res
582188.28_4130145.84	582188.28	4130145.84	4.40E-05	2.37E-08	1.42E-08	2.37E-08	2.20E-08	4.23E-08	9.85E-07	3.38E-08	0	0	8.20251E-10	0	0.0008	Res
582244.85_4130145.84	582244.85	4130145.84	4.01E-05	2.16E-08	1.30E-08	2.16E-08	2.02E-08	3.85E-08	8.98E-07	3.08E-08	0	0	7.47822E-10	0	0.0007	Res
582301.42_4130145.84	582301.42	4130145.84	3.64E-05	1.96E-08	1.18E-08	1.96E-08	1.86E-08	3.49E-08	8.12E-07	2.78E-08	0	0	6.77835E-10	0	0.0007	Res
582357.99_4130145.84	582357.99	4130145.84	3.31E-05	1.78E-08	1.07E-08	1.78E-08	1.72E-08	3.17E-08	7.38E-07	2.52E-08	0	0	6.16827E-10	0	0.0006	Res
582414.56_4130145.84	582414.56	4130145.84	3.00E-05	1.62E-08	9.71E-09	1.62E-08	1.59E-08	2.87E-08	6.69E-07	2.28E-08	0	0	5.59355E-10	0	0.0006	Res
582471.13_4130145.84	582471.13	4130145.84	2.70E-05	1.46E-08	8.74E-09	1.46E-08	1.46E-08	2.58E-08	6.00E-07	2.04E-08	0	0	5.03062E-10	0	0.0005	Res
582527.7_4130145.84	582527.7	4130145.84	2.41E-05	1.30E-08	7.80E-09	1.30E-08	1.34E-08	2.30E-08	5.34E-07	1.81E-08	0	0	4.48618E-10	0	0.0004	Res
582584.27_4130145.84	582584.27	4130145.84	2.14E-05	1.16E-08	6.95E-09	1.16E-08	1.22E-08	2.04E-08	4.74E-07	1.61E-08	0	0	3.99312E-10	0	0.0004	Res
582640.84_4130145.84	582640.84	4130145.84	1.91E-05	1.04E-08	6.22E-09	1.04E-08	1.12E-08	1.82E-08	4.22E-07	1.43E-08	0	0	3.56839E-10	0	0.0004	Res
582697.41_4130145.84	582697.41	4130145.84	1.72E-05	9.33E-09	5.60E-09	9.33E-09	1.04E-08	1.63E-08	3.78E-07	1.28E-08	0	0	3.20828E-10	0	0.0003	Res
582753.98_4130145.84	582753.98	4130145.84	1.56E-05	8.46E-09	5.08E-09	8.46E-09	9.68E-09	1.48E-08	3.42E-07	1.15E-08	0	0	2.90877E-10	0	0.0003	Res
582810.55_4130145.84	582810.55	4130145.84	1.43E-05	7.74E-09	4.64E-09	7.74E-09	9.06E-09	1.35E-08	3.12E-07	1.04E-08	0	0	2.65682E-10	0	0.0003	Res
582867.12_4130145.84	582867.12	4130145.84	1.25E-05	6.82E-09	4.09E-09	6.82E-09	8.27E-09	1.18E-08	2.73E-07	9.11E-09	0	0	2.33798E-10	0	0.0002	Res
581962_4130229.75	581962	4130229.75	6.38E-05	3.43E-08	2.06E-08	3.43E-08	3.03E-08	6.15E-08	1.43E-06	4.94E-08	0	0	1.18914E-09	0	0.0012	Res
582018.57_4130229.75	582018.57	4130229.75	6.08E-05	3.26E-08	1.96E-08	3.26E-08	2.85E-08	5.86E-08	1.37E-06	4.72E-08	0	0	1.13282E-09	0	0.0011	Res
582075.14_4130229.75	582075.14	4130229.75	5.65E-05	3.03E-08	1.82E-08	3.03E-08	2.65E-08	5.45E-08	1.27E-06	4.38E-08	0	0	1.05237E-09	0	0.0011	Res
582131.71_4130229.75	582131.71	4130229.75	5.08E-05	2.73E-08	1.64E-08	2.73E-08	2.41E-08	4.90E-08	1.14E-06	3.93E-08	0	0	9.46661E-10	0	0.0009	Res
582188.28_4130229.75	582188.28	4130229.75	4.53E-05	2.43E-08	1.46E-08	2.43E-08	2.18E-08	4.36E-08	1.02E-06	3.50E-08	0	0	8.4356E-10	0	0.0008	Res
582244.85_4130229.75	582244.85	4130229.75	4.04E-05	2.18E-08	1.31E-08	2.18E-08	1.99E-08	3.89E-08	9.07E-07	3.12E-08	0	0	7.53864E-10	0	0.0008	Res
582301.42_4130229.75	582301.42	4130229.75	3.64E-05	1.96E-08	1.17E-08	1.96E-08	1.82E-08	3.50E-08	8.14E-07	2.79E-08	0	0	6.77793E-10	0	0.0007	Res
582357.99_4130229.75	582357.99	4130229.75	3.28E-05	1.77E-08	1.06E-08	1.77E-08	1.66E-08	3.15E-08	7.33E-07	2.51E-08	0	0	6.10974E-10	0	0.0006	Res
582414.56_4130229.75	582414.56	4130229.75	2.92E-05	1.58E-08	9.45E-09	1.58E-08	1.52E-08	2.80E-08	6.52E-07	2.23E-08	0	0	5.44923E-10	0	0.0005	Res
582471.13_4130229.75	582471.13	4130229.75	2.58E-05	1.39E-08	8.35E-09	1.39E-08	1.38E-08	2.47E-08	5.74E-07	1.96E-08	0	0	4.80762E-10	0	0.0005	Res
582527.7_4130229.75	582527.7	4130229.75	2.28E-05	1.23E-08	7.37E-09	1.23E-08	1.25E-08	2.17E-08	5.05E-07	1.72E-08	0	0	4.24176E-10	0	0.0004	Res
582584.27_4130229.75	582584.27	4130229.75	2.02E-05	1.09E-08	6.54E-09	1.09E-08	1.14E-08	1.92E-08	4.46E-07	1.51E-08	0	0	3.76057E-10	0	0.0004	Res
582640.84_4130229.75	582640.84	4130229.75	1.80E-05	9.75E-09	5.85E-09	9.75E-09	1.05E-08	1.71E-08	3.98E-07	1.34E-08	0	0	3.35794E-10	0	0.0003	Res
582697.41_4130229.75	582697.41	4130229.75	1.63E-05	8.82E-09	5.29E-09	8.82E-09	9.74E-09	1.55E-08	3.58E-07	1.21E-08	0	0	3.03577E-10	0	0.0003	Res
582753.98_4130229.75	582753.98	4130229.75	1.48E-05	8.03E-09	4.82E-09	8.03E-09	9.08E-09	1.40E-08	3.25E-07	1.09E-08	0	0	2.76055E-10	0	0.0003	Res
582810.55_4130229.75	582810.55	4130229.75	1.36E-05	7.38E-09	4.43E-09	7.38E-09	8.52E-09	1.29E-08	2.98E-07	1.00E-08	0	0	2.5358E-10	0	0.0003	Res

Risk Calculation Part 2, $\sum R1*C_{TAC}$

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)								3rd Trimester	0<2	2<16	16<30	Cancer Risk - 2027	Receptor Type
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Cobalt	Lead	Nickel	Chromium VI					(per million)	
582867.12_4130229.75	582867.12	4130229.75	1.26E-05	6.84E-09	4.10E-09	6.84E-09	8.04E-09	1.19E-08	2.75E-07	9.22E-09	0	0	2.34718E-10	0	0.0002	Res
582018.57_4130313.66	582018.57	4130313.66	6.54E-05	3.51E-08	2.11E-08	3.51E-08	2.98E-08	6.32E-08	1.48E-06	5.10E-08	0	0	1.2196E-09	0	0.0012	Res
582075.14_4130313.66	582075.14	4130313.66	6.06E-05	3.25E-08	1.95E-08	3.25E-08	2.75E-08	5.85E-08	1.37E-06	4.72E-08	0	0	1.12883E-09	0	0.0011	Res
582131.71_4130313.66	582131.71	4130313.66	5.30E-05	2.84E-08	1.71E-08	2.84E-08	2.46E-08	5.12E-08	1.19E-06	4.12E-08	0	0	9.87492E-10	0	0.0010	Res
582188.28_4130313.66	582188.28	4130313.66	4.63E-05	2.49E-08	1.49E-08	2.49E-08	2.19E-08	4.46E-08	1.04E-06	3.59E-08	0	0	8.62714E-10	0	0.0009	Res
582244.85_4130313.66	582244.85	4130313.66	4.08E-05	2.19E-08	1.32E-08	2.19E-08	1.97E-08	3.93E-08	9.17E-07	3.15E-08	0	0	7.60848E-10	0	0.0008	Res
582301.42_4130313.66	582301.42	4130313.66	3.62E-05	1.95E-08	1.17E-08	1.95E-08	1.79E-08	3.48E-08	8.12E-07	2.79E-08	0	0	6.75082E-10	0	0.0007	Res
582357.99_4130313.66	582357.99	4130313.66	3.18E-05	1.71E-08	1.03E-08	1.71E-08	1.61E-08	3.06E-08	7.12E-07	2.44E-08	0	0	5.92901E-10	0	0.0006	Res
582414.56_4130313.66	582414.56	4130313.66	2.77E-05	1.49E-08	8.96E-09	1.49E-08	1.44E-08	2.66E-08	6.18E-07	2.11E-08	0	0	5.16321E-10	0	0.0005	Res
582471.13_4130313.66	582471.13	4130313.66	2.42E-05	1.30E-08	7.82E-09	1.30E-08	1.30E-08	2.31E-08	5.38E-07	1.83E-08	0	0	4.50576E-10	0	0.0005	Res
582527.7_4130313.66	582527.7	4130313.66	2.13E-05	1.15E-08	6.90E-09	1.15E-08	1.18E-08	2.03E-08	4.72E-07	1.61E-08	0	0	3.96738E-10	0	0.0004	Res
582584.27_4130313.66	582584.27	4130313.66	1.89E-05	1.02E-08	6.13E-09	1.02E-08	1.08E-08	1.80E-08	4.18E-07	1.42E-08	0	0	3.5228E-10	0	0.0004	Res
582640.84_4130313.66	582640.84	4130313.66	1.70E-05	9.19E-09	5.52E-09	9.19E-09	9.92E-09	1.62E-08	3.75E-07	1.27E-08	0	0	3.1662E-10	0	0.0003	Res
582697.41_4130313.66	582697.41	4130313.66	1.54E-05	8.34E-09	5.00E-09	8.34E-09	9.20E-09	1.46E-08	3.39E-07	1.14E-08	0	0	2.8693E-10	0	0.0003	Res
582753.98_4130313.66	582753.98	4130313.66	1.40E-05	7.61E-09	4.57E-09	7.61E-09	8.59E-09	1.33E-08	3.08E-07	1.04E-08	0	0	2.61766E-10	0	0.0003	Res
582810.55_4130313.66	582810.55	4130313.66	1.29E-05	6.97E-09	4.18E-09	6.97E-09	8.03E-09	1.22E-08	2.81E-07	9.45E-09	0	0	2.39532E-10	0	0.0002	Res
582867.12_4130313.66	582867.12	4130313.66	1.18E-05	6.41E-09	3.85E-09	6.41E-09	7.55E-09	1.12E-08	2.58E-07	8.64E-09	0	0	2.20139E-10	0	0.0002	Res
581848.86_4130397.57	581848.86	4130397.57	8.98E-05	4.81E-08	2.89E-08	4.81E-08	3.92E-08	8.70E-08	2.03E-06	7.04E-08	0	0	1.67342E-09	0	0.0017	Res
581905.43_4130397.57	581905.43	4130397.57	8.70E-05	4.66E-08	2.80E-08	4.66E-08	3.77E-08	8.43E-08	1.97E-06	6.83E-08	0	0	1.62135E-09	0	0.0016	Res
581962_4130397.57	581962	4130397.57	8.22E-05	4.40E-08	2.64E-08	4.40E-08	3.55E-08	7.97E-08	1.86E-06	6.46E-08	0	0	1.53197E-09	0	0.0015	Res
582018.57_4130397.57	582018.57	4130397.57	7.37E-05	3.95E-08	2.37E-08	3.95E-08	3.22E-08	7.13E-08	1.67E-06	5.78E-08	0	0	1.37278E-09	0	0.0014	Res
582075.14_4130397.57	582075.14	4130397.57	6.45E-05	3.46E-08	2.07E-08	3.46E-08	2.86E-08	6.24E-08	1.46E-06	5.05E-08	0	0	1.20155E-09	0	0.0012	Res
582131.71_4130397.57	582131.71	4130397.57	5.51E-05	2.96E-08	1.77E-08	2.96E-08	2.51E-08	5.32E-08	1.24E-06	4.30E-08	0	0	1.02669E-09	0	0.0010	Res
582188.28_4130397.57	582188.28	4130397.57	4.78E-05	2.56E-08	1.54E-08	2.56E-08	2.23E-08	4.61E-08	1.08E-06	3.71E-08	0	0	8.90138E-10	0	0.0009	Res
582244.85_4130397.57	582244.85	4130397.57	4.11E-05	2.21E-08	1.33E-08	2.21E-08	1.97E-08	3.96E-08	9.24E-07	3.18E-08	0	0	7.66326E-10	0	0.0008	Res
582301.42_4130397.57	582301.42	4130397.57	3.53E-05	1.90E-08	1.14E-08	1.90E-08	1.74E-08	3.40E-08	7.92E-07	2.72E-08	0	0	6.58723E-10	0	0.0007	Res
582357.99_4130397.57	582357.99	4130397.57	3.02E-05	1.63E-08	9.75E-09	1.63E-08	1.54E-08	2.90E-08	6.74E-07	2.31E-08	0	0	5.62395E-10	0	0.0006	Res
582414.56_4130397.57	582414.56	4130397.57	2.60E-05	1.40E-08	8.42E-09	1.40E-08	1.38E-08	2.49E-08	5.80E-07	1.98E-08	0	0	4.85304E-10	0	0.0005	Res
582471.13_4130397.57	582471.13	4130397.57	2.28E-05	1.23E-08	7.37E-09	1.23E-08	1.24E-08	2.17E-08	5.05E-07	1.72E-08	0	0	4.24042E-10	0	0.0004	Res
582527.7_4130397.57	582527.7	4130397.57	2.01E-05	1.09E-08	6.51E-09	1.09E-08	1.13E-08	1.92E-08	4.45E-07	1.51E-08	0	0	3.74306E-10	0	0.0004	Res
582584.27_4130397.57	582584.27	4130397.57	1.79E-05	9.68E-09	5.81E-09	9.68E-09	1.03E-08	1.70E-08	3.95E-07	1.34E-08	0	0	3.33528E-10	0	0.0003	Res
582640.84_4130397.57	582640.84	4130397.57	1.61E-05	8.70E-09	5.22E-09	8.70E-09	9.52E-09	1.53E-08	3.54E-07	1.20E-08	0	0	2.99673E-10	0	0.0003	Res
582697.41_4130397.57	582697.41	4130397.57	1.45E-05	7.84E-09	4.70E-09	7.84E-09	8.79E-09	1.37E-08	3.18E-07	1.07E-08	0	0	2.69661E-10	0	0.0003	Res
582753.98_4130397.57	582753.98	4130397.57	1.31E-05	7.12E-09	4.27E-09	7.12E-09	8.18E-09	1.24E-08	2.88E-07	9.66E-09	0	0	2.44597E-10	0	0.0002	Res
582810.55_4130397.57	582810.55	4130397.57	1.20E-05	6.50E-09	3.90E-09	6.50E-09	7.64E-09	1.13E-08	2.62E-07	8.76E-09	0	0	2.23105E-10	0	0.0002	Res
582867.12_4130397.57	582867.12	4130397.57	1.10E-05	5.96E-09	3.58E-09	5.96E-09	7.15E-09	1.03E-08	2.39E-07	7.99E-09	0	0	2.04373E-10	0	0.0002	Res
581848.86_4130481.48	581848.86	4130481.48	1.16E-04	6.20E-08	3.72E-08	6.20E-08	4.67E-08	1.13E-07	2.64E-06	9.19E-08	0	0	2.1594E-09	0	0.0022	Res
581905.43_4130481.48	581905.43	4130481.48	1.07E-04	5.74E-08	3.45E-08	5.74E-08	4.35E-08	1.04E-07	2.44E-06	8.51E-08	0	0	2.00074E-09	0	0.0020	Res
581962_4130481.48	581962	4130481.48	9.14E-05	4.89E-08	2.93E-08	4.89E-08	3.79E-08	8.88E-08	2.08E-06	7.22E-08	0	0	1.70333E-09	0	0.0017	Res
582018.57_4130481.48	582018.57	4130481.48	8.04E-05	4.30E-08	2.58E-08	4.30E-08	3.39E-08	7.80E-08	1.82E-06	6.34E-08	0	0	1.49818E-09	0	0.0015	Res
582075.14_4130481.48	582075.14	4130481.48	6.78E-05	3.63E-08	2.18E-08	3.63E-08	2.93E-08	6.57E-08	1.54E-06	5.33E-08	0	0	1.264E-09	0	0.0013	Res
582131.71_4130481.48	582131.71	4130481.48	5.74E-05	3.08E-08	1.85E-08	3.08E-08	2.55E-08	5.56E-08	1.30E-06	4.49E-08	0	0	1.0703E-09	0	0.0011	Res
582188.28_4130481.48	582188.28	4130481.48	4.84E-05	2.60E-08	1.56E-08	2.60E-08	2.22E-08	4.68E-08	1.09E-06	3.77E-08	0	0	9.02013E-10	0	0.0009	Res
582244.85_4130481.48	582244.85	4130481.48	4.02E-05	2.16E-08	1.30E-08	2.16E-08	1.92E-08	3.87E-08	9.03E-07	3.11E-08	0	0	7.49034E-10	0	0.0007	Res
582301.42_4130481.48	582301.42	4130481.48	3.36E-05	1.81E-08	1.08E-08	1.81E-08	1.67E-08	3.23E-08	7.52E-07	2.58E-08	0	0	6.25607E-10	0	0.0006	Res
582357.99_4130481.48	582357.99	4130481.48	2.85E-05	1.53E-08	9.21E-09	1.53E-08	1.47E-08	2.73E-08	6.36E-07	2.17E-08	0	0	5.30722E-10	0	0.0005	Res
582414.56_4130481.48	582414.56	4130481.48	2.46E-05	1.33E-08	7.97E-09	1.33E-08	1.32E-08	2.36E-08	5.48E-07	1.87E-08	0	0	4.58823E-10	0	0.0005	Res
582471.13_4130481.48	582471.13	4130481.48	2.15E-05	1.16E-08	6.97E-09	1.16E-08	1.19E-08	2.05E-08	4.77E-07	1.62E-08	0	0	4.00987E-10	0	0.0004	Res
582527.7_4130481.48	582527.7	4130481.48	1.89E-05	1.02E-08	6.14E-09	1.02E-08	1.08E-08	1.80E-08	4.18E-07	1.42E-08	0	0	3.52738E-10	0	0.0004	Res
582584.27_4130481.48	582584.27	4130481.48	1.68E-05	9.10E-09	5.46E-09	9.10E-09	9.93E-09	1.60E-08	3.70E-07	1.25E-08	0	0	3.13197E-10	0	0.0003	Res
582640.84_4130481.48	582640.84	4130481.48	1.50E-05	8.12E-09	4.87E-09	8.12E-09	9.13E-09	1.42E-08	3.29E-07	1.11E-08	0	0	2.79262E-10	0	0.0003	Res
582697.41_4130481.48	582697.41	4130481.48	1.35E-05	7.30E-09	4.38E-09	7.30E-09	8.44E-09	1.27E-08	2.95E-07	9.89E-09	0	0	2.50906E-10	0	0.0003	Res
582753.98_4130481.48	582753.98	4130481.48	1.22E-05	6.64E-09	3.98E-09	6.64E-09	7.86E-09	1.15E-08	2.67E-07	8.92E-09	0	0	2.27667E-10	0	0.0002	Res
582810.55_4130481.48	582810.55	4130481.48	1.12E-05	6.07E-09	3.64E-09	6.07E-09	7.35E-09	1.05E-08	2.43E-07	8.11E-09	0	0	2.0803E-10	0	0.0002	Res
582867.12_4130481.48	582867.12	4130481.48	1.03E-05	5.58E-09	3.35E-09	5.58E-09	6.90E-09	9.65E-09	2.23E-07	7.41E-09	0	0	1.91153E-10	0	0.0002	Res
581735.72_4130565.39	581735.72	4130565.39	1.41E-04	7.52E-08	4.51E-08	7.52E-08	5.44E-08	1.37E-07	3.22E-06	1.12E-07	0	0	2.62493E-09	0	0.0026	Res
581792.29_4130565.39	581792.29	4130565.39	1.39E-04	7.41E-08	4.45E-08	7.41E-08	5.35E-08	1.35E-07	3.17E-06	1.11E-07	0	0	2.58558E-09	0	0.0026	Res

Risk Calculation Part 2, $\sum R1*C_{TAC}$

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)								3rd Trimester	0<2	2<16	16<30	Cancer Risk - 2027	Receptor Type
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Cobalt	Lead	Nickel	Chromium VI					(per million)	
581848.86_4130565.39	581848.86	4130565.39	1.32E-04	7.05E-08	4.23E-08	7.05E-08	5.10E-08	1.29E-07	3.01E-06	1.05E-07	0	0	2.45936E-09	0	0.0025	Res
581905.43_4130565.39	581905.43	4130565.39	1.26E-04	6.73E-08	4.04E-08	6.73E-08	4.88E-08	1.23E-07	2.88E-06	1.01E-07	0	0	2.34881E-09	0	0.0023	Res
581962_4130565.39	581962	4130565.39	1.09E-04	5.81E-08	3.48E-08	5.81E-08	4.27E-08	1.06E-07	2.48E-06	8.65E-08	0	0	2.02459E-09	0	0.0020	Res
582018.57_4130565.39	582018.57	4130565.39	8.77E-05	4.69E-08	2.81E-08	4.69E-08	3.55E-08	8.53E-08	2.00E-06	6.96E-08	0	0	1.63475E-09	0	0.0016	Res
582075.14_4130565.39	582075.14	4130565.39	7.11E-05	3.80E-08	2.28E-08	3.80E-08	2.97E-08	6.90E-08	1.61E-06	5.61E-08	0	0	1.32444E-09	0	0.0013	Res
582131.71_4130565.39	582131.71	4130565.39	5.81E-05	3.11E-08	1.87E-08	3.11E-08	2.51E-08	5.63E-08	1.32E-06	4.57E-08	0	0	1.08345E-09	0	0.0011	Res
582188.28_4130565.39	582188.28	4130565.39	4.66E-05	2.50E-08	1.50E-08	2.50E-08	2.11E-08	4.50E-08	1.05E-06	3.63E-08	0	0	8.67886E-10	0	0.0009	Res
582244.85_4130565.39	582244.85	4130565.39	3.77E-05	2.03E-08	1.22E-08	2.03E-08	1.79E-08	3.64E-08	8.48E-07	2.92E-08	0	0	7.02742E-10	0	0.0007	Res
582301.42_4130565.39	582301.42	4130565.39	3.16E-05	1.70E-08	1.02E-08	1.70E-08	1.57E-08	3.04E-08	7.09E-07	2.43E-08	0	0	5.89782E-10	0	0.0006	Res
582357.99_4130565.39	582357.99	4130565.39	2.67E-05	1.44E-08	8.63E-09	1.44E-08	1.38E-08	2.56E-08	5.96E-07	2.04E-08	0	0	4.97781E-10	0	0.0005	Res
582414.56_4130565.39	582414.56	4130565.39	2.29E-05	1.24E-08	7.41E-09	1.24E-08	1.24E-08	2.19E-08	5.09E-07	1.73E-08	0	0	4.26567E-10	0	0.0004	Res
582471.13_4130565.39	582471.13	4130565.39	1.99E-05	1.07E-08	6.44E-09	1.07E-08	1.12E-08	1.90E-08	4.40E-07	1.49E-08	0	0	3.70456E-10	0	0.0004	Res
582527.7_4130565.39	582527.7	4130565.39	1.75E-05	9.44E-09	5.67E-09	9.44E-09	1.02E-08	1.66E-08	3.85E-07	1.30E-08	0	0	3.25256E-10	0	0.0003	Res
582584.27_4130565.39	582584.27	4130565.39	1.55E-05	8.41E-09	5.05E-09	8.41E-09	9.42E-09	1.47E-08	3.41E-07	1.15E-08	0	0	2.89192E-10	0	0.0003	Res
582640.84_4130565.39	582640.84	4130565.39	1.38E-05	7.51E-09	4.50E-09	7.51E-09	8.69E-09	1.31E-08	3.03E-07	1.02E-08	0	0	2.57811E-10	0	0.0003	Res
582697.41_4130565.39	582697.41	4130565.39	1.25E-05	6.79E-09	4.08E-09	6.79E-09	8.09E-09	1.18E-08	2.73E-07	9.12E-09	0	0	2.3299E-10	0	0.0002	Res
582753.98_4130565.39	582753.98	4130565.39	1.14E-05	6.20E-09	3.72E-09	6.20E-09	7.57E-09	1.07E-08	2.48E-07	8.26E-09	0	0	2.12412E-10	0	0.0002	Res
582810.55_4130565.39	582810.55	4130565.39	1.05E-05	5.71E-09	3.43E-09	5.71E-09	7.13E-09	9.86E-09	2.27E-07	7.56E-09	0	0	1.95486E-10	0	0.0002	Res
582867.12_4130565.39	582867.12	4130565.39	9.72E-06	5.30E-09	3.18E-09	5.30E-09	6.73E-09	9.12E-09	2.10E-07	6.98E-09	0	0	1.81228E-10	0	0.0002	Res
581735.72_4130649.3	581735.72	4130649.3	1.53E-04	8.15E-08	4.89E-08	8.15E-08	5.77E-08	1.49E-07	3.49E-06	1.22E-07	0	0	2.84446E-09	0	0.0028	Res
581792.29_4130649.3	581792.29	4130649.3	1.48E-04	7.89E-08	4.73E-08	7.89E-08	5.57E-08	1.44E-07	3.38E-06	1.18E-07	0	0	2.75289E-09	0	0.0028	Res
581905.43_4130649.3	581905.43	4130649.3	1.48E-04	7.89E-08	4.73E-08	7.89E-08	5.52E-08	1.44E-07	3.38E-06	1.18E-07	0	0	2.75492E-09	0	0.0028	Res
581962_4130649.3	581962	4130649.3	1.23E-04	6.54E-08	3.93E-08	6.54E-08	4.65E-08	1.20E-07	2.80E-06	9.80E-08	0	0	2.28377E-09	0	0.0023	Res
582018.57_4130649.3	582018.57	4130649.3	9.28E-05	4.96E-08	2.98E-08	4.96E-08	3.63E-08	9.04E-08	2.12E-06	7.39E-08	0	0	1.72974E-09	0	0.0017	Res
582075.14_4130649.3	582075.14	4130649.3	7.18E-05	3.84E-08	2.31E-08	3.84E-08	2.91E-08	6.99E-08	1.64E-06	5.70E-08	0	0	1.33907E-09	0	0.0013	Res
582131.71_4130649.3	582131.71	4130649.3	5.56E-05	2.98E-08	1.79E-08	2.98E-08	2.35E-08	5.40E-08	1.26E-06	4.38E-08	0	0	1.03658E-09	0	0.0010	Res
582188.28_4130649.3	582188.28	4130649.3	4.36E-05	2.34E-08	1.40E-08	2.34E-08	1.93E-08	4.22E-08	9.85E-07	3.41E-08	0	0	8.12175E-10	0	0.0008	Res
582244.85_4130649.3	582244.85	4130649.3	3.49E-05	1.87E-08	1.12E-08	1.87E-08	1.63E-08	3.37E-08	7.86E-07	2.71E-08	0	0	6.50307E-10	0	0.0007	Res
582301.42_4130649.3	582301.42	4130649.3	2.87E-05	1.54E-08	9.26E-09	1.54E-08	1.41E-08	2.76E-08	6.43E-07	2.21E-08	0	0	5.34746E-10	0	0.0005	Res
582357.99_4130649.3	582357.99	4130649.3	2.42E-05	1.30E-08	7.82E-09	1.30E-08	1.25E-08	2.32E-08	5.40E-07	1.85E-08	0	0	4.50584E-10	0	0.0005	Res
582414.56_4130649.3	582414.56	4130649.3	2.08E-05	1.12E-08	6.73E-09	1.12E-08	1.13E-08	1.99E-08	4.62E-07	1.57E-08	0	0	3.87641E-10	0	0.0004	Res
582471.13_4130649.3	582471.13	4130649.3	1.81E-05	9.77E-09	5.86E-09	9.77E-09	1.02E-08	1.72E-08	4.00E-07	1.36E-08	0	0	3.36838E-10	0	0.0003	Res
582527.7_4130649.3	582527.7	4130649.3	1.59E-05	8.63E-09	5.18E-09	8.63E-09	9.43E-09	1.51E-08	3.51E-07	1.19E-08	0	0	2.97036E-10	0	0.0003	Res
582584.27_4130649.3	582584.27	4130649.3	1.43E-05	7.73E-09	4.64E-09	7.73E-09	8.76E-09	1.35E-08	3.13E-07	1.05E-08	0	0	2.65697E-10	0	0.0003	Res
582640.84_4130649.3	582640.84	4130649.3	1.29E-05	7.01E-09	4.21E-09	7.01E-09	8.20E-09	1.22E-08	2.82E-07	9.46E-09	0	0	2.40716E-10	0	0.0002	Res
582697.41_4130649.3	582697.41	4130649.3	1.18E-05	6.42E-09	3.85E-09	6.42E-09	7.72E-09	1.11E-08	2.57E-07	8.60E-09	0	0	2.20246E-10	0	0.0002	Res
582753.98_4130649.3	582753.98	4130649.3	1.09E-05	5.95E-09	3.57E-09	5.95E-09	7.31E-09	1.03E-08	2.38E-07	7.92E-09	0	0	2.03777E-10	0	0.0002	Res
582810.55_4130649.3	582810.55	4130649.3	1.02E-05	5.56E-09	3.34E-09	5.56E-09	6.96E-09	9.59E-09	2.21E-07	7.35E-09	0	0	1.90247E-10	0	0.0002	Res
582867.12_4130649.3	582867.12	4130649.3	9.57E-06	5.21E-09	3.13E-09	5.21E-09	6.64E-09	8.97E-09	2.07E-07	6.86E-09	0	0	1.78281E-10	0	0.0002	Res
581848.86_4130733.21	581848.86	4130733.21	2.20E-04	1.17E-07	7.05E-08	1.17E-07	7.95E-08	2.15E-07	5.05E-06	1.77E-07	0	0	4.10524E-09	0	0.0041	Res
581905.43_4130733.21	581905.43	4130733.21	1.88E-04	1.00E-07	6.01E-08	1.00E-07	6.82E-08	1.84E-07	4.31E-06	1.51E-07	0	0	3.50109E-09	0	0.0035	Res
581962_4130733.21	581962	4130733.21	1.38E-04	7.35E-08	4.41E-08	7.35E-08	5.10E-08	1.35E-07	3.15E-06	1.11E-07	0	0	2.56832E-09	0	0.0026	Res
582018.57_4130733.21	582018.57	4130733.21	9.63E-05	5.15E-08	3.09E-08	5.15E-08	3.68E-08	9.40E-08	2.20E-06	7.70E-08	0	0	1.79563E-09	0	0.0018	Res
582075.14_4130733.21	582075.14	4130733.21	6.78E-05	3.62E-08	2.17E-08	3.62E-08	2.70E-08	6.60E-08	1.54E-06	5.39E-08	0	0	1.26349E-09	0	0.0013	Res
582131.71_4130733.21	582131.71	4130733.21	4.93E-05	2.64E-08	1.58E-08	2.64E-08	2.06E-08	4.79E-08	1.12E-06	3.89E-08	0	0	9.18993E-10	0	0.0009	Res
582188.28_4130733.21	582188.28	4130733.21	3.80E-05	2.04E-08	1.22E-08	2.04E-08	1.67E-08	3.68E-08	8.60E-07	2.98E-08	0	0	7.08161E-10	0	0.0007	Res
582244.85_4130733.21	582244.85	4130733.21	3.04E-05	1.63E-08	9.78E-09	1.63E-08	1.41E-08	2.93E-08	6.84E-07	2.36E-08	0	0	5.65993E-10	0	0.0006	Res
582301.42_4130733.21	582301.42	4130733.21	2.51E-05	1.35E-08	8.10E-09	1.35E-08	1.22E-08	2.42E-08	5.63E-07	1.94E-08	0	0	4.67881E-10	0	0.0005	Res
582357.99_4130733.21	582357.99	4130733.21	2.13E-05	1.15E-08	6.89E-09	1.15E-08	1.09E-08	2.05E-08	4.76E-07	1.63E-08	0	0	3.97457E-10	0	0.0004	Res
582414.56_4130733.21	582414.56	4130733.21	1.85E-05	1.00E-08	6.00E-09	1.00E-08	9.94E-09	1.77E-08	4.12E-07	1.41E-08	0	0	3.45344E-10	0	0.0003	Res
582471.13_4130733.21	582471.13	4130733.21	1.64E-05	8.88E-09	5.33E-09	8.88E-09	9.20E-09	1.57E-08	3.64E-07	1.24E-08	0	0	3.06407E-10	0	0.0003	Res
582527.7_4130733.21	582527.7	4130733.21	1.48E-05	8.02E-09	4.81E-09	8.02E-09	8.61E-09	1.41E-08	3.27E-07	1.11E-08	0	0	2.76344E-10	0	0.0003	Res
582584.27_4130733.21	582584.27	4130733.21	1.36E-05	7.34E-09	4.41E-09	7.34E-09	8.13E-09	1.29E-08	2.98E-07	1.01E-08	0	0	2.52658E-10	0	0.0003	Res
582640.84_4130733.21	582640.84	4130733.21	1.25E-05	6.79E-09	4.07E-09	6.79E-09	7.73E-09	1.19E-08	2.75E-07	9.23E-09	0	0	2.33314E-10	0	0.0002	Res
582697.41_4130733.21	582697.41	4130733.21	1.16E-05	6.32E-09	3.79E-09	6.32E-09	7.38E-09	1.10E-08	2.55E-07	8.54E-09	0	0	2.17117E-10	0	0.0002	Res
582753.98_4130733.21	582753.98	4130733.21	1.09E-05	5.92E-09	3.55E-09	5.92E-09	7.07E-09	1.03E-08	2.38E-07	7.95E-09	0	0	2.03055E-10	0	0.0002	Res
582810.55_4130733.21	582810.55	4130733.21	1.03E-05	5.59E-09	3.35E-09	5.59E-09	6.79E-09	9.67E-09	2.23E-07	7.46E-09	0	0	1.9143E-10	0	0.0002	Res

Risk Calculation Part 2, $\sum R1*C_{TAC}$

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)								3rd Trimester	0<2	2<16	16<30	Cancer Risk - 2027	Receptor Type
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Cobalt	Lead	Nickel	Chromium VI					(per million)	
582867.12_4130733.21	582867.12	4130733.21	9.68E-06	5.27E-09	3.16E-09	5.27E-09	6.53E-09	9.10E-09	2.10E-07	7.00E-09	0	0	1.80455E-10	0	0.0002	Res
581735.72_4130817.12	581735.72	4130817.12	3.24E-04	1.73E-07	1.04E-07	1.73E-07	1.15E-07	3.17E-07	7.44E-06	2.61E-07	0	0	6.04333E-09	0	0.0060	Res
581792.29_4130817.12	581792.29	4130817.12	3.66E-04	1.95E-07	1.17E-07	1.95E-07	1.29E-07	3.58E-07	8.41E-06	2.95E-07	0	0	6.82275E-09	0	0.0068	Res
581848.86_4130817.12	581848.86	4130817.12	3.28E-04	1.75E-07	1.05E-07	1.75E-07	1.16E-07	3.21E-07	7.54E-06	2.65E-07	0	0	6.11897E-09	0	0.0061	Res
581905.43_4130817.12	581905.43	4130817.12	2.48E-04	1.32E-07	7.93E-08	1.32E-07	8.84E-08	2.43E-07	5.69E-06	2.00E-07	0	0	4.62275E-09	0	0.0046	Res
581962_4130817.12	581962	4130817.12	1.50E-04	8.01E-08	4.80E-08	8.01E-08	5.48E-08	1.47E-07	3.44E-06	1.21E-07	0	0	2.79695E-09	0	0.0028	Res
582018.57_4130817.12	582018.57	4130817.12	8.95E-05	4.78E-08	2.87E-08	4.78E-08	3.40E-08	8.73E-08	2.05E-06	7.16E-08	0	0	1.66859E-09	0	0.0017	Res
582075.14_4130817.12	582075.14	4130817.12	5.77E-05	3.08E-08	1.85E-08	3.08E-08	2.30E-08	5.61E-08	1.31E-06	4.58E-08	0	0	1.07476E-09	0	0.0011	Res
582131.71_4130817.12	582131.71	4130817.12	4.13E-05	2.21E-08	1.33E-08	2.21E-08	1.74E-08	4.01E-08	9.38E-07	3.26E-08	0	0	7.70185E-10	0	0.0008	Res
582188.28_4130817.12	582188.28	4130817.12	3.19E-05	1.71E-08	1.03E-08	1.71E-08	1.41E-08	3.09E-08	7.22E-07	2.50E-08	0	0	5.94997E-10	0	0.0006	Res
582244.85_4130817.12	582244.85	4130817.12	2.60E-05	1.40E-08	8.38E-09	1.40E-08	1.20E-08	2.51E-08	5.86E-07	2.02E-08	0	0	4.85016E-10	0	0.0005	Res
582301.42_4130817.12	582301.42	4130817.12	2.21E-05	1.19E-08	7.14E-09	1.19E-08	1.07E-08	2.13E-08	4.97E-07	1.71E-08	0	0	4.12333E-10	0	0.0004	Res
582357.99_4130817.12	582357.99	4130817.12	1.94E-05	1.04E-08	6.26E-09	1.04E-08	9.69E-09	1.86E-08	4.34E-07	1.49E-08	0	0	3.61054E-10	0	0.0004	Res
582414.56_4130817.12	582414.56	4130817.12	1.73E-05	9.32E-09	5.59E-09	9.32E-09	8.97E-09	1.66E-08	3.86E-07	1.32E-08	0	0	3.22341E-10	0	0.0003	Res
582471.13_4130817.12	582471.13	4130817.12	1.57E-05	8.47E-09	5.08E-09	8.47E-09	8.42E-09	1.50E-08	3.50E-07	1.19E-08	0	0	2.92796E-10	0	0.0003	Res
582527.7_4130817.12	582527.7	4130817.12	1.44E-05	7.76E-09	4.66E-09	7.76E-09	7.95E-09	1.37E-08	3.19E-07	1.08E-08	0	0	2.67963E-10	0	0.0003	Res
582584.27_4130817.12	582584.27	4130817.12	1.33E-05	7.19E-09	4.31E-09	7.19E-09	7.57E-09	1.27E-08	2.94E-07	9.97E-09	0	0	2.47725E-10	0	0.0002	Res
582640.84_4130817.12	582640.84	4130817.12	1.24E-05	6.69E-09	4.01E-09	6.69E-09	7.25E-09	1.18E-08	2.73E-07	9.22E-09	0	0	2.30454E-10	0	0.0002	Res
582697.41_4130817.12	582697.41	4130817.12	1.16E-05	6.26E-09	3.76E-09	6.26E-09	6.96E-09	1.10E-08	2.54E-07	8.57E-09	0	0	2.15329E-10	0	0.0002	Res
582753.98_4130817.12	582753.98	4130817.12	1.08E-05	5.86E-09	3.52E-09	5.86E-09	6.68E-09	1.02E-08	2.37E-07	7.97E-09	0	0	2.01456E-10	0	0.0002	Res
582810.55_4130817.12	582810.55	4130817.12	1.02E-05	5.52E-09	3.31E-09	5.52E-09	6.44E-09	9.60E-09	2.22E-07	7.45E-09	0	0	1.89397E-10	0	0.0002	Res
582867.12_4130817.12	582867.12	4130817.12	9.59E-06	5.21E-09	3.13E-09	5.21E-09	6.22E-09	9.05E-09	2.09E-07	6.99E-09	0	0	1.78701E-10	0	0.0002	Res
581735.72_4130901.03	581735.72	4130901.03	6.46E-04	3.44E-07	2.06E-07	3.44E-07	2.24E-07	6.32E-07	1.48E-05	5.22E-07	0	0	1.20326E-08	0	0.0120	Res
581792.29_4130901.03	581792.29	4130901.03	6.89E-04	3.67E-07	2.20E-07	3.67E-07	2.39E-07	6.75E-07	1.58E-05	5.57E-07	0	0	1.28509E-08	0	0.0129	Res
581848.86_4130901.03	581848.86	4130901.03	6.14E-04	3.27E-07	1.96E-07	3.27E-07	2.13E-07	6.02E-07	1.41E-05	4.96E-07	0	0	1.14519E-08	0	0.0115	Res
581905.43_4130901.03	581905.43	4130901.03	3.22E-04	1.72E-07	1.03E-07	1.72E-07	1.13E-07	3.15E-07	7.40E-06	2.60E-07	0	0	6.0053E-09	0	0.0060	Res
581962_4130901.03	581962	4130901.03	1.30E-04	6.95E-08	4.17E-08	6.95E-08	4.78E-08	1.27E-07	2.98E-06	1.05E-07	0	0	2.42755E-09	0	0.0024	Res
582018.57_4130901.03	582018.57	4130901.03	6.95E-05	3.71E-08	2.23E-08	3.71E-08	2.70E-08	6.77E-08	1.59E-06	5.54E-08	0	0	1.29514E-09	0	0.0013	Res
582075.14_4130901.03	582075.14	4130901.03	4.64E-05	2.48E-08	1.49E-08	2.48E-08	1.89E-08	4.51E-08	1.05E-06	3.67E-08	0	0	8.64128E-10	0	0.0009	Res
582131.71_4130901.03	582131.71	4130901.03	3.53E-05	1.89E-08	1.14E-08	1.89E-08	1.50E-08	3.43E-08	8.01E-07	2.78E-08	0	0	6.58311E-10	0	0.0007	Res
582188.28_4130901.03	582188.28	4130901.03	2.88E-05	1.55E-08	9.27E-09	1.55E-08	1.27E-08	2.79E-08	6.52E-07	2.26E-08	0	0	5.37116E-10	0	0.0005	Res
582244.85_4130901.03	582244.85	4130901.03	2.44E-05	1.31E-08	7.86E-09	1.31E-08	1.11E-08	2.36E-08	5.51E-07	1.90E-08	0	0	4.54946E-10	0	0.0005	Res
582301.42_4130901.03	582301.42	4130901.03	2.12E-05	1.14E-08	6.82E-09	1.14E-08	9.94E-09	2.04E-08	4.76E-07	1.64E-08	0	0	3.9426E-10	0	0.0004	Res
582357.99_4130901.03	582357.99	4130901.03	1.87E-05	1.00E-08	6.02E-09	1.00E-08	9.04E-09	1.80E-08	4.19E-07	1.44E-08	0	0	3.48068E-10	0	0.0003	Res
582414.56_4130901.03	582414.56	4130901.03	1.67E-05	8.98E-09	5.39E-09	8.98E-09	8.32E-09	1.60E-08	3.74E-07	1.28E-08	0	0	3.11026E-10	0	0.0003	Res
582471.13_4130901.03	582471.13	4130901.03	1.51E-05	8.13E-09	4.88E-09	8.13E-09	7.76E-09	1.45E-08	3.37E-07	1.15E-08	0	0	2.81417E-10	0	0.0003	Res
582527.7_4130901.03	582527.7	4130901.03	1.38E-05	7.43E-09	4.46E-09	7.43E-09	7.29E-09	1.32E-08	3.07E-07	1.05E-08	0	0	2.56685E-10	0	0.0003	Res
582584.27_4130901.03	582584.27	4130901.03	1.27E-05	6.85E-09	4.11E-09	6.85E-09	6.92E-09	1.21E-08	2.82E-07	9.60E-09	0	0	2.36587E-10	0	0.0002	Res
582640.84_4130901.03	582640.84	4130901.03	1.18E-05	6.37E-09	3.82E-09	6.37E-09	6.61E-09	1.12E-08	2.61E-07	8.87E-09	0	0	2.1971E-10	0	0.0002	Res
582697.41_4130901.03	582697.41	4130901.03	1.10E-05	5.95E-09	3.57E-09	5.95E-09	6.34E-09	1.05E-08	2.43E-07	8.23E-09	0	0	2.05129E-10	0	0.0002	Res
582753.98_4130901.03	582753.98	4130901.03	1.03E-05	5.59E-09	3.35E-09	5.59E-09	6.11E-09	9.80E-09	2.27E-07	7.68E-09	0	0	1.92334E-10	0	0.0002	Res
582810.55_4130901.03	582810.55	4130901.03	9.70E-06	5.26E-09	3.15E-09	5.26E-09	5.90E-09	9.19E-09	2.13E-07	7.17E-09	0	0	1.80731E-10	0	0.0002	Res
582867.12_4130901.03	582867.12	4130901.03	9.16E-06	4.97E-09	2.98E-09	4.97E-09	5.72E-09	8.67E-09	2.01E-07	6.74E-09	0	0	1.70743E-10	0	0.0002	Res
581735.72_4130984.94	581735.72	4130984.94	1.72E-03	9.18E-07	5.51E-07	9.18E-07	5.91E-07	1.69E-06	3.96E-05	1.39E-06	0	0	3.21019E-08	0	0.0321	Res
581792.29_4130984.94	581792.29	4130984.94	2.26E-03	1.20E-06	7.23E-07	1.20E-06	7.75E-07	2.22E-06	5.20E-05	1.83E-06	0	0	4.215E-08	0	0.0422	Res
581848.86_4130984.94	581848.86	4130984.94	2.63E-03	1.40E-06	8.41E-07	1.40E-06	9.01E-07	2.58E-06	6.05E-05	2.13E-06	0	0	4.90392E-08	0	0.0490	Res
581905.43_4130984.94	581905.43	4130984.94	2.09E-04	1.11E-07	6.68E-08	1.11E-07	7.46E-08	2.04E-07	4.79E-06	1.68E-07	0	0	3.8893E-09	0	0.0039	Res
581962_4130984.94	581962	4130984.94	8.91E-05	4.76E-08	2.85E-08	4.76E-08	3.37E-08	8.69E-08	2.04E-06	7.13E-08	0	0	1.66071E-09	0	0.0017	Res
582018.57_4130984.94	582018.57	4130984.94	5.71E-05	3.05E-08	1.83E-08	3.05E-08	2.26E-08	5.56E-08	1.30E-06	4.54E-08	0	0	1.06392E-09	0	0.0011	Res
582075.14_4130984.94	582075.14	4130984.94	4.19E-05	2.24E-08	1.34E-08	2.24E-08	1.73E-08	4.07E-08	9.51E-07	3.31E-08	0	0	7.80197E-10	0	0.0008	Res
582131.71_4130984.94	582131.71	4130984.94	3.29E-05	1.76E-08	1.06E-08	1.76E-08	1.41E-08	3.19E-08	7.46E-07	2.59E-08	0	0	6.13638E-10	0	0.0006	Res
582188.28_4130984.94	582188.28	4130984.94	2.70E-05	1.45E-08	8.68E-09	1.45E-08	1.19E-08	2.61E-08	6.10E-07	2.11E-08	0	0	5.02948E-10	0	0.0005	Res
582244.85_4130984.94	582244.85	4130984.94	2.28E-05	1.22E-08	7.33E-09	1.22E-08	1.04E-08	2.20E-08	5.14E-07	1.78E-08	0	0	4.24463E-10	0	0.0004	Res
582301.42_4130984.94	582301.42	4130984.94	1.97E-05	1.06E-08	6.34E-09	1.06E-08	9.22E-09	1.90E-08	4.43E-07	1.53E-08	0	0	3.66427E-10	0	0.0004	Res
582357.99_4130984.94	582357.99	4130984.94	1.73E-05	9.29E-09	5.57E-09	9.29E-09	8.32E-09	1.67E-08	3.88E-07	1.34E-08	0	0	3.22165E-10	0	0.0003	Res
582414.56_4130984.94	582414.56	4130984.94	1.54E-05	8.29E-09	4.97E-09	8.29E-09	7.62E-09	1.48E-08	3.45E-07	1.19E-08	0	0	2.87241E-10	0	0.0003	Res
582471.13_4130984.94	582471.13	4130984.94	1.39E-05	7.48E-09	4.49E-09	7.48E-09	7.05E-09	1.33E-08	3.11E-07	1.07E-08	0	0	2.59091E-10	0	0.0003	Res

Risk Calculation Part 2, $\sum R1*C_{TAC}$

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)								3rd Trimester	0<2	2<16	16<30	Cancer Risk - 2027	Receptor Type
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Cobalt	Lead	Nickel	Chromium VI					(per million)	
582527.7_4130984.94	582527.7	4130984.94	1.27E-05	6.82E-09	4.09E-09	6.82E-09	6.58E-09	1.21E-08	2.82E-07	9.65E-09	0	0	2.35907E-10	0	0.0002	Res
582584.27_4130984.94	582584.27	4130984.94	1.17E-05	6.29E-09	3.77E-09	6.29E-09	6.22E-09	1.12E-08	2.60E-07	8.85E-09	0	0	2.17299E-10	0	0.0002	Res
582640.84_4130984.94	582640.84	4130984.94	1.09E-05	5.86E-09	3.51E-09	5.86E-09	5.93E-09	1.04E-08	2.41E-07	8.20E-09	0	0	2.02253E-10	0	0.0002	Res
582697.41_4130984.94	582697.41	4130984.94	1.01E-05	5.47E-09	3.28E-09	5.47E-09	5.67E-09	9.66E-09	2.24E-07	7.62E-09	0	0	1.88674E-10	0	0.0002	Res
582753.98_4130984.94	582753.98	4130984.94	9.53E-06	5.15E-09	3.09E-09	5.15E-09	5.47E-09	9.07E-09	2.11E-07	7.13E-09	0	0	1.77613E-10	0	0.0002	Res
582810.55_4130984.94	582810.55	4130984.94	8.99E-06	4.87E-09	2.92E-09	4.87E-09	5.29E-09	8.55E-09	1.98E-07	6.70E-09	0	0	1.67555E-10	0	0.0002	Res
582867.12_4130984.94	582867.12	4130984.94	8.51E-06	4.61E-09	2.77E-09	4.61E-09	5.13E-09	8.07E-09	1.87E-07	6.31E-09	0	0	1.58572E-10	0	0.0002	Res
581735.72_4131068.85	581735.72	4131068.85	2.81E-04	1.50E-07	8.98E-08	1.50E-07	9.96E-08	2.75E-07	6.44E-06	2.26E-07	0	0	5.23216E-09	0	0.0052	Res
581792.29_4131068.85	581792.29	4131068.85	2.24E-04	1.19E-07	7.16E-08	1.19E-07	8.00E-08	2.19E-07	5.13E-06	1.80E-07	0	0	4.1705E-09	0	0.0042	Res
581848.86_4131068.85	581848.86	4131068.85	1.20E-04	6.41E-08	3.84E-08	6.41E-08	4.45E-08	1.17E-07	2.75E-06	9.63E-08	0	0	2.23791E-09	0	0.0022	Res
581905.43_4131068.85	581905.43	4131068.85	7.62E-05	4.07E-08	2.44E-08	4.07E-08	2.93E-08	7.43E-08	1.74E-06	6.08E-08	0	0	1.42016E-09	0	0.0014	Res
581962_4131068.85	581962	4131068.85	5.50E-05	2.94E-08	1.76E-08	2.94E-08	2.20E-08	5.35E-08	1.25E-06	4.37E-08	0	0	1.02467E-09	0	0.0010	Res
582018.57_4131068.85	582018.57	4131068.85	4.15E-05	2.22E-08	1.33E-08	2.22E-08	1.72E-08	4.03E-08	9.42E-07	3.28E-08	0	0	7.73121E-10	0	0.0008	Res
582075.14_4131068.85	582075.14	4131068.85	3.27E-05	1.75E-08	1.05E-08	1.75E-08	1.41E-08	3.17E-08	7.42E-07	2.57E-08	0	0	6.10202E-10	0	0.0006	Res
582131.71_4131068.85	582131.71	4131068.85	2.68E-05	1.44E-08	8.64E-09	1.44E-08	1.20E-08	2.60E-08	6.07E-07	2.10E-08	0	0	5.00375E-10	0	0.0005	Res
582188.28_4131068.85	582188.28	4131068.85	2.26E-05	1.21E-08	7.27E-09	1.21E-08	1.04E-08	2.18E-08	5.09E-07	1.76E-08	0	0	4.20532E-10	0	0.0004	Res
582244.85_4131068.85	582244.85	4131068.85	1.94E-05	1.04E-08	6.25E-09	1.04E-08	9.16E-09	1.87E-08	4.36E-07	1.50E-08	0	0	3.6163E-10	0	0.0004	Res
582301.42_4131068.85	582301.42	4131068.85	1.70E-05	9.12E-09	5.47E-09	9.12E-09	8.22E-09	1.63E-08	3.81E-07	1.31E-08	0	0	3.16158E-10	0	0.0003	Res
582357.99_4131068.85	582357.99	4131068.85	1.50E-05	8.09E-09	4.85E-09	8.09E-09	7.45E-09	1.45E-08	3.37E-07	1.16E-08	0	0	2.80194E-10	0	0.0003	Res
582414.56_4131068.85	582414.56	4131068.85	1.35E-05	7.27E-09	4.36E-09	7.27E-09	6.84E-09	1.30E-08	3.02E-07	1.03E-08	0	0	2.51644E-10	0	0.0003	Res
582471.13_4131068.85	582471.13	4131068.85	1.22E-05	6.60E-09	3.96E-09	6.60E-09	6.33E-09	1.17E-08	2.73E-07	9.35E-09	0	0	2.28221E-10	0	0.0002	Res
582527.7_4131068.85	582527.7	4131068.85	1.12E-05	6.04E-09	3.62E-09	6.04E-09	5.90E-09	1.07E-08	2.50E-07	8.52E-09	0	0	2.08701E-10	0	0.0002	Res
582584.27_4131068.85	582584.27	4131068.85	1.03E-05	5.56E-09	3.33E-09	5.56E-09	5.54E-09	9.85E-09	2.29E-07	7.81E-09	0	0	1.91912E-10	0	0.0002	Res
582640.84_4131068.85	582640.84	4131068.85	9.64E-06	5.20E-09	3.12E-09	5.20E-09	5.27E-09	9.21E-09	2.14E-07	7.29E-09	0	0	1.79679E-10	0	0.0002	Res
582697.41_4131068.85	582697.41	4131068.85	9.04E-06	4.89E-09	2.93E-09	4.89E-09	5.04E-09	8.63E-09	2.00E-07	6.81E-09	0	0	1.68571E-10	0	0.0002	Res
582753.98_4131068.85	582753.98	4131068.85	8.57E-06	4.63E-09	2.78E-09	4.63E-09	4.86E-09	8.16E-09	1.90E-07	6.43E-09	0	0	1.59653E-10	0	0.0002	Res
582810.55_4131068.85	582810.55	4131068.85	8.14E-06	4.40E-09	2.64E-09	4.40E-09	4.71E-09	7.75E-09	1.80E-07	6.09E-09	0	0	1.51749E-10	0	0.0002	Res
582867.12_4131068.85	582867.12	4131068.85	7.70E-06	4.17E-09	2.50E-09	4.17E-09	4.55E-09	7.31E-09	1.70E-07	5.73E-09	0	0	1.43454E-10	0	0.0001	Res
582018.57_4131152.76	582018.57	4131152.76	2.75E-05	1.47E-08	8.85E-09	1.47E-08	1.23E-08	2.66E-08	6.21E-07	2.15E-08	0	0	5.12285E-10	0	0.0005	Res
582244.85_4131152.76	582244.85	4131152.76	1.63E-05	8.76E-09	5.25E-09	8.76E-09	8.05E-09	1.57E-08	3.65E-07	1.25E-08	0	0	3.03397E-10	0	0.0003	Res
582301.42_4131152.76	582301.42	4131152.76	1.46E-05	7.85E-09	4.71E-09	7.85E-09	7.37E-09	1.40E-08	3.26E-07	1.12E-08	0	0	2.71835E-10	0	0.0003	Res
582357.99_4131152.76	582357.99	4131152.76	1.31E-05	7.06E-09	4.23E-09	7.06E-09	6.76E-09	1.26E-08	2.93E-07	1.00E-08	0	0	2.44175E-10	0	0.0002	Res
582414.56_4131152.76	582414.56	4131152.76	1.19E-05	6.40E-09	3.84E-09	6.40E-09	6.24E-09	1.14E-08	2.65E-07	9.04E-09	0	0	2.21309E-10	0	0.0002	Res
582471.13_4131152.76	582471.13	4131152.76	1.07E-05	5.78E-09	3.47E-09	5.78E-09	5.75E-09	1.03E-08	2.39E-07	8.13E-09	0	0	1.99838E-10	0	0.0002	Res
582527.7_4131152.76	582527.7	4131152.76	9.81E-06	5.29E-09	3.18E-09	5.29E-09	5.35E-09	9.37E-09	2.18E-07	7.42E-09	0	0	1.82822E-10	0	0.0002	Res
582584.27_4131152.76	582584.27	4131152.76	9.03E-06	4.88E-09	2.93E-09	4.88E-09	5.01E-09	8.62E-09	2.00E-07	6.81E-09	0	0	1.68294E-10	0	0.0002	Res
582640.84_4131152.76	582640.84	4131152.76	8.40E-06	4.54E-09	2.73E-09	4.54E-09	4.73E-09	8.02E-09	1.86E-07	6.32E-09	0	0	1.56658E-10	0	0.0002	Res
582697.41_4131152.76	582697.41	4131152.76	7.88E-06	4.26E-09	2.55E-09	4.26E-09	4.49E-09	7.50E-09	1.74E-07	5.90E-09	0	0	1.46798E-10	0	0.0001	Res
582753.98_4131152.76	582753.98	4131152.76	7.49E-06	4.05E-09	2.43E-09	4.05E-09	4.32E-09	7.13E-09	1.65E-07	5.60E-09	0	0	1.39529E-10	0	0.0001	Res
582810.55_4131152.76	582810.55	4131152.76	7.13E-06	3.86E-09	2.31E-09	3.86E-09	4.17E-09	6.78E-09	1.57E-07	5.32E-09	0	0	1.32814E-10	0	0.0001	Res
582867.12_4131152.76	582867.12	4131152.76	6.74E-06	3.65E-09	2.19E-09	3.65E-09	4.01E-09	6.40E-09	1.48E-07	5.01E-09	0	0	1.25678E-10	0	0.0001	Res

HRA Permanente Creek Restoration Project

Construction Year 2028

Emissions Inputs

Construction Activity	Construction Year & Source	DPM Exhaust (tons/year)	PM10 Dust for speciation (tons/year)	Arsenic (tons/year)	Beryllium (tons/year)	Cadmium (tons/year)	Cobalt (tons/year)	Copper (tons/year)	Lead (tons/year)	Mercury (tons/year)	Nickel (tons/year)	Selenium (tons/year)	Chromium VI (tons/year)	Crystalline Silica (tons/year)
Concrete Channel 2024	2024_CONCRTE	0.000	0.00	2.91E-12	1.74E-12	2.91E-12	1.49E-11	3.26E-11	2.91E-12	4.65E-13	5.35E-11	5.81E-12	2.33E-13	8.63E-09
Paved road	2024_PAVED	2.07E-04	0.08	1.04E-07	6.26E-08	1.04E-07	6.68E-08	2.09E-06	1.92E-07	1.17E-08	4.51E-06	2.09E-07	1.59E-07	5.93E-04
Unpaved road	2024_CCP_UNPV	6.27E-05	0.20	2.56E-07	1.54E-07	2.56E-07	1.64E-07	5.12E-06	4.71E-07	2.87E-08	1.11E-05	5.12E-07	3.89E-07	1.46E-03
Channel Widening 2024	2024_CHAN_RCK	0.002	0.16	2.05E-07	1.23E-07	2.05E-07	1.05E-06	2.29E-06	2.05E-07	3.28E-08	3.77E-06	4.09E-07	1.64E-08	6.08E-04
Paved road	2024_PAVED	1.80E-03	2.39	2.99E-06	1.79E-06	2.99E-06	1.91E-06	5.98E-05	5.50E-06	3.35E-07	1.29E-04	5.98E-06	4.54E-06	1.70E-02
Rock Pile Area 2025	2025_CHAN_RCK	0.006	0.25	3.16E-07	1.89E-07	3.16E-07	1.62E-06	3.54E-06	3.16E-07	5.05E-08	5.81E-06	6.31E-07	2.53E-08	9.37E-04
Paved road	2025_PAVED	5.95E-03	2.44	3.05E-06	1.83E-06	3.05E-06	1.95E-06	6.10E-05	5.61E-06	3.41E-07	1.32E-04	6.10E-06	4.63E-06	1.73E-02
Rock Pile Area 2026	2026_CHAN_RCK	0.006	0.25	3.16E-07	1.89E-07	3.16E-07	1.62E-06	3.54E-06	3.16E-07	5.05E-08	5.81E-06	6.31E-07	2.53E-08	9.37E-04
Paved road	2026_PAVED	5.84E-03	2.44	3.05E-06	1.83E-06	3.05E-06	1.95E-06	6.10E-05	5.61E-06	3.41E-07	1.32E-04	6.10E-06	4.63E-06	1.73E-02
Channel Widening 2027	2027_CHAN_RCK	0.002	0.98	1.23E-06	7.36E-07	1.23E-06	6.28E-06	1.37E-05	1.23E-06	1.96E-07	2.26E-05	2.45E-06	9.82E-08	3.64E-03
Paved road	2027_PAVED	5.61E-03	2.39	2.99E-06	1.79E-06	2.99E-06	1.91E-06	5.98E-05	5.50E-06	3.35E-07	1.29E-04	5.98E-06	4.54E-06	1.70E-02
Material Removal 2028	2028_MATRMVL	0.001	0.25	3.15E-07	1.89E-07	3.15E-07	1.62E-06	3.53E-06	3.15E-07	5.05E-08	5.80E-06	6.31E-07	2.52E-08	9.37E-04
Paved road	2028_PAVED	5.57E-03	2.39	2.99E-06	1.80E-06	2.99E-06	1.92E-06	5.98E-05	5.51E-06	3.35E-07	1.29E-04	5.98E-06	4.55E-06	1.70E-02
Unpaved road	2028_UNPAVED	3.40E-03	11.84	1.48E-05	8.88E-06	1.48E-05	9.47E-06	2.96E-04	2.72E-05	1.66E-06	6.40E-04	2.96E-05	2.25E-05	8.41E-02
Material Removal 2029	2029_MATRMVL	0.001	0.25	3.15E-07	1.89E-07	3.15E-07	1.62E-06	3.53E-06	3.15E-07	5.05E-08	5.80E-06	6.31E-07	2.52E-08	9.37E-04
Paved road	2029_PAVED	5.56E-03	2.41	3.01E-06	1.81E-06	3.01E-06	1.93E-06	6.03E-05	5.55E-06	3.38E-07	1.30E-04	6.03E-06	4.58E-06	1.71E-02
Unpaved road	2029_UNPAVED	3.39E-03	11.93	1.49E-05	8.95E-06	1.49E-05	9.55E-06	2.98E-04	2.74E-05	1.67E-06	6.44E-04	2.98E-05	2.27E-05	8.47E-02

Construction Activity	Construction Year	DPM (g/s)	Arsenic (g/s)	Beryllium (g/s)	Cadmium (g/s)	Cobalt (g/s)	Copper (g/s)	Lead (g/s)	Mercury (g/s)	Nickel (g/s)	Selenium (g/s)	Chromium VI (g/s)	Crystalline Silica (g/s)
Concrete Channel 2024	2024_CONCRTE	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Paved road	2024_PAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Unpaved road	2024_CCP_UNPV	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Channel Widening 2024	2024_CHAN_RCK	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Paved road	2024_PAVED	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Rock Pile Area 2025	2025_CHAN_RCK	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Paved road	2025_PAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Rock Pile Area 2026	2026_CHAN_RCK	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Paved road	2026_PAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Channel Widening 2027	2027_CHAN_RCK	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Paved road	2027_PAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Material Removal 2028	2028_MATRMVL	3.324E-05	9.075E-09	5.445E-09	9.075E-09	4.647E-08	1.016E-07	9.075E-09	1.452E-09	1.670E-07	1.815E-08	7.260E-10	2.696E-05
Paved road	2028_PAVED	1.603E-04	8.608E-08	5.165E-08	8.608E-08	5.509E-08	1.722E-06	1.584E-07	9.641E-09	3.719E-06	1.722E-07	1.308E-07	4.889E-04
Unpaved road	2028_UNPAVED	9.795E-05	4.259E-07	2.555E-07	4.259E-07	2.726E-07	8.517E-06	7.836E-07	4.770E-08	1.840E-05	8.517E-07	6.473E-07	2.419E-03
Material Removal 2029	2029_MATRMVL	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Paved road	2029_PAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Unpaved road	2029_UNPAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

N/A = not including PM10 on-site dust in HRA calculation; it is only for speciating metals.

Exposure Duration, ED

	Exposure Start	3rd Trimester	0<2	2<16	16<30
Years	1/1/2028	0	0	1	0

Risk Factors

	Abbreviation	UOM	3rd Trimester	0<2	2<16	16<30
Daily Breathing Rate (95th %'ile)	DBR	L/kg-day	361	1090	572	261
Fraction Of Time At Home [a]	FAH	unitless	0.85	0.85	0.72	0.73
Exposure Frequency	EF	days/year	0.96	0.96	0.96	0.96
Age Sensitivity Factor	ASF	unitless	10	10	3	1
Inhalation Absorption Factor	A	unitless	1	1	1	1
Conversion Factor	CF_1	m^3/L	0.001	0.001	0.001	0.001
Conversion Factor	CF_2	$\mu g/m^3$	0.001	0.001	0.001	0.001
Averaging Time (for residential exposure)	AT	years	70.00	70.00	70.00	70.00

[a] assume school or daycare will have cancer risk of >1 per million

Cancer Potency Factor, CPF

TAC	UOM	
DPM	$mg/kg\text{-}day^{-1}$	1.1
Arsenic	$mg/kg\text{-}day^{-1}$	12
Beryllium	$mg/kg\text{-}day^{-1}$	8.4
Cadmium	$mg/kg\text{-}day^{-1}$	15
Cobalt	$mg/kg\text{-}day^{-1}$	27
Lead	$mg/kg\text{-}day^{-1}$	0.04
Nickel	$mg/kg\text{-}day^{-1}$	0.91
Chromium VI	$mg/kg\text{-}day^{-1}$	510

Intake Factor for Inhalation, IF (m^3/kg-day)

Equation	3rd Trimester	0<2	2<16	16<30
DBR*FAH*EF*ED*ASF*A*CF/AT	0.000	0.000	0.017	0.000

Risk Calculation Part 1, R1

	TAC	3rd Trimester	0<2	2<16	16<30
IF*CPF*CF	DPM	0.00E+00	0.00E+00	1.86E-05	0.00E+00
	Arsenic	0.00E+00	0.00E+00	2.03E-04	0.00E+00
	Beryllium	0.00E+00	0.00E+00	1.42E-04	0.00E+00
	Cadmium	0.00E+00	0.00E+00	2.54E-04	0.00E+00
	Cobalt	0.00E+00	0.00E+00	4.57E-04	0.00E+00
	Lead	0.00E+00	0.00E+00	6.78E-07	0.00E+00
	Nickel	0.00E+00	0.00E+00	1.54E-05	0.00E+00
	Chromium VI	0.00E+00	0.00E+00	8.64E-03	0.00E+00

Risk Calculation Part 2, $\sum R1*C_{TAC}$

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)								3rd Trimester	0<2	2<16	16<30	Cancer Risk - 2028	Receptor Type
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Cobalt	Lead	Nickel	Chromium VI					(per million)	
581336.22_4131207.48	581336.22	4131207.48	1.87E-04	1.10E-07	6.58E-08	1.10E-07	7.08E-08	2.02E-07	4.73E-06	1.66E-07	0	0	3.48473E-09	0	0.0035	CT House
581554.22_4130688.06	581554.22	4130688.06	1.25E-04	7.92E-08	4.75E-08	7.92E-08	5.13E-08	1.46E-07	3.42E-06	1.20E-07	0	0	2.33794E-09	0	0.0023	Res
579793.36_4131503.29	579793.36	4131503.29	1.11E-05	2.14E-08	1.29E-08	2.14E-08	1.47E-08	3.92E-08	9.20E-07	3.22E-08	0	0	2.07045E-10	0	0.0002	Acute
580488.37_4131517.71	580488.37	4131517.71	1.46E-05	1.75E-08	1.05E-08	1.75E-08	1.17E-08	3.21E-08	7.53E-07	2.64E-08	0	0	2.72807E-10	0	0.0003	Acute
581678.43_4131040.03	581678.43	4131040.03	5.93E-04	3.26E-07	1.96E-07	3.26E-07	2.09E-07	6.00E-07	1.41E-05	4.96E-07	0	0	1.1047E-08	0	0.0110	Res
581635.43_4130978.54	581635.43	4130978.54	1.20E-03	6.53E-07	3.92E-07	6.53E-07	4.18E-07	1.20E-06	2.82E-05	9.92E-07	0	0	2.23612E-08	0	0.0224	Res
581830.06_4131027.55	581830.06	4131027.55	5.46E-04	3.00E-07	1.80E-07	3.00E-07	1.93E-07	5.53E-07	1.30E-05	4.56E-07	0	0	1.01755E-08	0	0.0102	Res
581727.48_4130976.54	581727.48	4130976.54	1.45E-03	7.88E-07	4.73E-07	7.88E-07	5.05E-07	1.45E-06	3.40E-05	1.20E-06	0	0	2.70695E-08	0	0.0271	Res
581789.11_4130419.65	581789.11	4130419.65	9.48E-05	6.23E-08	3.74E-08	6.23E-08	4.06E-08	1.15E-07	2.69E-06	9.45E-08	0	0	1.76734E-09	0	0.0018	Res
581700.32_4130781.89	581700.32	4130781.89	2.88E-04	1.64E-07	9.85E-08	1.64E-07	1.06E-07	3.02E-07	7.09E-06	2.49E-07	0	0	5.37031E-09	0	0.0054	Res
581426.07_4131299.01	581426.07	4131299.01	6.79E-05	4.44E-08	2.67E-08	4.44E-08	2.90E-08	8.17E-08	1.92E-06	6.74E-08	0	0	1.26587E-09	0	0.0013	Acute
582301.42_4129474.56	582301.42	4129474.56	3.02E-05	2.48E-08	1.49E-08	2.48E-08	1.64E-08	4.55E-08	1.07E-06	3.75E-08	0	0	5.63214E-10	0	0.0006	Res
582357.99_4129474.56	582357.99	4129474.56	2.83E-05	2.34E-08	1.40E-08	2.34E-08	1.55E-08	4.29E-08	1.01E-06	3.53E-08	0	0	5.26922E-10	0	0.0005	Res
582414.56_4129474.56	582414.56	4129474.56	2.65E-05	2.21E-08	1.32E-08	2.21E-08	1.47E-08	4.05E-08	9.50E-07	3.34E-08	0	0	4.9404E-10	0	0.0005	Res
582471.13_4129474.56	582471.13	4129474.56	2.49E-05	2.09E-08	1.25E-08	2.09E-08	1.39E-08	3.83E-08	8.99E-07	3.16E-08	0	0	4.64346E-10	0	0.0005	Res
582527.7_4129474.56	582527.7	4129474.56	2.35E-05	1.99E-08	1.19E-08	1.99E-08	1.32E-08	3.64E-08	8.55E-07	3.00E-08	0	0	4.38821E-10	0	0.0004	Res
582584.27_4129474.56	582584.27	4129474.56	2.22E-05	1.88E-08	1.13E-08	1.88E-08	1.26E-08	3.45E-08	8.10E-07	2.85E-08	0	0	4.13034E-10	0	0.0004	Res
582640.84_4129474.56	582640.84	4129474.56	2.07E-05	1.78E-08	1.07E-08	1.78E-08	1.19E-08	3.26E-08	7.65E-07	2.69E-08	0	0	3.85624E-10	0	0.0004	Res
582244.85_4129558.47	582244.85	4129558.47	3.05E-05	2.52E-08	1.51E-08	2.52E-08	1.67E-08	4.62E-08	1.08E-06	3.80E-08	0	0	5.68968E-10	0	0.0006	Res
582301.42_4129558.47	582301.42	4129558.47	3.03E-05	2.46E-08	1.48E-08	2.46E-08	1.63E-08	4.51E-08	1.06E-06	3.72E-08	0	0	5.64207E-10	0	0.0006	Res
582357.99_4129558.47	582357.99	4129558.47	2.88E-05	2.34E-08	1.40E-08	2.34E-08	1.55E-08	4.30E-08	1.01E-06	3.54E-08	0	0	5.36024E-10	0	0.0005	Res
582414.56_4129558.47	582414.56	4129558.47	2.70E-05	2.22E-08	1.33E-08	2.22E-08	1.47E-08	4.07E-08	9.54E-07	3.35E-08	0	0	5.03593E-10	0	0.0005	Res
582471.13_4129558.47	582471.13	4129558.47	2.53E-05	2.09E-08	1.26E-08	2.09E-08	1.39E-08	3.84E-08	9.01E-07	3.16E-08	0	0	4.71962E-10	0	0.0005	Res
582527.7_4129558.47	582527.7	4129558.47	2.37E-05	1.98E-08	1.19E-08	1.98E-08	1.32E-08	3.63E-08	8.53E-07	2.99E-08	0	0	4.42243E-10	0	0.0004	Res
582584.27_4129558.47	582584.27	4129558.47	2.22E-05	1.88E-08	1.13E-08	1.88E-08	1.25E-08	3.44E-08	8.07E-07	2.83E-08	0	0	4.14086E-10	0	0.0004	Res
582640.84_4129558.47	582640.84	4129558.47	2.09E-05	1.79E-08	1.07E-08	1.79E-08	1.19E-08	3.28E-08	7.69E-07	2.70E-08	0	0	3.90427E-10	0	0.0004	Res
582697.41_4129558.47	582697.41	4129558.47	1.97E-05	1.70E-08	1.02E-08	1.70E-08	1.14E-08	3.12E-08	7.32E-07	2.57E-08	0	0	3.67768E-10	0	0.0004	Res
582244.85_4129642.38	582244.85	4129642.38	2.69E-05	2.31E-08	1.39E-08	2.31E-08	1.54E-08	4.24E-08	9.94E-07	3.49E-08	0	0	5.01087E-10	0	0.0005	Res

Risk Calculation Part 2, $\sum R1*C_{TAC}$

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)								3rd Trimester	0<2	2<16	16<30	Cancer Risk - 2028	Receptor Type
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Cobalt	Lead	Nickel	Chromium VI					(per million)	
582301.42_4129642.38	582301.42	4129642.38	2.95E-05	2.41E-08	1.45E-08	2.41E-08	1.60E-08	4.42E-08	1.04E-06	3.64E-08	0	0	5.49649E-10	0	0.0005	Res
582357.99_4129642.38	582357.99	4129642.38	2.92E-05	2.36E-08	1.41E-08	2.36E-08	1.56E-08	4.32E-08	1.01E-06	3.56E-08	0	0	5.44025E-10	0	0.0005	Res
582414.56_4129642.38	582414.56	4129642.38	2.76E-05	2.24E-08	1.34E-08	2.24E-08	1.49E-08	4.11E-08	9.65E-07	3.39E-08	0	0	5.14666E-10	0	0.0005	Res
582471.13_4129642.38	582471.13	4129642.38	2.60E-05	2.13E-08	1.28E-08	2.13E-08	1.41E-08	3.90E-08	9.15E-07	3.21E-08	0	0	4.83834E-10	0	0.0005	Res
582527.7_4129642.38	582527.7	4129642.38	2.44E-05	2.02E-08	1.21E-08	2.02E-08	1.35E-08	3.71E-08	8.70E-07	3.05E-08	0	0	4.55396E-10	0	0.0005	Res
582584.27_4129642.38	582584.27	4129642.38	2.28E-05	1.91E-08	1.15E-08	1.91E-08	1.27E-08	3.50E-08	8.22E-07	2.88E-08	0	0	4.24468E-10	0	0.0004	Res
582640.84_4129642.38	582640.84	4129642.38	2.13E-05	1.81E-08	1.09E-08	1.81E-08	1.21E-08	3.32E-08	7.80E-07	2.74E-08	0	0	3.97696E-10	0	0.0004	Res
582697.41_4129642.38	582697.41	4129642.38	2.00E-05	1.72E-08	1.03E-08	1.72E-08	1.15E-08	3.16E-08	7.42E-07	2.60E-08	0	0	3.7318E-10	0	0.0004	Res
582753.98_4129642.38	582753.98	4129642.38	1.87E-05	1.64E-08	9.83E-09	1.64E-08	1.10E-08	3.00E-08	7.05E-07	2.47E-08	0	0	3.49364E-10	0	0.0003	Res
582810.55_4129642.38	582810.55	4129642.38	1.76E-05	1.56E-08	9.37E-09	1.56E-08	1.05E-08	2.86E-08	6.72E-07	2.36E-08	0	0	3.27958E-10	0	0.0003	Res
582867.12_4129642.38	582867.12	4129642.38	1.64E-05	1.48E-08	8.88E-09	1.48E-08	9.94E-09	2.71E-08	6.37E-07	2.23E-08	0	0	3.04766E-10	0	0.0003	Res
582244.85_4129726.29	582244.85	4129726.29	2.95E-05	2.44E-08	1.46E-08	2.44E-08	1.62E-08	4.48E-08	1.05E-06	3.69E-08	0	0	5.49103E-10	0	0.0005	Res
582301.42_4129726.29	582301.42	4129726.29	2.88E-05	2.37E-08	1.42E-08	2.37E-08	1.58E-08	4.35E-08	1.02E-06	3.59E-08	0	0	5.35911E-10	0	0.0005	Res
582357.99_4129726.29	582357.99	4129726.29	2.94E-05	2.37E-08	1.42E-08	2.37E-08	1.58E-08	4.35E-08	1.02E-06	3.59E-08	0	0	5.48E-10	0	0.0005	Res
582414.56_4129726.29	582414.56	4129726.29	2.81E-05	2.28E-08	1.37E-08	2.28E-08	1.51E-08	4.18E-08	9.81E-07	3.44E-08	0	0	5.24663E-10	0	0.0005	Res
582471.13_4129726.29	582471.13	4129726.29	2.66E-05	2.17E-08	1.30E-08	2.17E-08	1.44E-08	3.98E-08	9.35E-07	3.28E-08	0	0	4.95967E-10	0	0.0005	Res
582527.7_4129726.29	582527.7	4129726.29	2.51E-05	2.07E-08	1.24E-08	2.07E-08	1.38E-08	3.79E-08	8.89E-07	3.12E-08	0	0	4.67374E-10	0	0.0005	Res
582584.27_4129726.29	582584.27	4129726.29	2.35E-05	1.96E-08	1.18E-08	1.96E-08	1.31E-08	3.60E-08	8.45E-07	2.97E-08	0	0	4.38574E-10	0	0.0004	Res
582640.84_4129726.29	582640.84	4129726.29	2.20E-05	1.86E-08	1.12E-08	1.86E-08	1.24E-08	3.42E-08	8.01E-07	2.81E-08	0	0	4.10213E-10	0	0.0004	Res
582697.41_4129726.29	582697.41	4129726.29	2.04E-05	1.76E-08	1.05E-08	1.76E-08	1.18E-08	3.23E-08	7.57E-07	2.66E-08	0	0	3.8043E-10	0	0.0004	Res
582753.98_4129726.29	582753.98	4129726.29	1.88E-05	1.66E-08	9.94E-09	1.66E-08	1.11E-08	3.04E-08	7.13E-07	2.50E-08	0	0	3.51025E-10	0	0.0004	Res
582810.55_4129726.29	582810.55	4129726.29	1.72E-05	1.55E-08	9.31E-09	1.55E-08	1.04E-08	2.85E-08	6.68E-07	2.34E-08	0	0	3.20674E-10	0	0.0003	Res
582244.85_4129810.2	582244.85	4129810.2	2.87E-05	2.41E-08	1.45E-08	2.41E-08	1.61E-08	4.43E-08	1.04E-06	3.65E-08	0	0	5.3551E-10	0	0.0005	Res
582301.42_4129810.2	582301.42	4129810.2	2.92E-05	2.41E-08	1.44E-08	2.41E-08	1.60E-08	4.42E-08	1.04E-06	3.64E-08	0	0	5.44318E-10	0	0.0005	Res
582357.99_4129810.2	582357.99	4129810.2	2.91E-05	2.37E-08	1.42E-08	2.37E-08	1.57E-08	4.35E-08	1.02E-06	3.58E-08	0	0	5.41952E-10	0	0.0005	Res
582414.56_4129810.2	582414.56	4129810.2	2.84E-05	2.31E-08	1.38E-08	2.31E-08	1.53E-08	4.23E-08	9.93E-07	3.49E-08	0	0	5.29355E-10	0	0.0005	Res
582471.13_4129810.2	582471.13	4129810.2	2.72E-05	2.21E-08	1.33E-08	2.21E-08	1.47E-08	4.06E-08	9.54E-07	3.35E-08	0	0	5.06318E-10	0	0.0005	Res
582527.7_4129810.2	582527.7	4129810.2	2.55E-05	2.10E-08	1.26E-08	2.10E-08	1.40E-08	3.86E-08	9.06E-07	3.18E-08	0	0	4.75598E-10	0	0.0005	Res
582584.27_4129810.2	582584.27	4129810.2	2.38E-05	1.99E-08	1.19E-08	1.99E-08	1.33E-08	3.65E-08	8.57E-07	3.01E-08	0	0	4.43767E-10	0	0.0004	Res
582640.84_4129810.2	582640.84	4129810.2	2.18E-05	1.86E-08	1.12E-08	1.86E-08	1.24E-08	3.42E-08	8.03E-07	2.82E-08	0	0	4.06922E-10	0	0.0004	Res
582697.41_4129810.2	582697.41	4129810.2	2.00E-05	1.75E-08	1.05E-08	1.75E-08	1.17E-08	3.21E-08	7.53E-07	2.64E-08	0	0	3.73593E-10	0	0.0004	Res
581905.43_4129894.11	581905.43	4129894.11	3.80E-05	3.17E-08	1.90E-08	3.17E-08	2.10E-08	5.82E-08	1.37E-06	4.80E-08	0	0	7.08149E-10	0	0.0007	Res
581962_4129894.11	581962	4129894.11	3.79E-05	3.11E-08	1.86E-08	3.11E-08	2.06E-08	5.70E-08	1.34E-06	4.70E-08	0	0	7.06111E-10	0	0.0007	Res
582131.71_4129894.11	582131.71	4129894.11	3.29E-05	2.72E-08	1.63E-08	2.72E-08	1.80E-08	4.99E-08	1.17E-06	4.11E-08	0	0	6.14006E-10	0	0.0006	Res
582188.28_4129894.11	582188.28	4129894.11	3.18E-05	2.62E-08	1.57E-08	2.62E-08	1.74E-08	4.81E-08	1.13E-06	3.97E-08	0	0	5.92028E-10	0	0.0006	Res
582244.85_4129894.11	582244.85	4129894.11	3.12E-05	2.56E-08	1.53E-08	2.56E-08	1.70E-08	4.69E-08	1.10E-06	3.87E-08	0	0	5.81152E-10	0	0.0006	Res
582301.42_4129894.11	582301.42	4129894.11	3.02E-05	2.47E-08	1.48E-08	2.47E-08	1.64E-08	4.54E-08	1.07E-06	3.74E-08	0	0	5.62575E-10	0	0.0006	Res
582357.99_4129894.11	582357.99	4129894.11	2.89E-05	2.37E-08	1.42E-08	2.37E-08	1.58E-08	4.36E-08	1.02E-06	3.59E-08	0	0	5.38291E-10	0	0.0005	Res
582414.56_4129894.11	582414.56	4129894.11	2.94E-05	2.37E-08	1.42E-08	2.37E-08	1.57E-08	4.35E-08	1.02E-06	3.58E-08	0	0	5.47322E-10	0	0.0005	Res
582471.13_4129894.11	582471.13	4129894.11	2.76E-05	2.25E-08	1.35E-08	2.25E-08	1.49E-08	4.12E-08	9.67E-07	3.40E-08	0	0	5.13722E-10	0	0.0005	Res
582527.7_4129894.11	582527.7	4129894.11	2.54E-05	2.11E-08	1.27E-08	2.11E-08	1.40E-08	3.87E-08	9.08E-07	3.19E-08	0	0	4.7416E-10	0	0.0005	Res
582584.27_4129894.11	582584.27	4129894.11	2.33E-05	1.97E-08	1.18E-08	1.97E-08	1.31E-08	3.62E-08	8.50E-07	2.98E-08	0	0	4.35025E-10	0	0.0004	Res
582640.84_4129894.11	582640.84	4129894.11	2.13E-05	1.85E-08	1.11E-08	1.85E-08	1.23E-08	3.39E-08	7.95E-07	2.79E-08	0	0	3.97809E-10	0	0.0004	Res
582697.41_4129894.11	582697.41	4129894.11	1.95E-05	1.73E-08	1.04E-08	1.73E-08	1.15E-08	3.17E-08	7.43E-07	2.61E-08	0	0	3.63159E-10	0	0.0004	Res
581962_4129978.02	581962	4129978.02	3.95E-05	3.21E-08	1.93E-08	3.21E-08	2.12E-08	5.89E-08	1.38E-06	4.86E-08	0	0	7.35883E-10	0	0.0007	Res
582018.57_4129978.02	582018.57	4129978.02	3.71E-05	3.04E-08	1.82E-08	3.04E-08	2.01E-08	5.58E-08	1.31E-06	4.60E-08	0	0	6.92307E-10	0	0.0007	Res
582075.14_4129978.02	582075.14	4129978.02	3.83E-05	3.05E-08	1.83E-08	3.05E-08	2.02E-08	5.61E-08	1.32E-06	4.62E-08	0	0	7.1377E-10	0	0.0007	Res
582131.71_4129978.02	582131.71	4129978.02	3.83E-05	3.01E-08	1.81E-08	3.01E-08	1.99E-08	5.53E-08	1.30E-06	4.56E-08	0	0	7.1367E-10	0	0.0007	Res
582188.28_4129978.02	582188.28	4129978.02	3.83E-05	2.98E-08	1.79E-08	2.98E-08	1.97E-08	5.47E-08	1.28E-06	4.51E-08	0	0	7.14129E-10	0	0.0007	Res
582244.85_4129978.02	582244.85	4129978.02	3.47E-05	2.75E-08	1.65E-08	2.75E-08	1.82E-08	5.05E-08	1.19E-06	4.16E-08	0	0	6.46651E-10	0	0.0006	Res
582301.42_4129978.02	582301.42	4129978.02	3.43E-05	2.70E-08	1.62E-08	2.70E-08	1.78E-08	4.95E-08	1.16E-06	4.08E-08	0	0	6.39522E-10	0	0.0006	Res
582357.99_4129978.02	582357.99	4129978.02	3.25E-05	2.57E-08	1.54E-08	2.57E-08	1.70E-08	4.72E-08	1.11E-06	3.89E-08	0	0	6.05762E-10	0	0.0006	Res
582414.56_4129978.02	582414.56	4129978.02	3.01E-05	2.41E-08	1.45E-08	2.41E-08	1.60E-08	4.43E-08	1.04E-06	3.65E-08	0	0	5.61169E-10	0	0.0006	Res
582471.13_4129978.02	582471.13	4129978.02	2.76E-05	2.25E-08	1.35E-08	2.25E-08	1.50E-08	4.14E-08	9.71E-07	3.41E-08	0	0	5.14916E-10	0	0.0005	Res
582527.7_4129978.02	582527.7	4129978.02	2.52E-05	2.10E-08	1.26E-08	2.10E-08	1.39E-08	3.85E-08	9.04E-07	3.17E-08	0	0	4.69544E-10	0	0.0005	Res

Risk Calculation Part 2, $\sum R1*C_{TAC}$

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)								3rd Trimester	0<2	2<16	16<30	Cancer Risk - 2028	Receptor Type
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Cobalt	Lead	Nickel	Chromium VI					(per million)	
582584.27_4129978.02	582584.27	4129978.02	2.29E-05	1.95E-08	1.17E-08	1.95E-08	1.30E-08	3.59E-08	8.42E-07	2.95E-08	0	0	4.27418E-10	0	0.0004	Res
582640.84_4129978.02	582640.84	4129978.02	2.09E-05	1.82E-08	1.09E-08	1.82E-08	1.22E-08	3.35E-08	7.85E-07	2.76E-08	0	0	3.89502E-10	0	0.0004	Res
582697.41_4129978.02	582697.41	4129978.02	1.90E-05	1.70E-08	1.02E-08	1.70E-08	1.14E-08	3.12E-08	7.33E-07	2.57E-08	0	0	3.5466E-10	0	0.0004	Res
582753.98_4129978.02	582753.98	4129978.02	1.72E-05	1.58E-08	9.50E-09	1.58E-08	1.06E-08	2.90E-08	6.81E-07	2.39E-08	0	0	3.20511E-10	0	0.0003	Res
582810.55_4129978.02	582810.55	4129978.02	1.52E-05	1.46E-08	8.73E-09	1.46E-08	9.77E-09	2.67E-08	6.26E-07	2.20E-08	0	0	2.83678E-10	0	0.0003	Res
581905.43_4130061.93	581905.43	4130061.93	5.66E-05	4.16E-08	2.50E-08	4.16E-08	2.73E-08	7.64E-08	1.79E-06	6.30E-08	0	0	1.05521E-09	0	0.0011	Res
581962_4130061.93	581962	4130061.93	5.35E-05	3.95E-08	2.37E-08	3.95E-08	2.59E-08	7.25E-08	1.70E-06	5.98E-08	0	0	9.96268E-10	0	0.0010	Res
582018.57_4130061.93	582018.57	4130061.93	4.55E-05	3.49E-08	2.09E-08	3.49E-08	2.30E-08	6.40E-08	1.50E-06	5.28E-08	0	0	8.48821E-10	0	0.0008	Res
582075.14_4130061.93	582075.14	4130061.93	4.07E-05	3.19E-08	1.91E-08	3.19E-08	2.10E-08	5.86E-08	1.37E-06	4.83E-08	0	0	7.58616E-10	0	0.0008	Res
582131.71_4130061.93	582131.71	4130061.93	4.00E-05	3.11E-08	1.87E-08	3.11E-08	2.05E-08	5.71E-08	1.34E-06	4.71E-08	0	0	7.4567E-10	0	0.0007	Res
582188.28_4130061.93	582188.28	4130061.93	3.91E-05	3.02E-08	1.81E-08	3.02E-08	1.99E-08	5.55E-08	1.30E-06	4.58E-08	0	0	7.29439E-10	0	0.0007	Res
582244.85_4130061.93	582244.85	4130061.93	3.84E-05	2.95E-08	1.77E-08	2.95E-08	1.94E-08	5.41E-08	1.27E-06	4.46E-08	0	0	7.15403E-10	0	0.0007	Res
582301.42_4130061.93	582301.42	4130061.93	3.57E-05	2.77E-08	1.66E-08	2.77E-08	1.83E-08	5.08E-08	1.19E-06	4.19E-08	0	0	6.65216E-10	0	0.0007	Res
582357.99_4130061.93	582357.99	4130061.93	3.31E-05	2.60E-08	1.56E-08	2.60E-08	1.72E-08	4.78E-08	1.12E-06	3.94E-08	0	0	6.17734E-10	0	0.0006	Res
582414.56_4130061.93	582414.56	4130061.93	3.04E-05	2.43E-08	1.46E-08	2.43E-08	1.61E-08	4.45E-08	1.05E-06	3.67E-08	0	0	5.66995E-10	0	0.0006	Res
582471.13_4130061.93	582471.13	4130061.93	2.76E-05	2.25E-08	1.35E-08	2.25E-08	1.49E-08	4.13E-08	9.69E-07	3.40E-08	0	0	5.15219E-10	0	0.0005	Res
582527.7_4130061.93	582527.7	4130061.93	2.50E-05	2.08E-08	1.25E-08	2.08E-08	1.38E-08	3.82E-08	8.97E-07	3.15E-08	0	0	4.65649E-10	0	0.0005	Res
582584.27_4130061.93	582584.27	4130061.93	2.26E-05	1.93E-08	1.16E-08	1.93E-08	1.29E-08	3.54E-08	8.31E-07	2.92E-08	0	0	4.21342E-10	0	0.0004	Res
582640.84_4130061.93	582640.84	4130061.93	2.04E-05	1.79E-08	1.07E-08	1.79E-08	1.19E-08	3.28E-08	7.70E-07	2.70E-08	0	0	3.80311E-10	0	0.0004	Res
582697.41_4130061.93	582697.41	4130061.93	1.85E-05	1.66E-08	9.99E-09	1.66E-08	1.11E-08	3.05E-08	7.17E-07	2.52E-08	0	0	3.44547E-10	0	0.0003	Res
582753.98_4130061.93	582753.98	4130061.93	1.68E-05	1.55E-08	9.32E-09	1.55E-08	1.04E-08	2.85E-08	6.69E-07	2.35E-08	0	0	3.13244E-10	0	0.0003	Res
582810.55_4130061.93	582810.55	4130061.93	1.53E-05	1.45E-08	8.71E-09	1.45E-08	9.75E-09	2.66E-08	6.25E-07	2.19E-08	0	0	2.84835E-10	0	0.0003	Res
581962_4130145.84	581962	4130145.84	6.24E-05	4.42E-08	2.65E-08	4.42E-08	2.89E-08	8.11E-08	1.90E-06	6.69E-08	0	0	1.16295E-09	0	0.0012	Res
582018.57_4130145.84	582018.57	4130145.84	5.79E-05	4.13E-08	2.48E-08	4.13E-08	2.71E-08	7.59E-08	1.78E-06	6.26E-08	0	0	1.07852E-09	0	0.0011	Res
582075.14_4130145.84	582075.14	4130145.84	4.93E-05	3.63E-08	2.18E-08	3.63E-08	2.39E-08	6.68E-08	1.57E-06	5.50E-08	0	0	9.18948E-10	0	0.0009	Res
582131.71_4130145.84	582131.71	4130145.84	4.57E-05	3.40E-08	2.04E-08	3.40E-08	2.24E-08	6.25E-08	1.47E-06	5.15E-08	0	0	8.52472E-10	0	0.0009	Res
582188.28_4130145.84	582188.28	4130145.84	4.42E-05	3.28E-08	1.97E-08	3.28E-08	2.16E-08	6.03E-08	1.41E-06	4.97E-08	0	0	8.2432E-10	0	0.0008	Res
582244.85_4130145.84	582244.85	4130145.84	4.04E-05	3.04E-08	1.82E-08	3.04E-08	2.00E-08	5.58E-08	1.31E-06	4.60E-08	0	0	7.52966E-10	0	0.0008	Res
582301.42_4130145.84	582301.42	4130145.84	3.67E-05	2.81E-08	1.69E-08	2.81E-08	1.85E-08	5.16E-08	1.21E-06	4.25E-08	0	0	6.83755E-10	0	0.0007	Res
582357.99_4130145.84	582357.99	4130145.84	3.34E-05	2.61E-08	1.56E-08	2.61E-08	1.72E-08	4.78E-08	1.12E-06	3.94E-08	0	0	6.23403E-10	0	0.0006	Res
582414.56_4130145.84	582414.56	4130145.84	3.04E-05	2.41E-08	1.45E-08	2.41E-08	1.60E-08	4.43E-08	1.04E-06	3.65E-08	0	0	5.66503E-10	0	0.0006	Res
582471.13_4130145.84	582471.13	4130145.84	2.74E-05	2.23E-08	1.34E-08	2.23E-08	1.48E-08	4.09E-08	9.59E-07	3.37E-08	0	0	5.10704E-10	0	0.0005	Res
582527.7_4130145.84	582527.7	4130145.84	2.45E-05	2.04E-08	1.23E-08	2.04E-08	1.36E-08	3.75E-08	8.80E-07	3.09E-08	0	0	4.56663E-10	0	0.0005	Res
582584.27_4130145.84	582584.27	4130145.84	2.19E-05	1.88E-08	1.13E-08	1.88E-08	1.25E-08	3.45E-08	8.09E-07	2.84E-08	0	0	4.07717E-10	0	0.0004	Res
582640.84_4130145.84	582640.84	4130145.84	1.96E-05	1.73E-08	1.04E-08	1.73E-08	1.16E-08	3.18E-08	7.47E-07	2.62E-08	0	0	3.65502E-10	0	0.0004	Res
582697.41_4130145.84	582697.41	4130145.84	1.77E-05	1.61E-08	9.66E-09	1.61E-08	1.08E-08	2.95E-08	6.93E-07	2.43E-08	0	0	3.29679E-10	0	0.0003	Res
582753.98_4130145.84	582753.98	4130145.84	1.61E-05	1.50E-08	9.02E-09	1.50E-08	1.01E-08	2.76E-08	6.47E-07	2.27E-08	0	0	2.99859E-10	0	0.0003	Res
582810.55_4130145.84	582810.55	4130145.84	1.47E-05	1.41E-08	8.47E-09	1.41E-08	9.48E-09	2.59E-08	6.07E-07	2.13E-08	0	0	2.74744E-10	0	0.0003	Res
582867.12_4130145.84	582867.12	4130145.84	1.30E-05	1.30E-08	7.79E-09	1.30E-08	8.74E-09	2.38E-08	5.58E-07	1.96E-08	0	0	2.43128E-10	0	0.0002	Res
581962_4130229.75	581962	4130229.75	6.38E-05	4.48E-08	2.69E-08	4.48E-08	2.93E-08	8.23E-08	1.93E-06	6.79E-08	0	0	1.18914E-09	0	0.0012	Res
582018.57_4130229.75	582018.57	4130229.75	6.09E-05	4.28E-08	2.57E-08	4.28E-08	2.80E-08	7.86E-08	1.84E-06	6.48E-08	0	0	1.13506E-09	0	0.0011	Res
582075.14_4130229.75	582075.14	4130229.75	5.67E-05	4.01E-08	2.40E-08	4.01E-08	2.62E-08	7.36E-08	1.73E-06	6.07E-08	0	0	1.05635E-09	0	0.0011	Res
582131.71_4130229.75	582131.71	4130229.75	5.11E-05	3.67E-08	2.20E-08	3.67E-08	2.41E-08	6.74E-08	1.58E-06	5.55E-08	0	0	9.51974E-10	0	0.0010	Res
582188.28_4130229.75	582188.28	4130229.75	4.56E-05	3.34E-08	2.00E-08	3.34E-08	2.19E-08	6.13E-08	1.44E-06	5.05E-08	0	0	8.49967E-10	0	0.0008	Res
582244.85_4130229.75	582244.85	4130229.75	4.08E-05	3.05E-08	1.83E-08	3.05E-08	2.01E-08	5.60E-08	1.31E-06	4.61E-08	0	0	7.61172E-10	0	0.0008	Res
582301.42_4130229.75	582301.42	4130229.75	3.68E-05	2.80E-08	1.68E-08	2.80E-08	1.85E-08	5.14E-08	1.21E-06	4.24E-08	0	0	6.85823E-10	0	0.0007	Res
582357.99_4130229.75	582357.99	4130229.75	3.32E-05	2.58E-08	1.55E-08	2.58E-08	1.70E-08	4.73E-08	1.11E-06	3.90E-08	0	0	6.19578E-10	0	0.0006	Res
582414.56_4130229.75	582414.56	4130229.75	2.97E-05	2.36E-08	1.42E-08	2.36E-08	1.56E-08	4.34E-08	1.02E-06	3.57E-08	0	0	5.54035E-10	0	0.0006	Res
582471.13_4130229.75	582471.13	4130229.75	2.63E-05	2.15E-08	1.29E-08	2.15E-08	1.43E-08	3.95E-08	9.26E-07	3.25E-08	0	0	4.9031E-10	0	0.0005	Res
582527.7_4130229.75	582527.7	4130229.75	2.33E-05	1.96E-08	1.18E-08	1.96E-08	1.31E-08	3.60E-08	8.46E-07	2.97E-08	0	0	4.34071E-10	0	0.0004	Res
582584.27_4130229.75	582584.27	4130229.75	2.07E-05	1.80E-08	1.08E-08	1.80E-08	1.20E-08	3.31E-08	7.76E-07	2.72E-08	0	0	3.86225E-10	0	0.0004	Res
582640.84_4130229.75	582640.84	4130229.75	1.86E-05	1.66E-08	9.99E-09	1.66E-08	1.11E-08	3.05E-08	7.17E-07	2.52E-08	0	0	3.46152E-10	0	0.0003	Res
582697.41_4130229.75	582697.41	4130229.75	1.68E-05	1.55E-08	9.31E-09	1.55E-08	1.04E-08	2.85E-08	6.68E-07	2.34E-08	0	0	3.14017E-10	0	0.0003	Res
582753.98_4130229.75	582753.98	4130229.75	1.54E-05	1.45E-08	8.71E-09	1.45E-08	9.74E-09	2.66E-08	6.25E-07	2.19E-08	0	0	2.86552E-10	0	0.0003	Res
582810.55_4130229.75	582810.55	4130229.75	1.42E-05	1.37E-08	8.21E-09	1.37E-08	9.20E-09	2.51E-08	5.88E-07	2.06E-08	0	0	2.64085E-10	0	0.0003	Res

Risk Calculation Part 2, $\sum R1*C_{TAC}$

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)								3rd Trimester	0<2	2<16	16<30	Cancer Risk - 2028	Receptor Type
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Cobalt	Lead	Nickel	Chromium VI					(per million)	
582867.12_4130229.75	582867.12	4130229.75	1.32E-05	1.30E-08	7.77E-09	1.30E-08	8.72E-09	2.38E-08	5.57E-07	1.95E-08	0	0	2.45176E-10	0	0.0002	Res
582018.57_4130313.66	582018.57	4130313.66	6.56E-05	4.50E-08	2.70E-08	4.50E-08	2.94E-08	8.28E-08	1.94E-06	6.83E-08	0	0	1.22223E-09	0	0.0012	Res
582075.14_4130313.66	582075.14	4130313.66	6.08E-05	4.20E-08	2.52E-08	4.20E-08	2.75E-08	7.72E-08	1.81E-06	6.37E-08	0	0	1.13324E-09	0	0.0011	Res
582131.71_4130313.66	582131.71	4130313.66	5.33E-05	3.76E-08	2.26E-08	3.76E-08	2.47E-08	6.92E-08	1.62E-06	5.70E-08	0	0	9.93303E-10	0	0.0010	Res
582188.28_4130313.66	582188.28	4130313.66	4.67E-05	3.37E-08	2.02E-08	3.37E-08	2.22E-08	6.20E-08	1.45E-06	5.11E-08	0	0	8.69714E-10	0	0.0009	Res
582244.85_4130313.66	582244.85	4130313.66	4.12E-05	3.05E-08	1.83E-08	3.05E-08	2.01E-08	5.60E-08	1.31E-06	4.62E-08	0	0	7.6878E-10	0	0.0008	Res
582301.42_4130313.66	582301.42	4130313.66	3.67E-05	2.78E-08	1.67E-08	2.78E-08	1.83E-08	5.10E-08	1.20E-06	4.20E-08	0	0	6.83808E-10	0	0.0007	Res
582357.99_4130313.66	582357.99	4130313.66	3.23E-05	2.51E-08	1.51E-08	2.51E-08	1.66E-08	4.61E-08	1.08E-06	3.80E-08	0	0	6.02322E-10	0	0.0006	Res
582414.56_4130313.66	582414.56	4130313.66	2.82E-05	2.27E-08	1.36E-08	2.27E-08	1.50E-08	4.16E-08	9.76E-07	3.43E-08	0	0	5.2635E-10	0	0.0005	Res
582471.13_4130313.66	582471.13	4130313.66	2.47E-05	2.05E-08	1.23E-08	2.05E-08	1.36E-08	3.77E-08	8.84E-07	3.10E-08	0	0	4.61078E-10	0	0.0005	Res
582527.7_4130313.66	582527.7	4130313.66	2.19E-05	1.87E-08	1.12E-08	1.87E-08	1.25E-08	3.44E-08	8.07E-07	2.83E-08	0	0	4.07619E-10	0	0.0004	Res
582584.27_4130313.66	582584.27	4130313.66	1.95E-05	1.72E-08	1.03E-08	1.72E-08	1.15E-08	3.16E-08	7.42E-07	2.61E-08	0	0	3.63433E-10	0	0.0004	Res
582640.84_4130313.66	582640.84	4130313.66	1.76E-05	1.60E-08	9.60E-09	1.60E-08	1.07E-08	2.94E-08	6.89E-07	2.42E-08	0	0	3.27945E-10	0	0.0003	Res
582697.41_4130313.66	582697.41	4130313.66	1.60E-05	1.49E-08	8.97E-09	1.49E-08	1.00E-08	2.74E-08	6.43E-07	2.26E-08	0	0	2.98369E-10	0	0.0003	Res
582753.98_4130313.66	582753.98	4130313.66	1.47E-05	1.40E-08	8.42E-09	1.40E-08	9.43E-09	2.57E-08	6.04E-07	2.12E-08	0	0	2.73266E-10	0	0.0003	Res
582810.55_4130313.66	582810.55	4130313.66	1.35E-05	1.32E-08	7.92E-09	1.32E-08	8.89E-09	2.42E-08	5.68E-07	1.99E-08	0	0	2.51051E-10	0	0.0003	Res
582867.12_4130313.66	582867.12	4130313.66	1.24E-05	1.25E-08	7.48E-09	1.25E-08	8.41E-09	2.29E-08	5.36E-07	1.88E-08	0	0	2.3164E-10	0	0.0002	Res
581848.86_4130397.57	581848.86	4130397.57	8.97E-05	5.91E-08	3.55E-08	5.91E-08	3.85E-08	1.09E-07	2.55E-06	8.96E-08	0	0	1.67172E-09	0	0.0017	Res
581905.43_4130397.57	581905.43	4130397.57	8.70E-05	5.71E-08	3.43E-08	5.71E-08	3.72E-08	1.05E-07	2.46E-06	8.66E-08	0	0	1.62107E-09	0	0.0016	Res
581962_4130397.57	581962	4130397.57	8.23E-05	5.41E-08	3.25E-08	5.41E-08	3.53E-08	9.95E-08	2.34E-06	8.21E-08	0	0	1.53316E-09	0	0.0015	Res
582018.57_4130397.57	582018.57	4130397.57	7.38E-05	4.92E-08	2.95E-08	4.92E-08	3.21E-08	9.04E-08	2.12E-06	7.46E-08	0	0	1.37551E-09	0	0.0014	Res
582075.14_4130397.57	582075.14	4130397.57	6.47E-05	4.39E-08	2.63E-08	4.39E-08	2.87E-08	8.07E-08	1.89E-06	6.65E-08	0	0	1.20578E-09	0	0.0012	Res
582131.71_4130397.57	582131.71	4130397.57	5.54E-05	3.86E-08	2.31E-08	3.86E-08	2.53E-08	7.08E-08	1.66E-06	5.84E-08	0	0	1.03231E-09	0	0.0010	Res
582188.28_4130397.57	582188.28	4130397.57	4.81E-05	3.43E-08	2.06E-08	3.43E-08	2.25E-08	6.31E-08	1.48E-06	5.20E-08	0	0	8.96871E-10	0	0.0009	Res
582244.85_4130397.57	582244.85	4130397.57	4.15E-05	3.05E-08	1.83E-08	3.05E-08	2.01E-08	5.60E-08	1.31E-06	4.62E-08	0	0	7.74051E-10	0	0.0008	Res
582301.42_4130397.57	582301.42	4130397.57	3.58E-05	2.71E-08	1.63E-08	2.71E-08	1.79E-08	4.98E-08	1.17E-06	4.10E-08	0	0	6.67341E-10	0	0.0007	Res
582357.99_4130397.57	582357.99	4130397.57	3.07E-05	2.41E-08	1.45E-08	2.41E-08	1.59E-08	4.42E-08	1.04E-06	3.65E-08	0	0	5.71798E-10	0	0.0006	Res
582414.56_4130397.57	582414.56	4130397.57	2.66E-05	2.16E-08	1.30E-08	2.16E-08	1.44E-08	3.97E-08	9.32E-07	3.27E-08	0	0	4.95354E-10	0	0.0005	Res
582471.13_4130397.57	582471.13	4130397.57	2.33E-05	1.96E-08	1.18E-08	1.96E-08	1.31E-08	3.60E-08	8.46E-07	2.97E-08	0	0	4.34585E-10	0	0.0004	Res
582527.7_4130397.57	582527.7	4130397.57	2.07E-05	1.80E-08	1.08E-08	1.80E-08	1.20E-08	3.30E-08	7.74E-07	2.72E-08	0	0	3.85251E-10	0	0.0004	Res
582584.27_4130397.57	582584.27	4130397.57	1.85E-05	1.66E-08	9.96E-09	1.66E-08	1.11E-08	3.05E-08	7.15E-07	2.51E-08	0	0	3.44796E-10	0	0.0003	Res
582640.84_4130397.57	582640.84	4130397.57	1.67E-05	1.54E-08	9.26E-09	1.54E-08	1.03E-08	2.83E-08	6.64E-07	2.33E-08	0	0	3.11162E-10	0	0.0003	Res
582697.41_4130397.57	582697.41	4130397.57	1.51E-05	1.44E-08	8.62E-09	1.44E-08	9.65E-09	2.64E-08	6.18E-07	2.17E-08	0	0	2.8133E-10	0	0.0003	Res
582753.98_4130397.57	582753.98	4130397.57	1.38E-05	1.35E-08	8.08E-09	1.35E-08	9.06E-09	2.47E-08	5.79E-07	2.03E-08	0	0	2.56389E-10	0	0.0003	Res
582810.55_4130397.57	582810.55	4130397.57	1.26E-05	1.27E-08	7.60E-09	1.27E-08	8.55E-09	2.32E-08	5.45E-07	1.91E-08	0	0	2.34957E-10	0	0.0002	Res
582867.12_4130397.57	582867.12	4130397.57	1.16E-05	1.20E-08	7.18E-09	1.20E-08	8.09E-09	2.19E-08	5.15E-07	1.81E-08	0	0	2.16271E-10	0	0.0002	Res
581848.86_4130481.48	581848.86	4130481.48	1.16E-04	7.27E-08	4.36E-08	7.27E-08	4.72E-08	1.34E-07	3.14E-06	1.10E-07	0	0	2.1611E-09	0	0.0022	Res
581905.43_4130481.48	581905.43	4130481.48	1.07E-04	6.77E-08	4.06E-08	6.77E-08	4.40E-08	1.25E-07	2.92E-06	1.03E-07	0	0	2.00268E-09	0	0.0020	Res
581962_4130481.48	581962	4130481.48	9.15E-05	5.88E-08	3.53E-08	5.88E-08	3.83E-08	1.08E-07	2.54E-06	8.92E-08	0	0	1.70633E-09	0	0.0017	Res
582018.57_4130481.48	582018.57	4130481.48	8.06E-05	5.25E-08	3.15E-08	5.25E-08	3.42E-08	9.66E-08	2.27E-06	7.97E-08	0	0	1.50223E-09	0	0.0015	Res
582075.14_4130481.48	582075.14	4130481.48	6.81E-05	4.55E-08	2.73E-08	4.55E-08	2.97E-08	8.36E-08	1.96E-06	6.89E-08	0	0	1.26923E-09	0	0.0013	Res
582131.71_4130481.48	582131.71	4130481.48	5.78E-05	3.96E-08	2.38E-08	3.96E-08	2.59E-08	7.27E-08	1.71E-06	6.00E-08	0	0	1.07654E-09	0	0.0011	Res
582188.28_4130481.48	582188.28	4130481.48	4.88E-05	3.45E-08	2.07E-08	3.45E-08	2.26E-08	6.33E-08	1.49E-06	5.22E-08	0	0	9.09153E-10	0	0.0009	Res
582244.85_4130481.48	582244.85	4130481.48	4.06E-05	2.98E-08	1.79E-08	2.98E-08	1.96E-08	5.47E-08	1.28E-06	4.51E-08	0	0	7.57022E-10	0	0.0008	Res
582301.42_4130481.48	582301.42	4130481.48	3.40E-05	2.60E-08	1.56E-08	2.60E-08	1.72E-08	4.77E-08	1.12E-06	3.93E-08	0	0	6.34342E-10	0	0.0006	Res
582357.99_4130481.48	582357.99	4130481.48	2.90E-05	2.30E-08	1.38E-08	2.30E-08	1.52E-08	4.22E-08	9.91E-07	3.48E-08	0	0	5.4005E-10	0	0.0005	Res
582414.56_4130481.48	582414.56	4130481.48	2.51E-05	2.07E-08	1.24E-08	2.07E-08	1.38E-08	3.80E-08	8.92E-07	3.13E-08	0	0	4.68641E-10	0	0.0005	Res
582471.13_4130481.48	582471.13	4130481.48	2.21E-05	1.88E-08	1.13E-08	1.88E-08	1.25E-08	3.45E-08	8.11E-07	2.85E-08	0	0	4.11179E-10	0	0.0004	Res
582527.7_4130481.48	582527.7	4130481.48	1.95E-05	1.72E-08	1.03E-08	1.72E-08	1.15E-08	3.16E-08	7.41E-07	2.60E-08	0	0	3.63263E-10	0	0.0004	Res
582584.27_4130481.48	582584.27	4130481.48	1.74E-05	1.59E-08	9.53E-09	1.59E-08	1.06E-08	2.91E-08	6.84E-07	2.40E-08	0	0	3.2401E-10	0	0.0003	Res
582640.84_4130481.48	582640.84	4130481.48	1.56E-05	1.47E-08	8.83E-09	1.47E-08	9.88E-09	2.70E-08	6.33E-07	2.22E-08	0	0	2.90317E-10	0	0.0003	Res
582697.41_4130481.48	582697.41	4130481.48	1.41E-05	1.37E-08	8.23E-09	1.37E-08	9.23E-09	2.52E-08	5.90E-07	2.07E-08	0	0	2.6216E-10	0	0.0003	Res
582753.98_4130481.48	582753.98	4130481.48	1.28E-05	1.29E-08	7.73E-09	1.29E-08	8.68E-09	2.36E-08	5.54E-07	1.94E-08	0	0	2.39054E-10	0	0.0002	Res
582810.55_4130481.48	582810.55	4130481.48	1.18E-05	1.21E-08	7.29E-09	1.21E-08	8.20E-09	2.23E-08	5.22E-07	1.83E-08	0	0	2.19537E-10	0	0.0002	Res
582867.12_4130481.48	582867.12	4130481.48	1.09E-05	1.15E-08	6.90E-09	1.15E-08	7.78E-09	2.11E-08	4.95E-07	1.73E-08	0	0	2.02734E-10	0	0.0002	Res
581735.72_4130565.39	581735.72	4130565.39	1.41E-04	8.68E-08	5.21E-08	8.68E-08	5.62E-08	1.60E-07	3.74E-06	1.32E-07	0	0	2.63119E-09	0	0.0026	Res
581792.29_4130565.39	581792.29	4130565.39	1.39E-04	8.51E-08	5.11E-08	8.51E-08	5.51E-08	1.57E-07	3.67E-06	1.29E-07	0	0	2.59079E-09	0	0.0026	Res

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)								Risk Calculation Part 2, $\sum R1*C_{TAC}$					
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Cobalt	Lead	Nickel	Chromium VI	3rd Trimester	0<2	2<16	16<30	Cancer Risk - 2028 (per million)	Receptor Type
581848.86_4130565.39	581848.86	4130565.39	1.32E-04	8.10E-08	4.86E-08	8.10E-08	5.25E-08	1.49E-07	3.50E-06	1.23E-07	0	0	2.46404E-09	0	0.0025	Res
581905.43_4130565.39	581905.43	4130565.39	1.26E-04	7.74E-08	4.64E-08	7.74E-08	5.01E-08	1.42E-07	3.34E-06	1.17E-07	0	0	2.35316E-09	0	0.0024	Res
581962_4130565.39	581962	4130565.39	1.09E-04	6.77E-08	4.06E-08	6.77E-08	4.39E-08	1.24E-07	2.92E-06	1.03E-07	0	0	2.02983E-09	0	0.0020	Res
582018.57_4130565.39	582018.57	4130565.39	8.81E-05	5.62E-08	3.37E-08	5.62E-08	3.65E-08	1.03E-07	2.42E-06	8.52E-08	0	0	1.64135E-09	0	0.0016	Res
582075.14_4130565.39	582075.14	4130565.39	7.15E-05	4.69E-08	2.82E-08	4.69E-08	3.06E-08	8.63E-08	2.02E-06	7.12E-08	0	0	1.33204E-09	0	0.0013	Res
582131.71_4130565.39	582131.71	4130565.39	5.86E-05	3.97E-08	2.38E-08	3.97E-08	2.60E-08	7.30E-08	1.71E-06	6.02E-08	0	0	1.09178E-09	0	0.0011	Res
582188.28_4130565.39	582188.28	4130565.39	4.70E-05	3.32E-08	1.99E-08	3.32E-08	2.18E-08	6.11E-08	1.43E-06	5.04E-08	0	0	8.76858E-10	0	0.0009	Res
582244.85_4130565.39	582244.85	4130565.39	3.82E-05	2.82E-08	1.69E-08	2.82E-08	1.86E-08	5.18E-08	1.22E-06	4.27E-08	0	0	7.12158E-10	0	0.0007	Res
582301.42_4130565.39	582301.42	4130565.39	3.22E-05	2.47E-08	1.48E-08	2.47E-08	1.63E-08	4.54E-08	1.07E-06	3.74E-08	0	0	5.99456E-10	0	0.0006	Res
582357.99_4130565.39	582357.99	4130565.39	2.72E-05	2.18E-08	1.31E-08	2.18E-08	1.45E-08	4.01E-08	9.41E-07	3.30E-08	0	0	5.07653E-10	0	0.0005	Res
582414.56_4130565.39	582414.56	4130565.39	2.34E-05	1.96E-08	1.17E-08	1.96E-08	1.30E-08	3.59E-08	8.42E-07	2.96E-08	0	0	4.36598E-10	0	0.0004	Res
582471.13_4130565.39	582471.13	4130565.39	2.04E-05	1.77E-08	1.06E-08	1.77E-08	1.18E-08	3.25E-08	7.63E-07	2.68E-08	0	0	3.80608E-10	0	0.0004	Res
582527.7_4130565.39	582527.7	4130565.39	1.80E-05	1.62E-08	9.74E-09	1.62E-08	1.09E-08	2.98E-08	6.99E-07	2.45E-08	0	0	3.35539E-10	0	0.0003	Res
582584.27_4130565.39	582584.27	4130565.39	1.61E-05	1.50E-08	9.00E-09	1.50E-08	1.01E-08	2.75E-08	6.46E-07	2.27E-08	0	0	2.99563E-10	0	0.0003	Res
582640.84_4130565.39	582640.84	4130565.39	1.44E-05	1.39E-08	8.35E-09	1.39E-08	9.35E-09	2.55E-08	5.99E-07	2.10E-08	0	0	2.68298E-10	0	0.0003	Res
582697.41_4130565.39	582697.41	4130565.39	1.31E-05	1.30E-08	7.81E-09	1.30E-08	8.77E-09	2.39E-08	5.60E-07	1.97E-08	0	0	2.43549E-10	0	0.0002	Res
582753.98_4130565.39	582753.98	4130565.39	1.20E-05	1.23E-08	7.36E-09	1.23E-08	8.28E-09	2.25E-08	5.28E-07	1.85E-08	0	0	2.23052E-10	0	0.0002	Res
582810.55_4130565.39	582810.55	4130565.39	1.11E-05	1.16E-08	6.97E-09	1.16E-08	7.86E-09	2.13E-08	5.00E-07	1.75E-08	0	0	2.06177E-10	0	0.0002	Res
582867.12_4130565.39	582867.12	4130565.39	1.03E-05	1.11E-08	6.64E-09	1.11E-08	7.49E-09	2.03E-08	4.76E-07	1.67E-08	0	0	1.91975E-10	0	0.0002	Res
581735.72_4130649.3	581735.72	4130649.3	1.53E-04	9.25E-08	5.55E-08	9.25E-08	5.98E-08	1.70E-07	3.99E-06	1.40E-07	0	0	2.8509E-09	0	0.0029	Res
581792.29_4130649.3	581792.29	4130649.3	1.48E-04	8.94E-08	5.37E-08	8.94E-08	5.78E-08	1.64E-07	3.86E-06	1.36E-07	0	0	2.75906E-09	0	0.0028	Res
581905.43_4130649.3	581905.43	4130649.3	1.48E-04	8.86E-08	5.31E-08	8.86E-08	5.73E-08	1.63E-07	3.82E-06	1.34E-07	0	0	2.75974E-09	0	0.0028	Res
581962_4130649.3	581962	4130649.3	1.23E-04	7.47E-08	4.48E-08	7.47E-08	4.84E-08	1.37E-07	3.22E-06	1.13E-07	0	0	2.29048E-09	0	0.0023	Res
582018.57_4130649.3	582018.57	4130649.3	9.33E-05	5.85E-08	3.51E-08	5.85E-08	3.80E-08	1.08E-07	2.52E-06	8.87E-08	0	0	1.73877E-09	0	0.0017	Res
582075.14_4130649.3	582075.14	4130649.3	7.24E-05	4.70E-08	2.82E-08	4.70E-08	3.06E-08	8.64E-08	2.03E-06	7.12E-08	0	0	1.34944E-09	0	0.0013	Res
582131.71_4130649.3	582131.71	4130649.3	5.62E-05	3.80E-08	2.28E-08	3.80E-08	2.48E-08	6.99E-08	1.64E-06	5.76E-08	0	0	1.04774E-09	0	0.0010	Res
582188.28_4130649.3	582188.28	4130649.3	4.42E-05	3.13E-08	1.88E-08	3.13E-08	2.05E-08	5.75E-08	1.35E-06	4.74E-08	0	0	8.23706E-10	0	0.0008	Res
582244.85_4130649.3	582244.85	4130649.3	3.55E-05	2.64E-08	1.58E-08	2.64E-08	1.74E-08	4.85E-08	1.14E-06	4.00E-08	0	0	6.61877E-10	0	0.0007	Res
582301.42_4130649.3	582301.42	4130649.3	2.93E-05	2.28E-08	1.37E-08	2.28E-08	1.51E-08	4.19E-08	9.83E-07	3.45E-08	0	0	5.46195E-10	0	0.0005	Res
582357.99_4130649.3	582357.99	4130649.3	2.48E-05	2.02E-08	1.21E-08	2.02E-08	1.34E-08	3.70E-08	8.69E-07	3.05E-08	0	0	4.61794E-10	0	0.0005	Res
582414.56_4130649.3	582414.56	4130649.3	2.14E-05	1.81E-08	1.09E-08	1.81E-08	1.21E-08	3.33E-08	7.81E-07	2.74E-08	0	0	3.98572E-10	0	0.0004	Res
582471.13_4130649.3	582471.13	4130649.3	1.86E-05	1.65E-08	9.88E-09	1.65E-08	1.10E-08	3.02E-08	7.09E-07	2.49E-08	0	0	3.47538E-10	0	0.0003	Res
582527.7_4130649.3	582527.7	4130649.3	1.65E-05	1.51E-08	9.08E-09	1.51E-08	1.01E-08	2.77E-08	6.51E-07	2.28E-08	0	0	3.07516E-10	0	0.0003	Res
582584.27_4130649.3	582584.27	4130649.3	1.48E-05	1.40E-08	8.42E-09	1.40E-08	9.42E-09	2.58E-08	6.04E-07	2.12E-08	0	0	2.75989E-10	0	0.0003	Res
582640.84_4130649.3	582640.84	4130649.3	1.35E-05	1.31E-08	7.89E-09	1.31E-08	8.84E-09	2.41E-08	5.66E-07	1.98E-08	0	0	2.50835E-10	0	0.0003	Res
582697.41_4130649.3	582697.41	4130649.3	1.24E-05	1.24E-08	7.43E-09	1.24E-08	8.34E-09	2.27E-08	5.33E-07	1.87E-08	0	0	2.30218E-10	0	0.0002	Res
582753.98_4130649.3	582753.98	4130649.3	1.15E-05	1.18E-08	7.05E-09	1.18E-08	7.93E-09	2.16E-08	5.06E-07	1.77E-08	0	0	2.13655E-10	0	0.0002	Res
582810.55_4130649.3	582810.55	4130649.3	1.07E-05	1.12E-08	6.73E-09	1.12E-08	7.58E-09	2.06E-08	4.82E-07	1.69E-08	0	0	2.00016E-10	0	0.0002	Res
582867.12_4130649.3	582867.12	4130649.3	1.01E-05	1.07E-08	6.44E-09	1.07E-08	7.26E-09	1.97E-08	4.61E-07	1.62E-08	0	0	1.87997E-10	0	0.0002	Res
581848.86_4130733.21	581848.86	4130733.21	2.20E-04	1.27E-07	7.62E-08	1.27E-07	8.18E-08	2.34E-07	5.48E-06	1.93E-07	0	0	4.10244E-09	0	0.0041	Res
581905.43_4130733.21	581905.43	4130733.21	1.88E-04	1.09E-07	6.56E-08	1.09E-07	7.05E-08	2.01E-07	4.72E-06	1.66E-07	0	0	3.5016E-09	0	0.0035	Res
581962_4130733.21	581962	4130733.21	1.38E-04	8.23E-08	4.94E-08	8.23E-08	5.32E-08	1.51E-07	3.55E-06	1.25E-07	0	0	2.57411E-09	0	0.0026	Res
582018.57_4130733.21	582018.57	4130733.21	9.69E-05	5.98E-08	3.59E-08	5.98E-08	3.88E-08	1.10E-07	2.58E-06	9.08E-08	0	0	1.80552E-09	0	0.0018	Res
582075.14_4130733.21	582075.14	4130733.21	6.85E-05	4.43E-08	2.66E-08	4.43E-08	2.89E-08	8.15E-08	1.91E-06	6.72E-08	0	0	1.27583E-09	0	0.0013	Res
582131.71_4130733.21	582131.71	4130733.21	5.00E-05	3.42E-08	2.05E-08	3.42E-08	2.24E-08	6.28E-08	1.47E-06	5.18E-08	0	0	9.32508E-10	0	0.0009	Res
582188.28_4130733.21	582188.28	4130733.21	3.87E-05	2.79E-08	1.67E-08	2.79E-08	1.83E-08	5.12E-08	1.20E-06	4.22E-08	0	0	7.21983E-10	0	0.0007	Res
582244.85_4130733.21	582244.85	4130733.21	3.11E-05	2.35E-08	1.41E-08	2.35E-08	1.55E-08	4.32E-08	1.01E-06	3.56E-08	0	0	5.79685E-10	0	0.0006	Res
582301.42_4130733.21	582301.42	4130733.21	2.58E-05	2.05E-08	1.23E-08	2.05E-08	1.36E-08	3.76E-08	8.83E-07	3.10E-08	0	0	4.8119E-10	0	0.0005	Res
582357.99_4130733.21	582357.99	4130733.21	2.20E-05	1.82E-08	1.09E-08	1.82E-08	1.21E-08	3.35E-08	7.86E-07	2.76E-08	0	0	4.10277E-10	0	0.0004	Res
582414.56_4130733.21	582414.56	4130733.21	1.92E-05	1.65E-08	9.92E-09	1.65E-08	1.10E-08	3.03E-08	7.12E-07	2.50E-08	0	0	3.57582E-10	0	0.0004	Res
582471.13_4130733.21	582471.13	4130733.21	1.71E-05	1.52E-08	9.13E-09	1.52E-08	1.02E-08	2.79E-08	6.55E-07	2.30E-08	0	0	3.18069E-10	0	0.0003	Res
582527.7_4130733.21	582527.7	4130733.21	1.54E-05	1.42E-08	8.49E-09	1.42E-08	9.48E-09	2.60E-08	6.09E-07	2.14E-08	0	0	2.87457E-10	0	0.0003	Res
582584.27_4130733.21	582584.27	4130733.21	1.41E-05	1.33E-08	7.98E-09	1.33E-08	8.92E-09	2.44E-08	5.72E-07	2.01E-08	0	0	2.63278E-10	0	0.0003	Res
582640.84_4130733.21	582640.84	4130733.21	1.31E-05	1.26E-08	7.54E-09	1.26E-08	8.45E-09	2.31E-08	5.41E-07	1.90E-08	0	0	2.43469E-10	0	0.0002	Res
582697.41_4130733.21	582697.41	4130733.21	1.22E-05	1.20E-08	7.17E-09	1.20E-08	8.04E-09	2.19E-08	5.14E-07	1.80E-08	0	0	2.26895E-10	0	0.0002	Res
582753.98_4130733.21	582753.98	4130733.21	1.14E-05	1.14E-08	6.84E-09	1.14E-08	7.68E-09	2.09E-08	4.90E-07	1.72E-08	0	0	2.12485E-10	0	0.0002	Res
582810.55_4130733.21	582810.55	4130733.21	1.08E-05	1.09E-08	6.55E-09	1.09E-08	7.37E-09	2.00E-08	4.70E-07	1.65E-08	0	0	2.00545E-10	0	0.0002	Res

Risk Calculation Part 2, $\sum R1*C_{TAC}$

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)								3rd Trimester	0<2	2<16	16<30	Cancer Risk - 2028	Receptor Type
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Cobalt	Lead	Nickel	Chromium VI					(per million)	
582867.12_4130733.21	582867.12	4130733.21	1.02E-05	1.05E-08	6.28E-09	1.05E-08	7.08E-09	1.92E-08	4.50E-07	1.58E-08	0	0	1.89329E-10	0	0.0002	Res
581735.72_4130817.12	581735.72	4130817.12	3.23E-04	1.82E-07	1.09E-07	1.82E-07	1.17E-07	3.36E-07	7.88E-06	2.77E-07	0	0	6.02642E-09	0	0.0060	Res
581792.29_4130817.12	581792.29	4130817.12	3.65E-04	2.04E-07	1.23E-07	2.04E-07	1.31E-07	3.76E-07	8.83E-06	3.10E-07	0	0	6.80072E-09	0	0.0068	Res
581848.86_4130817.12	581848.86	4130817.12	3.27E-04	1.84E-07	1.10E-07	1.84E-07	1.18E-07	3.38E-07	7.94E-06	2.79E-07	0	0	6.10125E-09	0	0.0061	Res
581905.43_4130817.12	581905.43	4130817.12	2.48E-04	1.41E-07	8.44E-08	1.41E-07	9.06E-08	2.59E-07	6.08E-06	2.14E-07	0	0	4.61452E-09	0	0.0046	Res
581962_4130817.12	581962	4130817.12	1.50E-04	8.82E-08	5.29E-08	8.82E-08	5.69E-08	1.62E-07	3.81E-06	1.34E-07	0	0	2.80027E-09	0	0.0028	Res
582018.57_4130817.12	582018.57	4130817.12	9.01E-05	5.56E-08	3.34E-08	5.56E-08	3.61E-08	1.02E-07	2.40E-06	8.44E-08	0	0	1.67878E-09	0	0.0017	Res
582075.14_4130817.12	582075.14	4130817.12	5.84E-05	3.84E-08	2.30E-08	3.84E-08	2.50E-08	7.05E-08	1.66E-06	5.82E-08	0	0	1.08819E-09	0	0.0011	Res
582131.71_4130817.12	582131.71	4130817.12	4.21E-05	2.94E-08	1.76E-08	2.94E-08	1.93E-08	5.40E-08	1.27E-06	4.45E-08	0	0	7.84895E-10	0	0.0008	Res
582188.28_4130817.12	582188.28	4130817.12	3.27E-05	2.41E-08	1.45E-08	2.41E-08	1.59E-08	4.43E-08	1.04E-06	3.66E-08	0	0	6.10051E-10	0	0.0006	Res
582244.85_4130817.12	582244.85	4130817.12	2.68E-05	2.08E-08	1.25E-08	2.08E-08	1.37E-08	3.81E-08	8.94E-07	3.14E-08	0	0	4.99961E-10	0	0.0005	Res
582301.42_4130817.12	582301.42	4130817.12	2.29E-05	1.85E-08	1.11E-08	1.85E-08	1.22E-08	3.39E-08	7.95E-07	2.79E-08	0	0	4.26865E-10	0	0.0004	Res
582357.99_4130817.12	582357.99	4130817.12	2.01E-05	1.68E-08	1.01E-08	1.68E-08	1.12E-08	3.08E-08	7.22E-07	2.54E-08	0	0	3.75021E-10	0	0.0004	Res
582414.56_4130817.12	582414.56	4130817.12	1.80E-05	1.55E-08	9.27E-09	1.55E-08	1.03E-08	2.84E-08	6.66E-07	2.34E-08	0	0	3.35651E-10	0	0.0003	Res
582471.13_4130817.12	582471.13	4130817.12	1.64E-05	1.44E-08	8.65E-09	1.44E-08	9.63E-09	2.65E-08	6.21E-07	2.18E-08	0	0	3.05417E-10	0	0.0003	Res
582527.7_4130817.12	582527.7	4130817.12	1.50E-05	1.35E-08	8.12E-09	1.35E-08	9.05E-09	2.48E-08	5.82E-07	2.04E-08	0	0	2.79917E-10	0	0.0003	Res
582584.27_4130817.12	582584.27	4130817.12	1.39E-05	1.28E-08	7.67E-09	1.28E-08	8.56E-09	2.34E-08	5.50E-07	1.93E-08	0	0	2.59022E-10	0	0.0003	Res
582640.84_4130817.12	582640.84	4130817.12	1.29E-05	1.21E-08	7.27E-09	1.21E-08	8.13E-09	2.22E-08	5.21E-07	1.83E-08	0	0	2.41103E-10	0	0.0002	Res
582697.41_4130817.12	582697.41	4130817.12	1.21E-05	1.15E-08	6.92E-09	1.15E-08	7.75E-09	2.12E-08	4.96E-07	1.74E-08	0	0	2.25397E-10	0	0.0002	Res
582753.98_4130817.12	582753.98	4130817.12	1.13E-05	1.10E-08	6.59E-09	1.10E-08	7.40E-09	2.02E-08	4.73E-07	1.66E-08	0	0	2.10995E-10	0	0.0002	Res
582810.55_4130817.12	582810.55	4130817.12	1.06E-05	1.05E-08	6.31E-09	1.05E-08	7.09E-09	1.93E-08	4.52E-07	1.59E-08	0	0	1.98483E-10	0	0.0002	Res
582867.12_4130817.12	582867.12	4130817.12	1.01E-05	1.01E-08	6.04E-09	1.01E-08	6.80E-09	1.85E-08	4.33E-07	1.52E-08	0	0	1.87339E-10	0	0.0002	Res
581735.72_4130901.03	581735.72	4130901.03	6.42E-04	3.53E-07	2.12E-07	3.53E-07	2.27E-07	6.50E-07	1.53E-05	5.37E-07	0	0	1.19747E-08	0	0.0120	Res
581792.29_4130901.03	581792.29	4130901.03	6.86E-04	3.76E-07	2.26E-07	3.76E-07	2.41E-07	6.92E-07	1.63E-05	5.72E-07	0	0	1.27874E-08	0	0.0128	Res
581848.86_4130901.03	581848.86	4130901.03	6.11E-04	3.36E-07	2.02E-07	3.36E-07	2.15E-07	6.18E-07	1.45E-05	5.10E-07	0	0	1.13973E-08	0	0.0114	Res
581905.43_4130901.03	581905.43	4130901.03	3.21E-04	1.80E-07	1.08E-07	1.80E-07	1.16E-07	3.31E-07	7.76E-06	2.73E-07	0	0	5.98625E-09	0	0.0060	Res
581962_4130901.03	581962	4130901.03	1.30E-04	7.71E-08	4.63E-08	7.71E-08	4.98E-08	1.42E-07	3.33E-06	1.17E-07	0	0	2.43177E-09	0	0.0024	Res
582018.57_4130901.03	582018.57	4130901.03	7.01E-05	4.45E-08	2.67E-08	4.45E-08	2.89E-08	8.17E-08	1.92E-06	6.74E-08	0	0	1.30647E-09	0	0.0013	Res
582075.14_4130901.03	582075.14	4130901.03	4.71E-05	3.19E-08	1.91E-08	3.19E-08	2.08E-08	5.86E-08	1.37E-06	4.83E-08	0	0	8.77906E-10	0	0.0009	Res
582131.71_4130901.03	582131.71	4130901.03	3.61E-05	2.58E-08	1.55E-08	2.58E-08	1.69E-08	4.73E-08	1.11E-06	3.90E-08	0	0	6.73025E-10	0	0.0007	Res
582188.28_4130901.03	582188.28	4130901.03	2.96E-05	2.21E-08	1.32E-08	2.21E-08	1.45E-08	4.05E-08	9.51E-07	3.34E-08	0	0	5.52152E-10	0	0.0006	Res
582244.85_4130901.03	582244.85	4130901.03	2.52E-05	1.95E-08	1.17E-08	1.95E-08	1.29E-08	3.58E-08	8.40E-07	2.95E-08	0	0	4.69959E-10	0	0.0005	Res
582301.42_4130901.03	582301.42	4130901.03	2.19E-05	1.75E-08	1.05E-08	1.75E-08	1.16E-08	3.22E-08	7.56E-07	2.65E-08	0	0	4.0904E-10	0	0.0004	Res
582357.99_4130901.03	582357.99	4130901.03	1.94E-05	1.60E-08	9.62E-09	1.60E-08	1.07E-08	2.94E-08	6.90E-07	2.42E-08	0	0	3.62493E-10	0	0.0004	Res
582414.56_4130901.03	582414.56	4130901.03	1.74E-05	1.48E-08	8.87E-09	1.48E-08	9.84E-09	2.71E-08	6.36E-07	2.23E-08	0	0	3.24978E-10	0	0.0003	Res
582471.13_4130901.03	582471.13	4130901.03	1.58E-05	1.37E-08	8.25E-09	1.37E-08	9.18E-09	2.52E-08	5.92E-07	2.08E-08	0	0	2.94804E-10	0	0.0003	Res
582527.7_4130901.03	582527.7	4130901.03	1.45E-05	1.29E-08	7.72E-09	1.29E-08	8.60E-09	2.36E-08	5.54E-07	1.94E-08	0	0	2.69467E-10	0	0.0003	Res
582584.27_4130901.03	582584.27	4130901.03	1.33E-05	1.21E-08	7.28E-09	1.21E-08	8.13E-09	2.22E-08	5.22E-07	1.83E-08	0	0	2.48733E-10	0	0.0002	Res
582640.84_4130901.03	582640.84	4130901.03	1.24E-05	1.15E-08	6.89E-09	1.15E-08	7.71E-09	2.11E-08	4.94E-07	1.73E-08	0	0	2.31186E-10	0	0.0002	Res
582697.41_4130901.03	582697.41	4130901.03	1.16E-05	1.09E-08	6.55E-09	1.09E-08	7.34E-09	2.00E-08	4.70E-07	1.65E-08	0	0	2.15971E-10	0	0.0002	Res
582753.98_4130901.03	582753.98	4130901.03	1.09E-05	1.04E-08	6.25E-09	1.04E-08	7.01E-09	1.91E-08	4.48E-07	1.57E-08	0	0	2.02544E-10	0	0.0002	Res
582810.55_4130901.03	582810.55	4130901.03	1.02E-05	9.95E-09	5.97E-09	9.95E-09	6.70E-09	1.82E-08	4.28E-07	1.50E-08	0	0	1.90349E-10	0	0.0002	Res
582867.12_4130901.03	582867.12	4130901.03	9.65E-06	9.53E-09	5.72E-09	9.53E-09	6.43E-09	1.75E-08	4.10E-07	1.44E-08	0	0	1.79792E-10	0	0.0002	Res
581735.72_4130984.94	581735.72	4130984.94	1.71E-03	9.27E-07	5.56E-07	9.27E-07	5.94E-07	1.71E-06	4.00E-05	1.41E-06	0	0	3.19109E-08	0	0.0319	Res
581792.29_4130984.94	581792.29	4130984.94	2.25E-03	1.21E-06	7.28E-07	1.21E-06	7.78E-07	2.23E-06	5.24E-05	1.85E-06	0	0	4.18927E-08	0	0.0419	Res
581848.86_4130984.94	581848.86	4130984.94	2.61E-03	1.41E-06	8.47E-07	1.41E-06	9.03E-07	2.60E-06	6.10E-05	2.14E-06	0	0	4.87363E-08	0	0.0487	Res
581905.43_4130984.94	581905.43	4130984.94	2.08E-04	1.19E-07	7.13E-08	1.19E-07	7.65E-08	2.19E-07	5.13E-06	1.81E-07	0	0	3.88315E-09	0	0.0039	Res
581962_4130984.94	581962	4130984.94	8.95E-05	5.49E-08	3.29E-08	5.49E-08	3.56E-08	1.01E-07	2.37E-06	8.33E-08	0	0	1.66894E-09	0	0.0017	Res
582018.57_4130984.94	582018.57	4130984.94	5.77E-05	3.75E-08	2.25E-08	3.75E-08	2.45E-08	6.90E-08	1.62E-06	5.69E-08	0	0	1.07578E-09	0	0.0011	Res
582075.14_4130984.94	582075.14	4130984.94	4.26E-05	2.92E-08	1.75E-08	2.92E-08	1.91E-08	5.36E-08	1.26E-06	4.42E-08	0	0	7.93621E-10	0	0.0008	Res
582131.71_4130984.94	582131.71	4130984.94	3.37E-05	2.42E-08	1.45E-08	2.42E-08	1.59E-08	4.44E-08	1.04E-06	3.66E-08	0	0	6.27857E-10	0	0.0006	Res
582188.28_4130984.94	582188.28	4130984.94	2.78E-05	2.08E-08	1.25E-08	2.08E-08	1.37E-08	3.82E-08	8.97E-07	3.15E-08	0	0	5.17576E-10	0	0.0005	Res
582244.85_4130984.94	582244.85	4130984.94	2.36E-05	1.84E-08	1.10E-08	1.84E-08	1.21E-08	3.37E-08	7.91E-07	2.78E-08	0	0	4.39245E-10	0	0.0004	Res
582301.42_4130984.94	582301.42	4130984.94	2.05E-05	1.65E-08	9.90E-09	1.65E-08	1.09E-08	3.03E-08	7.10E-07	2.50E-08	0	0	3.8119E-10	0	0.0004	Res
582357.99_4130984.94	582357.99	4130984.94	1.81E-05	1.50E-08	9.03E-09	1.50E-08	1.00E-08	2.76E-08	6.48E-07	2.27E-08	0	0	3.36777E-10	0	0.0003	Res
582414.56_4130984.94	582414.56	4130984.94	1.62E-05	1.39E-08	8.32E-09	1.39E-08	9.24E-09	2.54E-08	5.97E-07	2.09E-08	0	0	3.01569E-10	0	0.0003	Res
582471.13_4130984.94	582471.13	4130984.94	1.47E-05	1.29E-08	7.73E-09	1.29E-08	8.60E-09	2.36E-08	5.54E-07	1.95E-08	0	0	2.73057E-10	0	0.0003	Res

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)								Risk Calculation Part 2, $\sum R1*C_{TAC}$					
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Cobalt	Lead	Nickel	Chromium VI	3rd Trimester	0<2	2<16	16<30	Cancer Risk - 2028 (per million)	Receptor Type
582527.7_4130984.94	582527.7	4130984.94	1.34E-05	1.20E-08	7.23E-09	1.20E-08	8.06E-09	2.21E-08	5.18E-07	1.82E-08	0	0	2.49424E-10	0	0.0002	Res
582584.27_4130984.94	582584.27	4130984.94	1.24E-05	1.14E-08	6.81E-09	1.14E-08	7.61E-09	2.08E-08	4.89E-07	1.71E-08	0	0	2.30304E-10	0	0.0002	Res
582640.84_4130984.94	582640.84	4130984.94	1.15E-05	1.08E-08	6.46E-09	1.08E-08	7.23E-09	1.98E-08	4.64E-07	1.63E-08	0	0	2.14694E-10	0	0.0002	Res
582697.41_4130984.94	582697.41	4130984.94	1.08E-05	1.02E-08	6.14E-09	1.02E-08	6.89E-09	1.88E-08	4.40E-07	1.55E-08	0	0	2.00525E-10	0	0.0002	Res
582753.98_4130984.94	582753.98	4130984.94	1.01E-05	9.78E-09	5.87E-09	9.78E-09	6.59E-09	1.79E-08	4.21E-07	1.48E-08	0	0	1.88838E-10	0	0.0002	Res
582810.55_4130984.94	582810.55	4130984.94	9.56E-06	9.36E-09	5.62E-09	9.36E-09	6.31E-09	1.72E-08	4.03E-07	1.41E-08	0	0	1.78167E-10	0	0.0002	Res
582867.12_4130984.94	582867.12	4130984.94	9.04E-06	8.98E-09	5.39E-09	8.98E-09	6.06E-09	1.65E-08	3.86E-07	1.35E-08	0	0	1.68585E-10	0	0.0002	Res
581735.72_4131068.85	581735.72	4131068.85	2.80E-04	1.58E-07	9.47E-08	1.58E-07	1.02E-07	2.90E-07	6.82E-06	2.40E-07	0	0	5.21793E-09	0	0.0052	Res
581792.29_4131068.85	581792.29	4131068.85	2.23E-04	1.27E-07	7.63E-08	1.27E-07	8.19E-08	2.34E-07	5.49E-06	1.93E-07	0	0	4.16293E-09	0	0.0042	Res
581848.86_4131068.85	581848.86	4131068.85	1.20E-04	7.17E-08	4.30E-08	7.17E-08	4.63E-08	1.32E-07	3.09E-06	1.09E-07	0	0	2.24273E-09	0	0.0022	Res
581905.43_4131068.85	581905.43	4131068.85	7.67E-05	4.80E-08	2.88E-08	4.80E-08	3.12E-08	8.83E-08	2.07E-06	7.29E-08	0	0	1.43005E-09	0	0.0014	Res
581962_4131068.85	581962	4131068.85	5.56E-05	3.65E-08	2.19E-08	3.65E-08	2.38E-08	6.70E-08	1.57E-06	5.53E-08	0	0	1.03681E-09	0	0.0010	Res
582018.57_4131068.85	582018.57	4131068.85	4.22E-05	2.90E-08	1.74E-08	2.90E-08	1.90E-08	5.34E-08	1.25E-06	4.40E-08	0	0	7.86563E-10	0	0.0008	Res
582075.14_4131068.85	582075.14	4131068.85	3.35E-05	2.42E-08	1.45E-08	2.42E-08	1.59E-08	4.44E-08	1.04E-06	3.66E-08	0	0	6.24397E-10	0	0.0006	Res
582131.71_4131068.85	582131.71	4131068.85	2.76E-05	2.08E-08	1.25E-08	2.08E-08	1.37E-08	3.82E-08	8.97E-07	3.15E-08	0	0	5.14989E-10	0	0.0005	Res
582188.28_4131068.85	582188.28	4131068.85	2.34E-05	1.83E-08	1.10E-08	1.83E-08	1.21E-08	3.36E-08	7.89E-07	2.77E-08	0	0	4.35372E-10	0	0.0004	Res
582244.85_4131068.85	582244.85	4131068.85	2.02E-05	1.64E-08	9.86E-09	1.64E-08	1.09E-08	3.02E-08	7.08E-07	2.48E-08	0	0	3.76539E-10	0	0.0004	Res
582301.42_4131068.85	582301.42	4131068.85	1.78E-05	1.49E-08	8.96E-09	1.49E-08	9.93E-09	2.74E-08	6.43E-07	2.26E-08	0	0	3.31067E-10	0	0.0003	Res
582357.99_4131068.85	582357.99	4131068.85	1.58E-05	1.37E-08	8.23E-09	1.37E-08	9.15E-09	2.52E-08	5.91E-07	2.07E-08	0	0	2.95003E-10	0	0.0003	Res
582414.56_4131068.85	582414.56	4131068.85	1.43E-05	1.27E-08	7.64E-09	1.27E-08	8.51E-09	2.34E-08	5.48E-07	1.92E-08	0	0	2.66311E-10	0	0.0003	Res
582471.13_4131068.85	582471.13	4131068.85	1.30E-05	1.19E-08	7.13E-09	1.19E-08	7.96E-09	2.18E-08	5.12E-07	1.80E-08	0	0	2.42646E-10	0	0.0002	Res
582527.7_4131068.85	582527.7	4131068.85	1.20E-05	1.12E-08	6.70E-09	1.12E-08	7.49E-09	2.05E-08	4.81E-07	1.69E-08	0	0	2.22832E-10	0	0.0002	Res
582584.27_4131068.85	582584.27	4131068.85	1.10E-05	1.05E-08	6.32E-09	1.05E-08	7.07E-09	1.93E-08	4.53E-07	1.59E-08	0	0	2.05691E-10	0	0.0002	Res
582640.84_4131068.85	582640.84	4131068.85	1.04E-05	1.00E-08	6.02E-09	1.00E-08	6.74E-09	1.84E-08	4.31E-07	1.51E-08	0	0	1.93021E-10	0	0.0002	Res
582697.41_4131068.85	582697.41	4131068.85	9.73E-06	9.56E-09	5.74E-09	9.56E-09	6.44E-09	1.75E-08	4.11E-07	1.44E-08	0	0	1.81416E-10	0	0.0002	Res
582753.98_4131068.85	582753.98	4131068.85	9.23E-06	9.17E-09	5.50E-09	9.17E-09	6.18E-09	1.68E-08	3.94E-07	1.38E-08	0	0	1.71982E-10	0	0.0002	Res
582810.55_4131068.85	582810.55	4131068.85	8.77E-06	8.81E-09	5.29E-09	8.81E-09	5.95E-09	1.62E-08	3.79E-07	1.33E-08	0	0	1.63529E-10	0	0.0002	Res
582867.12_4131068.85	582867.12	4131068.85	8.30E-06	8.44E-09	5.07E-09	8.44E-09	5.71E-09	1.55E-08	3.63E-07	1.27E-08	0	0	1.54681E-10	0	0.0002	Res
582018.57_4131152.76	582018.57	4131152.76	2.83E-05	2.15E-08	1.29E-08	2.15E-08	1.42E-08	3.94E-08	9.25E-07	3.25E-08	0	0	5.27574E-10	0	0.0005	Res
582244.85_4131152.76	582244.85	4131152.76	1.71E-05	1.47E-08	8.83E-09	1.47E-08	9.80E-09	2.70E-08	6.34E-07	2.22E-08	0	0	3.18715E-10	0	0.0003	Res
582301.42_4131152.76	582301.42	4131152.76	1.54E-05	1.36E-08	8.18E-09	1.36E-08	9.09E-09	2.50E-08	5.87E-07	2.06E-08	0	0	2.87045E-10	0	0.0003	Res
582357.99_4131152.76	582357.99	4131152.76	1.39E-05	1.27E-08	7.60E-09	1.27E-08	8.47E-09	2.32E-08	5.45E-07	1.91E-08	0	0	2.59278E-10	0	0.0003	Res
582414.56_4131152.76	582414.56	4131152.76	1.27E-05	1.18E-08	7.11E-09	1.18E-08	7.93E-09	2.17E-08	5.10E-07	1.79E-08	0	0	2.36277E-10	0	0.0002	Res
582471.13_4131152.76	582471.13	4131152.76	1.15E-05	1.11E-08	6.64E-09	1.11E-08	7.42E-09	2.03E-08	4.76E-07	1.67E-08	0	0	2.14651E-10	0	0.0002	Res
582527.7_4131152.76	582527.7	4131152.76	1.06E-05	1.04E-08	6.25E-09	1.04E-08	7.00E-09	1.91E-08	4.48E-07	1.57E-08	0	0	1.9743E-10	0	0.0002	Res
582584.27_4131152.76	582584.27	4131152.76	9.80E-06	9.84E-09	5.90E-09	9.84E-09	6.63E-09	1.80E-08	4.23E-07	1.49E-08	0	0	1.82655E-10	0	0.0002	Res
582640.84_4131152.76	582640.84	4131152.76	9.16E-06	9.36E-09	5.62E-09	9.36E-09	6.31E-09	1.72E-08	4.03E-07	1.41E-08	0	0	1.7072E-10	0	0.0002	Res
582697.41_4131152.76	582697.41	4131152.76	8.61E-06	8.93E-09	5.36E-09	8.93E-09	6.03E-09	1.64E-08	3.84E-07	1.35E-08	0	0	1.60514E-10	0	0.0002	Res
582753.98_4131152.76	582753.98	4131152.76	8.20E-06	8.59E-09	5.15E-09	8.59E-09	5.80E-09	1.57E-08	3.69E-07	1.30E-08	0	0	1.52836E-10	0	0.0002	Res
582810.55_4131152.76	582810.55	4131152.76	7.82E-06	8.27E-09	4.96E-09	8.27E-09	5.59E-09	1.52E-08	3.55E-07	1.25E-08	0	0	1.45692E-10	0	0.0001	Res
582867.12_4131152.76	582867.12	4131152.76	7.41E-06	7.93E-09	4.76E-09	7.93E-09	5.37E-09	1.45E-08	3.41E-07	1.20E-08	0	0	1.38111E-10	0	0.0001	Res

HRA Permanente Creek Restoration Project

Construction Year 2029

Emissions Inputs

Construction Activity	Construction Year & Source	DPM Exhaust (tons/year)	PM10 Dust for speciation (tons/year)	Arsenic (tons/year)	Beryllium (tons/year)	Cadmium (tons/year)	Cobalt (tons/year)	Copper (tons/year)	Lead (tons/year)	Mercury (tons/year)	Nickel (tons/year)	Selenium (tons/year)	Chromium VI (tons/year)	Crystalline Silica (tons/year)
Concrete Channel 2024	2024_CONCRTE	0.000	0.00	2.91E-12	1.74E-12	2.91E-12	1.49E-11	3.26E-11	2.91E-12	4.65E-13	5.35E-11	5.81E-12	2.33E-13	8.63E-09
Paved road	2024_PAVED	2.07E-04	0.08	1.04E-07	6.26E-08	1.04E-07	6.68E-08	2.09E-06	1.92E-07	1.17E-08	4.51E-06	2.09E-07	1.59E-07	5.93E-04
Unpaved road	2024_CCP_UNPV	6.27E-05	0.20	2.56E-07	1.54E-07	2.56E-07	1.64E-07	5.12E-06	4.71E-07	2.87E-08	1.11E-05	5.12E-07	3.89E-07	1.46E-03
Channel Widening 2024	2024_CHAN_RCK	0.002	0.16	2.05E-07	1.23E-07	2.05E-07	1.05E-06	2.29E-06	2.05E-07	3.28E-08	3.77E-06	4.09E-07	1.64E-08	6.08E-04
Paved road	2024_PAVED	1.80E-03	2.39	2.99E-06	1.79E-06	2.99E-06	1.91E-06	5.98E-05	5.50E-06	3.35E-07	1.29E-04	5.98E-06	4.54E-06	1.70E-02
Rock Pile Area 2025	2025_CHAN_RCK	0.006	0.25	3.16E-07	1.89E-07	3.16E-07	1.62E-06	3.54E-06	3.16E-07	5.05E-08	5.81E-06	6.31E-07	2.53E-08	9.37E-04
Paved road	2025_PAVED	5.95E-03	2.44	3.05E-06	1.83E-06	3.05E-06	1.95E-06	6.10E-05	5.61E-06	3.41E-07	1.32E-04	6.10E-06	4.63E-06	1.73E-02
Rock Pile Area 2026	2026_CHAN_RCK	0.006	0.25	3.16E-07	1.89E-07	3.16E-07	1.62E-06	3.54E-06	3.16E-07	5.05E-08	5.81E-06	6.31E-07	2.53E-08	9.37E-04
Paved road	2026_PAVED	5.84E-03	2.44	3.05E-06	1.83E-06	3.05E-06	1.95E-06	6.10E-05	5.61E-06	3.41E-07	1.32E-04	6.10E-06	4.63E-06	1.73E-02
Channel Widening 2027	2027_CHAN_RCK	0.002	0.98	1.23E-06	7.36E-07	1.23E-06	6.28E-06	1.37E-05	1.23E-06	1.96E-07	2.26E-05	2.45E-06	9.82E-08	3.64E-03
Paved road	2027_PAVED	5.61E-03	2.39	2.99E-06	1.79E-06	2.99E-06	1.91E-06	5.98E-05	5.50E-06	3.35E-07	1.29E-04	5.98E-06	4.54E-06	1.70E-02
Material Removal 2028	2028_MATRMVL	0.001	0.25	3.15E-07	1.89E-07	3.15E-07	1.62E-06	3.53E-06	3.15E-07	5.05E-08	5.80E-06	6.31E-07	2.52E-08	9.37E-04
Paved road	2028_PAVED	5.57E-03	2.39	2.99E-06	1.80E-06	2.99E-06	1.92E-06	5.98E-05	5.51E-06	3.35E-07	1.29E-04	5.98E-06	4.55E-06	1.70E-02
Unpaved road	2028_UNPAVED	3.40E-03	11.84	1.48E-05	8.88E-06	1.48E-05	9.47E-06	2.96E-04	2.72E-05	1.66E-06	6.40E-04	2.96E-05	2.25E-05	8.41E-02
Material Removal 2029	2029_MATRMVL	0.001	0.25	3.15E-07	1.89E-07	3.15E-07	1.62E-06	3.53E-06	3.15E-07	5.05E-08	5.80E-06	6.31E-07	2.52E-08	9.37E-04
Paved road	2029_PAVED	5.56E-03	2.41	3.01E-06	1.81E-06	3.01E-06	1.93E-06	6.03E-05	5.55E-06	3.38E-07	1.30E-04	6.03E-06	4.58E-06	1.71E-02
Unpaved road	2029_UNPAVED	3.39E-03	11.93	1.49E-05	8.95E-06	1.49E-05	9.55E-06	2.98E-04	2.74E-05	1.67E-06	6.44E-04	2.98E-05	2.27E-05	8.47E-02

Construction Activity	Construction Year	DPM (g/s)	Arsenic (g/s)	Beryllium (g/s)	Cadmium (g/s)	Cobalt (g/s)	Copper (g/s)	Lead (g/s)	Mercury (g/s)	Nickel (g/s)	Selenium (g/s)	Chromium VI (g/s)	Crystalline Silica (g/s)
Concrete Channel 2024	2024_CONCRTE	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Paved road	2024_PAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Unpaved road	2024_CCP_UNPV	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Channel Widening 2024	2024_CHAN_RCK	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Paved road	2024_PAVED	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Rock Pile Area 2025	2025_CHAN_RCK	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Paved road	2025_PAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Rock Pile Area 2026	2026_CHAN_RCK	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Paved road	2026_PAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Channel Widening 2027	2027_CHAN_RCK	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Paved road	2027_PAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Material Removal 2028	2028_MATRMVL	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Paved road	2028_PAVED	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Unpaved road	2028_UNPAVED	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Material Removal 2029	2029_MATRMVL	3.324E-05	9.08E-09	5.45E-09	9.08E-09	4.65E-08	1.02E-07	9.08E-09	1.45E-09	1.67E-07	1.82E-08	7.26E-10	2.70E-05
Paved road	2029_PAVED	1.598E-04	8.67E-08	5.20E-08	8.67E-08	5.55E-08	1.73E-06	1.60E-07	9.71E-09	3.75E-06	1.73E-07	1.32E-07	4.93E-04
Unpaved road	2029_UNPAVED	9.761E-05	4.29E-07	2.57E-07	4.29E-07	2.75E-07	8.58E-06	7.89E-07	4.81E-08	1.85E-05	8.58E-07	6.52E-07	2.44E-03

N/A = not including PM10 on-site dust in HRA calculation; it is only for speciating metals.

Exposure Duration, ED

	Exposure Start	3rd Trimester	0<2	2<16	16<30
Years	1/1/2029	0	0	1	0

Risk Factors

	Abbreviation	UOM	3rd Trimester	0<2	2<16	16<30
Daily Breathing Rate (95th %'ile)	DBR	L/kg-day	361	1090	572	261
Fraction Of Time At Home [a]	FAH	unitless	0.85	0.85	0.72	0.73
Exposure Frequency	EF	days/year	0.96	0.96	0.96	0.96
Age Sensitivity Factor	ASF	unitless	10	10	3	1
Inhalation Absorption Factor	A	unitless	1	1	1	1
Conversion Factor	CF_1	m^3/L	0.001	0.001	0.001	0.001
Conversion Factor	CF_2	$\mu g/m^3$	0.001	0.001	0.001	0.001
Averaging Time (for residential exposure)	AT	years	70.00	70.00	70.00	70.00

[a] assume school or daycare will have cancer risk of >1 per million

Cancer Potency Factor, CPF

TAC	UOM	
DPM	$mg/kg\text{-}day^{-1}$	1.1
Arsenic	$mg/kg\text{-}day^{-1}$	12
Beryllium	$mg/kg\text{-}day^{-1}$	8.4
Cadmium	$mg/kg\text{-}day^{-1}$	15
Cobalt	$mg/kg\text{-}day^{-1}$	27
Lead	$mg/kg\text{-}day^{-1}$	0.04
Nickel	$mg/kg\text{-}day^{-1}$	0.91
Chromium VI	$mg/kg\text{-}day^{-1}$	510

Intake Factor for Inhalation, IF (m^3/kg-day)

Equation	3rd Trimester	0<2	2<16	16<30
DBR*FAH*EF*ED*ASF*A*CF/AT	0.000	0.000	0.017	0.000

Risk Calculation Part 1, R1

	TAC	3rd Trimester	0<2	2<16	16<30
IF*CPF*CF	DPM	0.00E+00	0.00E+00	1.86E-05	0.00E+00
	Arsenic	0.00E+00	0.00E+00	2.03E-04	0.00E+00
	Beryllium	0.00E+00	0.00E+00	1.42E-04	0.00E+00
	Cadmium	0.00E+00	0.00E+00	2.54E-04	0.00E+00
	Cobalt	0.00E+00	0.00E+00	4.57E-04	0.00E+00
	Lead	0.00E+00	0.00E+00	6.78E-07	0.00E+00
	Nickel	0.00E+00	0.00E+00	1.54E-05	0.00E+00
	Chromium VI	0.00E+00	0.00E+00	8.64E-03	0.00E+00

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)								Risk Calculation Part 2, $\sum R1*C_{TAC}$					
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Cobalt	Lead	Nickel	Chromium VI	3rd Trimester	0<2	2<16	16<30	Cancer Risk - 2029 (per million)	Receptor Type
581336.22_4131207.48	581336.22	4131207.48	1.86E-04	1.10E-07	6.63E-08	1.10E-07	7.13E-08	2.03E-07	4.77E-06	1.68E-07	0	0	3.47291E-09	0	0.0035	CT House
581554.22_4130688.06	581554.22	4130688.06	1.25E-04	7.98E-08	4.79E-08	7.98E-08	5.17E-08	1.47E-07	3.44E-06	1.21E-07	0	0	2.33003E-09	0	0.0023	Res
579793.36_4131503.29	579793.36	4131503.29	1.11E-05	2.16E-08	1.29E-08	2.16E-08	1.48E-08	3.95E-08	9.27E-07	3.25E-08	0	0	2.06394E-10	0	0.0002	Acute
580488.37_4131517.71	580488.37	4131517.71	1.46E-05	1.76E-08	1.06E-08	1.76E-08	1.18E-08	3.23E-08	7.58E-07	2.66E-08	0	0	2.71908E-10	0	0.0003	Acute
581678.43_4131040.03	581678.43	4131040.03	5.91E-04	3.29E-07	1.97E-07	3.29E-07	2.11E-07	6.05E-07	1.42E-05	4.99E-07	0	0	1.10095E-08	0	0.0110	Res
581635.43_4130978.54	581635.43	4130978.54	1.20E-03	6.57E-07	3.94E-07	6.57E-07	4.21E-07	1.21E-06	2.84E-05	9.99E-07	0	0	2.22851E-08	0	0.0223	Res
581830.06_4131027.55	581830.06	4131027.55	5.44E-04	3.03E-07	1.82E-07	3.03E-07	1.94E-07	5.57E-07	1.31E-05	4.60E-07	0	0	1.01409E-08	0	0.0101	Res
581727.48_4130976.54	581727.48	4130976.54	1.45E-03	7.94E-07	4.76E-07	7.94E-07	5.08E-07	1.46E-06	3.43E-05	1.21E-06	0	0	2.69775E-08	0	0.0270	Res
581789.11_4130419.65	581789.11	4130419.65	9.45E-05	6.28E-08	3.77E-08	6.28E-08	4.09E-08	1.15E-07	2.71E-06	9.52E-08	0	0	1.76136E-09	0	0.0018	Res
581700.32_4130781.89	581700.32	4130781.89	2.87E-04	1.65E-07	9.92E-08	1.65E-07	1.06E-07	3.04E-07	7.14E-06	2.51E-07	0	0	5.35208E-09	0	0.0054	Res
581426.07_4131299.01	581426.07	4131299.01	6.77E-05	4.48E-08	2.69E-08	4.48E-08	2.92E-08	8.23E-08	1.93E-06	6.79E-08	0	0	1.2616E-09	0	0.0013	Acute
582301.42_4129474.56	582301.42	4129474.56	3.01E-05	2.50E-08	1.50E-08	2.50E-08	1.65E-08	4.58E-08	1.08E-06	3.78E-08	0	0	5.61329E-10	0	0.0006	Res
582357.99_4129474.56	582357.99	4129474.56	2.82E-05	2.35E-08	1.41E-08	2.35E-08	1.56E-08	4.32E-08	1.01E-06	3.56E-08	0	0	5.25159E-10	0	0.0005	Res
582414.56_4129474.56	582414.56	4129474.56	2.64E-05	2.22E-08	1.33E-08	2.22E-08	1.48E-08	4.08E-08	9.57E-07	3.36E-08	0	0	4.92388E-10	0	0.0005	Res
582471.13_4129474.56	582471.13	4129474.56	2.48E-05	2.10E-08	1.26E-08	2.10E-08	1.40E-08	3.86E-08	9.06E-07	3.18E-08	0	0	4.62794E-10	0	0.0005	Res
582527.7_4129474.56	582527.7	4129474.56	2.35E-05	2.00E-08	1.20E-08	2.00E-08	1.33E-08	3.67E-08	8.61E-07	3.02E-08	0	0	4.37356E-10	0	0.0004	Res
582584.27_4129474.56	582584.27	4129474.56	2.21E-05	1.90E-08	1.14E-08	1.90E-08	1.27E-08	3.48E-08	8.17E-07	2.87E-08	0	0	4.11656E-10	0	0.0004	Res
582640.84_4129474.56	582640.84	4129474.56	2.06E-05	1.79E-08	1.07E-08	1.79E-08	1.20E-08	3.29E-08	7.71E-07	2.71E-08	0	0	3.84338E-10	0	0.0004	Res
582244.85_4129558.47	582244.85	4129558.47	3.04E-05	2.53E-08	1.52E-08	2.53E-08	1.68E-08	4.65E-08	1.09E-06	3.83E-08	0	0	5.67065E-10	0	0.0006	Res
582301.42_4129558.47	582301.42	4129558.47	3.02E-05	2.48E-08	1.49E-08	2.48E-08	1.64E-08	4.55E-08	1.07E-06	3.75E-08	0	0	5.62318E-10	0	0.0006	Res
582357.99_4129558.47	582357.99	4129558.47	2.87E-05	2.36E-08	1.41E-08	2.36E-08	1.57E-08	4.33E-08	1.02E-06	3.57E-08	0	0	5.34231E-10	0	0.0005	Res
582414.56_4129558.47	582414.56	4129558.47	2.69E-05	2.23E-08	1.34E-08	2.23E-08	1.48E-08	4.10E-08	9.61E-07	3.38E-08	0	0	5.01909E-10	0	0.0005	Res
582471.13_4129558.47	582471.13	4129558.47	2.52E-05	2.11E-08	1.27E-08	2.11E-08	1.40E-08	3.87E-08	9.08E-07	3.19E-08	0	0	4.70385E-10	0	0.0005	Res
582527.7_4129558.47	582527.7	4129558.47	2.36E-05	2.00E-08	1.20E-08	2.00E-08	1.33E-08	3.66E-08	8.59E-07	3.02E-08	0	0	4.40767E-10	0	0.0004	Res
582584.27_4129558.47	582584.27	4129558.47	2.21E-05	1.89E-08	1.13E-08	1.89E-08	1.26E-08	3.47E-08	8.13E-07	2.86E-08	0	0	4.12705E-10	0	0.0004	Res
582640.84_4129558.47	582640.84	4129558.47	2.09E-05	1.80E-08	1.08E-08	1.80E-08	1.20E-08	3.30E-08	7.74E-07	2.72E-08	0	0	3.89126E-10	0	0.0004	Res
582697.41_4129558.47	582697.41	4129558.47	1.97E-05	1.71E-08	1.03E-08	1.71E-08	1.15E-08	3.14E-08	7.37E-07	2.59E-08	0	0	3.66544E-10	0	0.0004	Res
582244.85_4129642.38	582244.85	4129642.38	2.68E-05	2.33E-08	1.40E-08	2.33E-08	1.55E-08	4.27E-08	1.00E-06	3.52E-08	0	0	4.99414E-10	0	0.0005	Res

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)								Risk Calculation Part 2, $\sum R1*C_{TAC}$					
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Cobalt	Lead	Nickel	Chromium VI	3rd Trimester	0<2	2<16	16<30	Cancer Risk - 2029 (per million)	Receptor Type
582301.42_4129642.38	582301.42	4129642.38	2.94E-05	2.43E-08	1.46E-08	2.43E-08	1.61E-08	4.45E-08	1.04E-06	3.67E-08	0	0	5.4781E-10	0	0.0005	Res
582357.99_4129642.38	582357.99	4129642.38	2.91E-05	2.37E-08	1.42E-08	2.37E-08	1.58E-08	4.36E-08	1.02E-06	3.59E-08	0	0	5.42205E-10	0	0.0005	Res
582414.56_4129642.38	582414.56	4129642.38	2.75E-05	2.26E-08	1.35E-08	2.26E-08	1.50E-08	4.14E-08	9.72E-07	3.41E-08	0	0	5.12945E-10	0	0.0005	Res
582471.13_4129642.38	582471.13	4129642.38	2.59E-05	2.14E-08	1.28E-08	2.14E-08	1.42E-08	3.93E-08	9.22E-07	3.24E-08	0	0	4.82217E-10	0	0.0005	Res
582527.7_4129642.38	582527.7	4129642.38	2.44E-05	2.03E-08	1.22E-08	2.03E-08	1.36E-08	3.73E-08	8.76E-07	3.08E-08	0	0	4.53876E-10	0	0.0005	Res
582584.27_4129642.38	582584.27	4129642.38	2.27E-05	1.92E-08	1.15E-08	1.92E-08	1.28E-08	3.53E-08	8.28E-07	2.91E-08	0	0	4.23051E-10	0	0.0004	Res
582640.84_4129642.38	582640.84	4129642.38	2.13E-05	1.83E-08	1.10E-08	1.83E-08	1.22E-08	3.35E-08	7.86E-07	2.76E-08	0	0	3.9637E-10	0	0.0004	Res
582697.41_4129642.38	582697.41	4129642.38	2.00E-05	1.74E-08	1.04E-08	1.74E-08	1.16E-08	3.19E-08	7.47E-07	2.62E-08	0	0	3.71937E-10	0	0.0004	Res
582753.98_4129642.38	582753.98	4129642.38	1.87E-05	1.65E-08	9.90E-09	1.65E-08	1.11E-08	3.03E-08	7.10E-07	2.49E-08	0	0	3.48201E-10	0	0.0003	Res
582810.55_4129642.38	582810.55	4129642.38	1.75E-05	1.57E-08	9.44E-09	1.57E-08	1.05E-08	2.89E-08	6.77E-07	2.38E-08	0	0	3.26868E-10	0	0.0003	Res
582867.12_4129642.38	582867.12	4129642.38	1.63E-05	1.49E-08	8.95E-09	1.49E-08	1.00E-08	2.73E-08	6.41E-07	2.25E-08	0	0	3.03754E-10	0	0.0003	Res
582244.85_4129726.29	582244.85	4129726.29	2.94E-05	2.46E-08	1.48E-08	2.46E-08	1.63E-08	4.51E-08	1.06E-06	3.72E-08	0	0	5.47268E-10	0	0.0005	Res
582301.42_4129726.29	582301.42	4129726.29	2.87E-05	2.39E-08	1.43E-08	2.39E-08	1.59E-08	4.38E-08	1.03E-06	3.61E-08	0	0	5.3412E-10	0	0.0005	Res
582357.99_4129726.29	582357.99	4129726.29	2.93E-05	2.39E-08	1.43E-08	2.39E-08	1.59E-08	4.39E-08	1.03E-06	3.61E-08	0	0	5.46167E-10	0	0.0005	Res
582414.56_4129726.29	582414.56	4129726.29	2.81E-05	2.30E-08	1.38E-08	2.30E-08	1.52E-08	4.21E-08	9.88E-07	3.47E-08	0	0	5.22908E-10	0	0.0005	Res
582471.13_4129726.29	582471.13	4129726.29	2.65E-05	2.19E-08	1.31E-08	2.19E-08	1.45E-08	4.01E-08	9.42E-07	3.31E-08	0	0	4.94309E-10	0	0.0005	Res
582527.7_4129726.29	582527.7	4129726.29	2.50E-05	2.08E-08	1.25E-08	2.08E-08	1.39E-08	3.82E-08	8.96E-07	3.15E-08	0	0	4.65812E-10	0	0.0005	Res
582584.27_4129726.29	582584.27	4129726.29	2.35E-05	1.98E-08	1.19E-08	1.98E-08	1.32E-08	3.63E-08	8.51E-07	2.99E-08	0	0	4.3711E-10	0	0.0004	Res
582640.84_4129726.29	582640.84	4129726.29	2.19E-05	1.88E-08	1.13E-08	1.88E-08	1.25E-08	3.44E-08	8.07E-07	2.83E-08	0	0	4.08845E-10	0	0.0004	Res
582697.41_4129726.29	582697.41	4129726.29	2.03E-05	1.77E-08	1.06E-08	1.77E-08	1.18E-08	3.25E-08	7.62E-07	2.68E-08	0	0	3.79162E-10	0	0.0004	Res
582753.98_4129726.29	582753.98	4129726.29	1.88E-05	1.67E-08	1.00E-08	1.67E-08	1.12E-08	3.06E-08	7.18E-07	2.52E-08	0	0	3.49856E-10	0	0.0003	Res
582810.55_4129726.29	582810.55	4129726.29	1.71E-05	1.56E-08	9.38E-09	1.56E-08	1.05E-08	2.87E-08	6.73E-07	2.36E-08	0	0	3.19609E-10	0	0.0003	Res
582244.85_4129810.2	582244.85	4129810.2	2.86E-05	2.43E-08	1.46E-08	2.43E-08	1.62E-08	4.46E-08	1.05E-06	3.68E-08	0	0	5.3372E-10	0	0.0005	Res
582301.42_4129810.2	582301.42	4129810.2	2.91E-05	2.42E-08	1.45E-08	2.42E-08	1.61E-08	4.45E-08	1.04E-06	3.67E-08	0	0	5.42498E-10	0	0.0005	Res
582357.99_4129810.2	582357.99	4129810.2	2.90E-05	2.39E-08	1.43E-08	2.39E-08	1.59E-08	4.38E-08	1.03E-06	3.61E-08	0	0	5.40139E-10	0	0.0005	Res
582414.56_4129810.2	582414.56	4129810.2	2.83E-05	2.32E-08	1.39E-08	2.32E-08	1.54E-08	4.26E-08	1.00E-06	3.51E-08	0	0	5.27584E-10	0	0.0005	Res
582471.13_4129810.2	582471.13	4129810.2	2.71E-05	2.23E-08	1.34E-08	2.23E-08	1.48E-08	4.09E-08	9.61E-07	3.37E-08	0	0	5.04624E-10	0	0.0005	Res
582527.7_4129810.2	582527.7	4129810.2	2.54E-05	2.12E-08	1.27E-08	2.12E-08	1.41E-08	3.89E-08	9.13E-07	3.21E-08	0	0	4.74008E-10	0	0.0005	Res
582584.27_4129810.2	582584.27	4129810.2	2.37E-05	2.01E-08	1.20E-08	2.01E-08	1.34E-08	3.68E-08	8.64E-07	3.03E-08	0	0	4.42285E-10	0	0.0004	Res
582640.84_4129810.2	582640.84	4129810.2	2.18E-05	1.88E-08	1.13E-08	1.88E-08	1.25E-08	3.45E-08	8.09E-07	2.84E-08	0	0	4.05564E-10	0	0.0004	Res
582697.41_4129810.2	582697.41	4129810.2	2.00E-05	1.76E-08	1.06E-08	1.76E-08	1.18E-08	3.23E-08	7.59E-07	2.66E-08	0	0	3.72349E-10	0	0.0004	Res
581905.43_4129894.11	581905.43	4129894.11	3.79E-05	3.19E-08	1.92E-08	3.19E-08	2.12E-08	5.86E-08	1.38E-06	4.83E-08	0	0	7.05779E-10	0	0.0007	Res
581962_4129894.11	581962	4129894.11	3.78E-05	3.13E-08	1.88E-08	3.13E-08	2.07E-08	5.75E-08	1.35E-06	4.74E-08	0	0	7.03746E-10	0	0.0007	Res
582131.71_4129894.11	582131.71	4129894.11	3.28E-05	2.74E-08	1.64E-08	2.74E-08	1.82E-08	5.03E-08	1.18E-06	4.15E-08	0	0	6.11951E-10	0	0.0006	Res
582188.28_4129894.11	582188.28	4129894.11	3.17E-05	2.64E-08	1.58E-08	2.64E-08	1.75E-08	4.85E-08	1.14E-06	4.00E-08	0	0	5.90047E-10	0	0.0006	Res
582244.85_4129894.11	582244.85	4129894.11	3.11E-05	2.58E-08	1.55E-08	2.58E-08	1.71E-08	4.73E-08	1.11E-06	3.90E-08	0	0	5.79207E-10	0	0.0006	Res
582301.42_4129894.11	582301.42	4129894.11	3.01E-05	2.49E-08	1.50E-08	2.49E-08	1.65E-08	4.57E-08	1.07E-06	3.77E-08	0	0	5.60692E-10	0	0.0006	Res
582357.99_4129894.11	582357.99	4129894.11	2.88E-05	2.39E-08	1.44E-08	2.39E-08	1.59E-08	4.39E-08	1.03E-06	3.62E-08	0	0	5.3649E-10	0	0.0005	Res
582414.56_4129894.11	582414.56	4129894.11	2.93E-05	2.39E-08	1.43E-08	2.39E-08	1.58E-08	4.38E-08	1.03E-06	3.61E-08	0	0	5.4549E-10	0	0.0005	Res
582471.13_4129894.11	582471.13	4129894.11	2.75E-05	2.26E-08	1.36E-08	2.26E-08	1.50E-08	4.15E-08	9.74E-07	3.42E-08	0	0	5.12003E-10	0	0.0005	Res
582527.7_4129894.11	582527.7	4129894.11	2.54E-05	2.12E-08	1.27E-08	2.12E-08	1.41E-08	3.90E-08	9.15E-07	3.21E-08	0	0	4.72575E-10	0	0.0005	Res
582584.27_4129894.11	582584.27	4129894.11	2.33E-05	1.99E-08	1.19E-08	1.99E-08	1.32E-08	3.65E-08	8.56E-07	3.01E-08	0	0	4.33572E-10	0	0.0004	Res
582640.84_4129894.11	582640.84	4129894.11	2.13E-05	1.86E-08	1.12E-08	1.86E-08	1.24E-08	3.41E-08	8.01E-07	2.81E-08	0	0	3.96482E-10	0	0.0004	Res
582697.41_4129894.11	582697.41	4129894.11	1.94E-05	1.74E-08	1.04E-08	1.74E-08	1.16E-08	3.19E-08	7.49E-07	2.63E-08	0	0	3.61949E-10	0	0.0004	Res
581962_4129978.02	581962	4129978.02	3.93E-05	3.23E-08	1.94E-08	3.23E-08	2.14E-08	5.94E-08	1.39E-06	4.89E-08	0	0	7.33416E-10	0	0.0007	Res
582018.57_4129978.02	582018.57	4129978.02	3.70E-05	3.06E-08	1.84E-08	3.06E-08	2.03E-08	5.63E-08	1.32E-06	4.64E-08	0	0	6.89987E-10	0	0.0007	Res
582075.14_4129978.02	582075.14	4129978.02	3.82E-05	3.08E-08	1.85E-08	3.08E-08	2.03E-08	5.65E-08	1.33E-06	4.66E-08	0	0	7.11377E-10	0	0.0007	Res
582131.71_4129978.02	582131.71	4129978.02	3.82E-05	3.04E-08	1.82E-08	3.04E-08	2.01E-08	5.58E-08	1.31E-06	4.60E-08	0	0	7.11276E-10	0	0.0007	Res
582188.28_4129978.02	582188.28	4129978.02	3.82E-05	3.00E-08	1.80E-08	3.00E-08	1.98E-08	5.51E-08	1.29E-06	4.54E-08	0	0	7.11732E-10	0	0.0007	Res
582244.85_4129978.02	582244.85	4129978.02	3.46E-05	2.77E-08	1.66E-08	2.77E-08	1.83E-08	5.09E-08	1.19E-06	4.20E-08	0	0	6.44483E-10	0	0.0006	Res
582301.42_4129978.02	582301.42	4129978.02	3.42E-05	2.72E-08	1.63E-08	2.72E-08	1.80E-08	4.99E-08	1.17E-06	4.11E-08	0	0	6.37377E-10	0	0.0006	Res
582357.99_4129978.02	582357.99	4129978.02	3.24E-05	2.59E-08	1.55E-08	2.59E-08	1.71E-08	4.75E-08	1.11E-06	3.92E-08	0	0	6.03731E-10	0	0.0006	Res
582414.56_4129978.02	582414.56	4129978.02	3.00E-05	2.43E-08	1.46E-08	2.43E-08	1.61E-08	4.46E-08	1.05E-06	3.68E-08	0	0	5.59289E-10	0	0.0006	Res
582471.13_4129978.02	582471.13	4129978.02	2.75E-05	2.27E-08	1.36E-08	2.27E-08	1.51E-08	4.17E-08	9.78E-07	3.43E-08	0	0	5.13193E-10	0	0.0005	Res
582527.7_4129978.02	582527.7	4129978.02	2.51E-05	2.11E-08	1.27E-08	2.11E-08	1.40E-08	3.88E-08	9.11E-07	3.20E-08	0	0	4.67974E-10	0	0.0005	Res

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)								Risk Calculation Part 2, $\sum R1*C_{TAC}$					
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Cobalt	Lead	Nickel	Chromium VI	3rd Trimester	0<2	2<16	16<30	Cancer Risk - 2029 (per million)	Receptor Type
582584.27_4129978.02	582584.27	4129978.02	2.29E-05	1.97E-08	1.18E-08	1.97E-08	1.31E-08	3.61E-08	8.48E-07	2.98E-08	0	0	4.25991E-10	0	0.0004	Res
582640.84_4129978.02	582640.84	4129978.02	2.08E-05	1.84E-08	1.10E-08	1.84E-08	1.22E-08	3.37E-08	7.91E-07	2.78E-08	0	0	3.88203E-10	0	0.0004	Res
582697.41_4129978.02	582697.41	4129978.02	1.90E-05	1.71E-08	1.03E-08	1.71E-08	1.15E-08	3.15E-08	7.38E-07	2.59E-08	0	0	3.53479E-10	0	0.0004	Res
582753.98_4129978.02	582753.98	4129978.02	1.71E-05	1.59E-08	9.57E-09	1.59E-08	1.07E-08	2.93E-08	6.86E-07	2.41E-08	0	0	3.19446E-10	0	0.0003	Res
582810.55_4129978.02	582810.55	4129978.02	1.52E-05	1.47E-08	8.80E-09	1.47E-08	9.84E-09	2.69E-08	6.31E-07	2.21E-08	0	0	2.82737E-10	0	0.0003	Res
581905.43_4130061.93	581905.43	4130061.93	5.64E-05	4.19E-08	2.52E-08	4.19E-08	2.75E-08	7.70E-08	1.81E-06	6.35E-08	0	0	1.05165E-09	0	0.0011	Res
581962_4130061.93	581962	4130061.93	5.33E-05	3.98E-08	2.39E-08	3.98E-08	2.61E-08	7.30E-08	1.71E-06	6.02E-08	0	0	9.92915E-10	0	0.0010	Res
582018.57_4130061.93	582018.57	4130061.93	4.54E-05	3.51E-08	2.11E-08	3.51E-08	2.31E-08	6.45E-08	1.51E-06	5.32E-08	0	0	8.45968E-10	0	0.0008	Res
582075.14_4130061.93	582075.14	4130061.93	4.06E-05	3.21E-08	1.93E-08	3.21E-08	2.12E-08	5.90E-08	1.38E-06	4.86E-08	0	0	7.56069E-10	0	0.0008	Res
582131.71_4130061.93	582131.71	4130061.93	3.99E-05	3.13E-08	1.88E-08	3.13E-08	2.07E-08	5.75E-08	1.35E-06	4.74E-08	0	0	7.43166E-10	0	0.0007	Res
582188.28_4130061.93	582188.28	4130061.93	3.90E-05	3.05E-08	1.83E-08	3.05E-08	2.01E-08	5.59E-08	1.31E-06	4.61E-08	0	0	7.2699E-10	0	0.0007	Res
582244.85_4130061.93	582244.85	4130061.93	3.83E-05	2.97E-08	1.78E-08	2.97E-08	1.96E-08	5.45E-08	1.28E-06	4.49E-08	0	0	7.13001E-10	0	0.0007	Res
582301.42_4130061.93	582301.42	4130061.93	3.56E-05	2.79E-08	1.67E-08	2.79E-08	1.84E-08	5.12E-08	1.20E-06	4.22E-08	0	0	6.62984E-10	0	0.0007	Res
582357.99_4130061.93	582357.99	4130061.93	3.30E-05	2.62E-08	1.57E-08	2.62E-08	1.73E-08	4.81E-08	1.13E-06	3.97E-08	0	0	6.15661E-10	0	0.0006	Res
582414.56_4130061.93	582414.56	4130061.93	3.03E-05	2.44E-08	1.47E-08	2.44E-08	1.62E-08	4.49E-08	1.05E-06	3.70E-08	0	0	5.65095E-10	0	0.0006	Res
582471.13_4130061.93	582471.13	4130061.93	2.75E-05	2.27E-08	1.36E-08	2.27E-08	1.50E-08	4.16E-08	9.77E-07	3.43E-08	0	0	5.13494E-10	0	0.0005	Res
582527.7_4130061.93	582527.7	4130061.93	2.49E-05	2.10E-08	1.26E-08	2.10E-08	1.39E-08	3.85E-08	9.03E-07	3.17E-08	0	0	4.64092E-10	0	0.0005	Res
582584.27_4130061.93	582584.27	4130061.93	2.25E-05	1.95E-08	1.17E-08	1.95E-08	1.29E-08	3.57E-08	8.38E-07	2.94E-08	0	0	4.19935E-10	0	0.0004	Res
582640.84_4130061.93	582640.84	4130061.93	2.03E-05	1.80E-08	1.08E-08	1.80E-08	1.20E-08	3.31E-08	7.76E-07	2.73E-08	0	0	3.79043E-10	0	0.0004	Res
582697.41_4130061.93	582697.41	4130061.93	1.84E-05	1.68E-08	1.01E-08	1.68E-08	1.12E-08	3.08E-08	7.22E-07	2.53E-08	0	0	3.434E-10	0	0.0003	Res
582753.98_4130061.93	582753.98	4130061.93	1.68E-05	1.57E-08	9.39E-09	1.57E-08	1.05E-08	2.87E-08	6.74E-07	2.37E-08	0	0	3.12203E-10	0	0.0003	Res
582810.55_4130061.93	582810.55	4130061.93	1.52E-05	1.46E-08	8.78E-09	1.46E-08	9.81E-09	2.68E-08	6.30E-07	2.21E-08	0	0	2.83889E-10	0	0.0003	Res
581962_4130145.84	581962	4130145.84	6.22E-05	4.45E-08	2.67E-08	4.45E-08	2.91E-08	8.17E-08	1.92E-06	6.74E-08	0	0	1.15903E-09	0	0.0012	Res
582018.57_4130145.84	582018.57	4130145.84	5.77E-05	4.16E-08	2.50E-08	4.16E-08	2.73E-08	7.64E-08	1.79E-06	6.30E-08	0	0	1.07489E-09	0	0.0011	Res
582075.14_4130145.84	582075.14	4130145.84	4.91E-05	3.66E-08	2.20E-08	3.66E-08	2.41E-08	6.73E-08	1.58E-06	5.55E-08	0	0	9.15856E-10	0	0.0009	Res
582131.71_4130145.84	582131.71	4130145.84	4.56E-05	3.43E-08	2.06E-08	3.43E-08	2.25E-08	6.30E-08	1.48E-06	5.19E-08	0	0	8.49605E-10	0	0.0008	Res
582188.28_4130145.84	582188.28	4130145.84	4.41E-05	3.31E-08	1.98E-08	3.31E-08	2.17E-08	6.07E-08	1.42E-06	5.01E-08	0	0	8.21548E-10	0	0.0008	Res
582244.85_4130145.84	582244.85	4130145.84	4.03E-05	3.06E-08	1.84E-08	3.06E-08	2.02E-08	5.63E-08	1.32E-06	4.64E-08	0	0	7.50435E-10	0	0.0008	Res
582301.42_4130145.84	582301.42	4130145.84	3.66E-05	2.83E-08	1.70E-08	2.83E-08	1.87E-08	5.20E-08	1.22E-06	4.28E-08	0	0	6.81458E-10	0	0.0007	Res
582357.99_4130145.84	582357.99	4130145.84	3.33E-05	2.62E-08	1.57E-08	2.62E-08	1.73E-08	4.82E-08	1.13E-06	3.97E-08	0	0	6.21311E-10	0	0.0006	Res
582414.56_4130145.84	582414.56	4130145.84	3.03E-05	2.43E-08	1.46E-08	2.43E-08	1.61E-08	4.46E-08	1.05E-06	3.68E-08	0	0	5.64603E-10	0	0.0006	Res
582471.13_4130145.84	582471.13	4130145.84	2.73E-05	2.24E-08	1.35E-08	2.24E-08	1.49E-08	4.12E-08	9.66E-07	3.39E-08	0	0	5.08994E-10	0	0.0005	Res
582527.7_4130145.84	582527.7	4130145.84	2.44E-05	2.06E-08	1.24E-08	2.06E-08	1.37E-08	3.78E-08	8.87E-07	3.11E-08	0	0	4.55136E-10	0	0.0005	Res
582584.27_4130145.84	582584.27	4130145.84	2.18E-05	1.89E-08	1.14E-08	1.89E-08	1.26E-08	3.47E-08	8.15E-07	2.86E-08	0	0	4.06356E-10	0	0.0004	Res
582640.84_4130145.84	582640.84	4130145.84	1.95E-05	1.75E-08	1.05E-08	1.75E-08	1.17E-08	3.21E-08	7.52E-07	2.64E-08	0	0	3.64284E-10	0	0.0004	Res
582697.41_4130145.84	582697.41	4130145.84	1.76E-05	1.62E-08	9.73E-09	1.62E-08	1.08E-08	2.97E-08	6.98E-07	2.45E-08	0	0	3.28582E-10	0	0.0003	Res
582753.98_4130145.84	582753.98	4130145.84	1.60E-05	1.51E-08	9.09E-09	1.51E-08	1.01E-08	2.78E-08	6.52E-07	2.29E-08	0	0	2.98863E-10	0	0.0003	Res
582810.55_4130145.84	582810.55	4130145.84	1.47E-05	1.42E-08	8.53E-09	1.42E-08	9.54E-09	2.61E-08	6.12E-07	2.15E-08	0	0	2.73832E-10	0	0.0003	Res
582867.12_4130145.84	582867.12	4130145.84	1.30E-05	1.31E-08	7.85E-09	1.31E-08	8.80E-09	2.40E-08	5.63E-07	1.97E-08	0	0	2.42324E-10	0	0.0002	Res
581962_4130229.75	581962	4130229.75	6.36E-05	4.51E-08	2.71E-08	4.51E-08	2.95E-08	8.29E-08	1.95E-06	6.84E-08	0	0	1.18513E-09	0	0.0012	Res
582018.57_4130229.75	582018.57	4130229.75	6.07E-05	4.31E-08	2.58E-08	4.31E-08	2.82E-08	7.92E-08	1.86E-06	6.53E-08	0	0	1.13123E-09	0	0.0011	Res
582075.14_4130229.75	582075.14	4130229.75	5.65E-05	4.04E-08	2.42E-08	4.04E-08	2.64E-08	7.42E-08	1.74E-06	6.12E-08	0	0	1.05279E-09	0	0.0011	Res
582131.71_4130229.75	582131.71	4130229.75	5.09E-05	3.69E-08	2.22E-08	3.69E-08	2.42E-08	6.79E-08	1.59E-06	5.60E-08	0	0	9.48768E-10	0	0.0009	Res
582188.28_4130229.75	582188.28	4130229.75	4.54E-05	3.36E-08	2.02E-08	3.36E-08	2.21E-08	6.17E-08	1.45E-06	5.09E-08	0	0	8.47107E-10	0	0.0008	Res
582244.85_4130229.75	582244.85	4130229.75	4.07E-05	3.07E-08	1.84E-08	3.07E-08	2.02E-08	5.64E-08	1.32E-06	4.65E-08	0	0	7.58613E-10	0	0.0008	Res
582301.42_4130229.75	582301.42	4130229.75	3.67E-05	2.82E-08	1.69E-08	2.82E-08	1.86E-08	5.18E-08	1.22E-06	4.27E-08	0	0	6.83519E-10	0	0.0007	Res
582357.99_4130229.75	582357.99	4130229.75	3.31E-05	2.60E-08	1.56E-08	2.60E-08	1.72E-08	4.77E-08	1.12E-06	3.93E-08	0	0	6.17499E-10	0	0.0006	Res
582414.56_4130229.75	582414.56	4130229.75	2.96E-05	2.38E-08	1.43E-08	2.38E-08	1.57E-08	4.37E-08	1.02E-06	3.60E-08	0	0	5.52178E-10	0	0.0006	Res
582471.13_4130229.75	582471.13	4130229.75	2.62E-05	2.17E-08	1.30E-08	2.17E-08	1.44E-08	3.98E-08	9.33E-07	3.28E-08	0	0	4.8867E-10	0	0.0005	Res
582527.7_4130229.75	582527.7	4130229.75	2.32E-05	1.98E-08	1.19E-08	1.98E-08	1.32E-08	3.63E-08	8.52E-07	2.99E-08	0	0	4.32621E-10	0	0.0004	Res
582584.27_4130229.75	582584.27	4130229.75	2.07E-05	1.82E-08	1.09E-08	1.82E-08	1.21E-08	3.33E-08	7.82E-07	2.74E-08	0	0	3.84937E-10	0	0.0004	Res
582640.84_4130229.75	582640.84	4130229.75	1.85E-05	1.68E-08	1.01E-08	1.68E-08	1.12E-08	3.08E-08	7.22E-07	2.53E-08	0	0	3.44999E-10	0	0.0003	Res
582697.41_4130229.75	582697.41	4130229.75	1.68E-05	1.56E-08	9.38E-09	1.56E-08	1.05E-08	2.87E-08	6.73E-07	2.36E-08	0	0	3.12973E-10	0	0.0003	Res
582753.98_4130229.75	582753.98	4130229.75	1.53E-05	1.46E-08	8.78E-09	1.46E-08	9.81E-09	2.68E-08	6.29E-07	2.21E-08	0	0	2.85601E-10	0	0.0003	Res
582810.55_4130229.75	582810.55	4130229.75	1.41E-05	1.38E-08	8.27E-09	1.38E-08	9.26E-09	2.53E-08	5.93E-07	2.08E-08	0	0	2.6321E-10	0	0.0003	Res

Risk Calculation Part 2, $\sum R1*C_{TAC}$

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)								3rd Trimester	0<2	2<16	16<30	Cancer Risk - 2029	Receptor Type
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Cobalt	Lead	Nickel	Chromium VI					(per million)	
582867.12_4130229.75	582867.12	4130229.75	1.31E-05	1.30E-08	7.83E-09	1.30E-08	8.78E-09	2.39E-08	5.61E-07	1.97E-08	0	0	2.44364E-10	0	0.0002	Res
582018.57_4130313.66	582018.57	4130313.66	6.54E-05	4.54E-08	2.72E-08	4.54E-08	2.97E-08	8.34E-08	1.96E-06	6.88E-08	0	0	1.21811E-09	0	0.0012	Res
582075.14_4130313.66	582075.14	4130313.66	6.06E-05	4.24E-08	2.54E-08	4.24E-08	2.77E-08	7.78E-08	1.83E-06	6.42E-08	0	0	1.12942E-09	0	0.0011	Res
582131.71_4130313.66	582131.71	4130313.66	5.31E-05	3.79E-08	2.28E-08	3.79E-08	2.49E-08	6.97E-08	1.64E-06	5.75E-08	0	0	9.89956E-10	0	0.0010	Res
582188.28_4130313.66	582188.28	4130313.66	4.65E-05	3.40E-08	2.04E-08	3.40E-08	2.23E-08	6.24E-08	1.47E-06	5.15E-08	0	0	8.66786E-10	0	0.0009	Res
582244.85_4130313.66	582244.85	4130313.66	4.11E-05	3.07E-08	1.84E-08	3.07E-08	2.02E-08	5.64E-08	1.32E-06	4.65E-08	0	0	7.66195E-10	0	0.0008	Res
582301.42_4130313.66	582301.42	4130313.66	3.66E-05	2.80E-08	1.68E-08	2.80E-08	1.84E-08	5.14E-08	1.21E-06	4.23E-08	0	0	6.81511E-10	0	0.0007	Res
582357.99_4130313.66	582357.99	4130313.66	3.22E-05	2.53E-08	1.52E-08	2.53E-08	1.67E-08	4.65E-08	1.09E-06	3.83E-08	0	0	6.00302E-10	0	0.0006	Res
582414.56_4130313.66	582414.56	4130313.66	2.81E-05	2.28E-08	1.37E-08	2.28E-08	1.51E-08	4.19E-08	9.84E-07	3.45E-08	0	0	5.24587E-10	0	0.0005	Res
582471.13_4130313.66	582471.13	4130313.66	2.47E-05	2.07E-08	1.24E-08	2.07E-08	1.37E-08	3.80E-08	8.91E-07	3.13E-08	0	0	4.59536E-10	0	0.0005	Res
582527.7_4130313.66	582527.7	4130313.66	2.18E-05	1.89E-08	1.13E-08	1.89E-08	1.26E-08	3.47E-08	8.13E-07	2.85E-08	0	0	4.06259E-10	0	0.0004	Res
582584.27_4130313.66	582584.27	4130313.66	1.94E-05	1.74E-08	1.04E-08	1.74E-08	1.16E-08	3.19E-08	7.48E-07	2.63E-08	0	0	3.62222E-10	0	0.0004	Res
582640.84_4130313.66	582640.84	4130313.66	1.75E-05	1.61E-08	9.67E-09	1.61E-08	1.08E-08	2.96E-08	6.94E-07	2.44E-08	0	0	3.26854E-10	0	0.0003	Res
582697.41_4130313.66	582697.41	4130313.66	1.60E-05	1.51E-08	9.03E-09	1.51E-08	1.01E-08	2.76E-08	6.48E-07	2.27E-08	0	0	2.97378E-10	0	0.0003	Res
582753.98_4130313.66	582753.98	4130313.66	1.46E-05	1.41E-08	8.48E-09	1.41E-08	9.49E-09	2.59E-08	6.08E-07	2.13E-08	0	0	2.7236E-10	0	0.0003	Res
582810.55_4130313.66	582810.55	4130313.66	1.34E-05	1.33E-08	7.98E-09	1.33E-08	8.95E-09	2.44E-08	5.72E-07	2.01E-08	0	0	2.5022E-10	0	0.0003	Res
582867.12_4130313.66	582867.12	4130313.66	1.24E-05	1.26E-08	7.54E-09	1.26E-08	8.47E-09	2.30E-08	5.40E-07	1.90E-08	0	0	2.30874E-10	0	0.0002	Res
581848.86_4130397.57	581848.86	4130397.57	8.94E-05	5.95E-08	3.57E-08	5.95E-08	3.88E-08	1.09E-07	2.57E-06	9.03E-08	0	0	1.66607E-09	0	0.0017	Res
581905.43_4130397.57	581905.43	4130397.57	8.67E-05	5.76E-08	3.45E-08	5.76E-08	3.75E-08	1.06E-07	2.48E-06	8.73E-08	0	0	1.61559E-09	0	0.0016	Res
581962_4130397.57	581962	4130397.57	8.20E-05	5.45E-08	3.27E-08	5.45E-08	3.55E-08	1.00E-07	2.35E-06	8.27E-08	0	0	1.52798E-09	0	0.0015	Res
582018.57_4130397.57	582018.57	4130397.57	7.35E-05	4.95E-08	2.97E-08	4.95E-08	3.23E-08	9.11E-08	2.14E-06	7.51E-08	0	0	1.37087E-09	0	0.0014	Res
582075.14_4130397.57	582075.14	4130397.57	6.45E-05	4.42E-08	2.65E-08	4.42E-08	2.89E-08	8.13E-08	1.91E-06	6.70E-08	0	0	1.20171E-09	0	0.0012	Res
582131.71_4130397.57	582131.71	4130397.57	5.52E-05	3.88E-08	2.33E-08	3.88E-08	2.54E-08	7.14E-08	1.67E-06	5.89E-08	0	0	1.02883E-09	0	0.0010	Res
582188.28_4130397.57	582188.28	4130397.57	4.80E-05	3.46E-08	2.07E-08	3.46E-08	2.27E-08	6.35E-08	1.49E-06	5.24E-08	0	0	8.93851E-10	0	0.0009	Res
582244.85_4130397.57	582244.85	4130397.57	4.14E-05	3.07E-08	1.84E-08	3.07E-08	2.02E-08	5.64E-08	1.32E-06	4.65E-08	0	0	7.71447E-10	0	0.0008	Res
582301.42_4130397.57	582301.42	4130397.57	3.57E-05	2.73E-08	1.64E-08	2.73E-08	1.80E-08	5.02E-08	1.18E-06	4.14E-08	0	0	6.651E-10	0	0.0007	Res
582357.99_4130397.57	582357.99	4130397.57	3.06E-05	2.43E-08	1.46E-08	2.43E-08	1.61E-08	4.46E-08	1.05E-06	3.67E-08	0	0	5.69881E-10	0	0.0006	Res
582414.56_4130397.57	582414.56	4130397.57	2.65E-05	2.18E-08	1.31E-08	2.18E-08	1.45E-08	4.00E-08	9.39E-07	3.30E-08	0	0	4.93696E-10	0	0.0005	Res
582471.13_4130397.57	582471.13	4130397.57	2.32E-05	1.98E-08	1.19E-08	1.98E-08	1.32E-08	3.63E-08	8.52E-07	2.99E-08	0	0	4.33133E-10	0	0.0004	Res
582527.7_4130397.57	582527.7	4130397.57	2.06E-05	1.81E-08	1.09E-08	1.81E-08	1.21E-08	3.33E-08	7.80E-07	2.74E-08	0	0	3.83967E-10	0	0.0004	Res
582584.27_4130397.57	582584.27	4130397.57	1.84E-05	1.67E-08	1.00E-08	1.67E-08	1.12E-08	3.07E-08	7.20E-07	2.53E-08	0	0	3.43648E-10	0	0.0003	Res
582640.84_4130397.57	582640.84	4130397.57	1.66E-05	1.55E-08	9.33E-09	1.55E-08	1.04E-08	2.85E-08	6.69E-07	2.35E-08	0	0	3.10128E-10	0	0.0003	Res
582697.41_4130397.57	582697.41	4130397.57	1.50E-05	1.45E-08	8.69E-09	1.45E-08	9.72E-09	2.66E-08	6.23E-07	2.19E-08	0	0	2.80397E-10	0	0.0003	Res
582753.98_4130397.57	582753.98	4130397.57	1.37E-05	1.36E-08	8.14E-09	1.36E-08	9.13E-09	2.49E-08	5.84E-07	2.05E-08	0	0	2.5554E-10	0	0.0003	Res
582810.55_4130397.57	582810.55	4130397.57	1.26E-05	1.28E-08	7.66E-09	1.28E-08	8.61E-09	2.34E-08	5.49E-07	1.93E-08	0	0	2.34181E-10	0	0.0002	Res
582867.12_4130397.57	582867.12	4130397.57	1.16E-05	1.21E-08	7.23E-09	1.21E-08	8.14E-09	2.21E-08	5.19E-07	1.82E-08	0	0	2.15557E-10	0	0.0002	Res
581848.86_4130481.48	581848.86	4130481.48	1.16E-04	7.33E-08	4.40E-08	7.33E-08	4.75E-08	1.35E-07	3.16E-06	1.11E-07	0	0	2.15379E-09	0	0.0022	Res
581905.43_4130481.48	581905.43	4130481.48	1.07E-04	6.82E-08	4.09E-08	6.82E-08	4.43E-08	1.25E-07	2.94E-06	1.04E-07	0	0	1.9959E-09	0	0.0020	Res
581962_4130481.48	581962	4130481.48	9.12E-05	5.93E-08	3.56E-08	5.93E-08	3.85E-08	1.09E-07	2.56E-06	8.99E-08	0	0	1.70056E-09	0	0.0017	Res
582018.57_4130481.48	582018.57	4130481.48	8.03E-05	5.29E-08	3.18E-08	5.29E-08	3.45E-08	9.73E-08	2.28E-06	8.03E-08	0	0	1.49716E-09	0	0.0015	Res
582075.14_4130481.48	582075.14	4130481.48	6.79E-05	4.58E-08	2.75E-08	4.58E-08	2.99E-08	8.42E-08	1.98E-06	6.94E-08	0	0	1.26495E-09	0	0.0013	Res
582131.71_4130481.48	582131.71	4130481.48	5.76E-05	3.99E-08	2.39E-08	3.99E-08	2.61E-08	7.33E-08	1.72E-06	6.04E-08	0	0	1.07291E-09	0	0.0011	Res
582188.28_4130481.48	582188.28	4130481.48	4.86E-05	3.47E-08	2.08E-08	3.47E-08	2.28E-08	6.38E-08	1.50E-06	5.26E-08	0	0	9.06091E-10	0	0.0009	Res
582244.85_4130481.48	582244.85	4130481.48	4.05E-05	3.00E-08	1.80E-08	3.00E-08	1.97E-08	5.51E-08	1.29E-06	4.54E-08	0	0	7.54476E-10	0	0.0008	Res
582301.42_4130481.48	582301.42	4130481.48	3.39E-05	2.62E-08	1.57E-08	2.62E-08	1.73E-08	4.81E-08	1.13E-06	3.96E-08	0	0	6.32212E-10	0	0.0006	Res
582357.99_4130481.48	582357.99	4130481.48	2.89E-05	2.32E-08	1.39E-08	2.32E-08	1.53E-08	4.26E-08	9.99E-07	3.51E-08	0	0	5.3824E-10	0	0.0005	Res
582414.56_4130481.48	582414.56	4130481.48	2.51E-05	2.09E-08	1.25E-08	2.09E-08	1.39E-08	3.83E-08	8.99E-07	3.16E-08	0	0	4.67073E-10	0	0.0005	Res
582471.13_4130481.48	582471.13	4130481.48	2.20E-05	1.90E-08	1.14E-08	1.90E-08	1.26E-08	3.48E-08	8.17E-07	2.87E-08	0	0	4.09806E-10	0	0.0004	Res
582527.7_4130481.48	582527.7	4130481.48	1.94E-05	1.74E-08	1.04E-08	1.74E-08	1.16E-08	3.18E-08	7.47E-07	2.62E-08	0	0	3.62052E-10	0	0.0004	Res
582584.27_4130481.48	582584.27	4130481.48	1.73E-05	1.60E-08	9.60E-09	1.60E-08	1.07E-08	2.94E-08	6.89E-07	2.42E-08	0	0	3.22933E-10	0	0.0003	Res
582640.84_4130481.48	582640.84	4130481.48	1.55E-05	1.48E-08	8.90E-09	1.48E-08	9.95E-09	2.72E-08	6.38E-07	2.24E-08	0	0	2.89353E-10	0	0.0003	Res
582697.41_4130481.48	582697.41	4130481.48	1.40E-05	1.38E-08	8.29E-09	1.38E-08	9.29E-09	2.53E-08	5.95E-07	2.09E-08	0	0	2.61291E-10	0	0.0003	Res
582753.98_4130481.48	582753.98	4130481.48	1.28E-05	1.30E-08	7.78E-09	1.30E-08	8.74E-09	2.38E-08	5.58E-07	1.96E-08	0	0	2.38264E-10	0	0.0002	Res
582810.55_4130481.48	582810.55	4130481.48	1.17E-05	1.22E-08	7.34E-09	1.22E-08	8.26E-09	2.24E-08	5.26E-07	1.85E-08	0	0	2.18813E-10	0	0.0002	Res
582867.12_4130481.48	582867.12	4130481.48	1.08E-05	1.16E-08	6.95E-09	1.16E-08	7.84E-09	2.12E-08	4.98E-07	1.75E-08	0	0	2.02066E-10	0	0.0002	Res
581735.72_4130565.39	581735.72	4130565.39	1.41E-04	8.74E-08	5.24E-08	8.74E-08	5.66E-08	1.61E-07	3.77E-06	1.33E-07	0	0	2.62228E-09	0	0.0026	Res
581792.29_4130565.39	581792.29	4130565.39	1.39E-04	8.58E-08	5.15E-08	8.58E-08	5.55E-08	1.58E-07	3.70E-06	1.30E-07	0	0	2.58201E-09	0	0.0026	Res

Risk Calculation Part 2, $\sum R1*C_{TAC}$

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)								3rd Trimester	0<2	2<16	16<30	Cancer Risk - 2029	Receptor Type
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Cobalt	Lead	Nickel	Chromium VI					(per million)	
581848.86_4130565.39	581848.86	4130565.39	1.32E-04	8.16E-08	4.90E-08	8.16E-08	5.29E-08	1.50E-07	3.52E-06	1.24E-07	0	0	2.45569E-09	0	0.0025	Res
581905.43_4130565.39	581905.43	4130565.39	1.26E-04	7.80E-08	4.68E-08	7.80E-08	5.05E-08	1.43E-07	3.37E-06	1.18E-07	0	0	2.34519E-09	0	0.0023	Res
581962_4130565.39	581962	4130565.39	1.09E-04	6.82E-08	4.09E-08	6.82E-08	4.42E-08	1.25E-07	2.94E-06	1.03E-07	0	0	2.02296E-09	0	0.0020	Res
582018.57_4130565.39	582018.57	4130565.39	8.78E-05	5.66E-08	3.40E-08	5.66E-08	3.68E-08	1.04E-07	2.44E-06	8.58E-08	0	0	1.6358E-09	0	0.0016	Res
582075.14_4130565.39	582075.14	4130565.39	7.12E-05	4.73E-08	2.84E-08	4.73E-08	3.08E-08	8.69E-08	2.04E-06	7.17E-08	0	0	1.32754E-09	0	0.0013	Res
582131.71_4130565.39	582131.71	4130565.39	5.84E-05	4.00E-08	2.40E-08	4.00E-08	2.62E-08	7.35E-08	1.73E-06	6.06E-08	0	0	1.08809E-09	0	0.0011	Res
582188.28_4130565.39	582188.28	4130565.39	4.69E-05	3.35E-08	2.01E-08	3.35E-08	2.20E-08	6.15E-08	1.44E-06	5.07E-08	0	0	8.73904E-10	0	0.0009	Res
582244.85_4130565.39	582244.85	4130565.39	3.81E-05	2.84E-08	1.71E-08	2.84E-08	1.87E-08	5.22E-08	1.23E-06	4.31E-08	0	0	7.09764E-10	0	0.0007	Res
582301.42_4130565.39	582301.42	4130565.39	3.21E-05	2.49E-08	1.49E-08	2.49E-08	1.64E-08	4.57E-08	1.07E-06	3.77E-08	0	0	5.97444E-10	0	0.0006	Res
582357.99_4130565.39	582357.99	4130565.39	2.71E-05	2.20E-08	1.32E-08	2.20E-08	1.46E-08	4.04E-08	9.48E-07	3.33E-08	0	0	5.05953E-10	0	0.0005	Res
582414.56_4130565.39	582414.56	4130565.39	2.33E-05	1.97E-08	1.18E-08	1.97E-08	1.31E-08	3.62E-08	8.49E-07	2.98E-08	0	0	4.35139E-10	0	0.0004	Res
582471.13_4130565.39	582471.13	4130565.39	2.04E-05	1.79E-08	1.07E-08	1.79E-08	1.19E-08	3.28E-08	7.69E-07	2.70E-08	0	0	3.79338E-10	0	0.0004	Res
582527.7_4130565.39	582527.7	4130565.39	1.79E-05	1.64E-08	9.81E-09	1.64E-08	1.09E-08	3.00E-08	7.04E-07	2.47E-08	0	0	3.34422E-10	0	0.0003	Res
582584.27_4130565.39	582584.27	4130565.39	1.60E-05	1.51E-08	9.07E-09	1.51E-08	1.01E-08	2.77E-08	6.50E-07	2.28E-08	0	0	2.98568E-10	0	0.0003	Res
582640.84_4130565.39	582640.84	4130565.39	1.43E-05	1.40E-08	8.41E-09	1.40E-08	9.42E-09	2.57E-08	6.03E-07	2.12E-08	0	0	2.67409E-10	0	0.0003	Res
582697.41_4130565.39	582697.41	4130565.39	1.30E-05	1.31E-08	7.87E-09	1.31E-08	8.83E-09	2.41E-08	5.64E-07	1.98E-08	0	0	2.42744E-10	0	0.0002	Res
582753.98_4130565.39	582753.98	4130565.39	1.19E-05	1.24E-08	7.42E-09	1.24E-08	8.34E-09	2.27E-08	5.32E-07	1.86E-08	0	0	2.22315E-10	0	0.0002	Res
582810.55_4130565.39	582810.55	4130565.39	1.10E-05	1.17E-08	7.03E-09	1.17E-08	7.91E-09	2.15E-08	5.04E-07	1.77E-08	0	0	2.05498E-10	0	0.0002	Res
582867.12_4130565.39	582867.12	4130565.39	1.03E-05	1.11E-08	6.69E-09	1.11E-08	7.54E-09	2.04E-08	4.79E-07	1.68E-08	0	0	1.91344E-10	0	0.0002	Res
581735.72_4130649.3	581735.72	4130649.3	1.52E-04	9.32E-08	5.59E-08	9.32E-08	6.03E-08	1.71E-07	4.02E-06	1.41E-07	0	0	2.84123E-09	0	0.0028	Res
581792.29_4130649.3	581792.29	4130649.3	1.48E-04	9.01E-08	5.41E-08	9.01E-08	5.83E-08	1.66E-07	3.89E-06	1.37E-07	0	0	2.74971E-09	0	0.0027	Res
581905.43_4130649.3	581905.43	4130649.3	1.48E-04	8.92E-08	5.35E-08	8.92E-08	5.77E-08	1.64E-07	3.85E-06	1.35E-07	0	0	2.75039E-09	0	0.0028	Res
581962_4130649.3	581962	4130649.3	1.22E-04	7.53E-08	4.52E-08	7.53E-08	4.87E-08	1.38E-07	3.25E-06	1.14E-07	0	0	2.28272E-09	0	0.0023	Res
582018.57_4130649.3	582018.57	4130649.3	9.30E-05	5.89E-08	3.54E-08	5.89E-08	3.83E-08	1.08E-07	2.54E-06	8.94E-08	0	0	1.73289E-09	0	0.0017	Res
582075.14_4130649.3	582075.14	4130649.3	7.22E-05	4.73E-08	2.84E-08	4.73E-08	3.08E-08	8.70E-08	2.04E-06	7.18E-08	0	0	1.34488E-09	0	0.0013	Res
582131.71_4130649.3	582131.71	4130649.3	5.60E-05	3.83E-08	2.30E-08	3.83E-08	2.50E-08	7.04E-08	1.65E-06	5.81E-08	0	0	1.04421E-09	0	0.0010	Res
582188.28_4130649.3	582188.28	4130649.3	4.40E-05	3.15E-08	1.89E-08	3.15E-08	2.07E-08	5.79E-08	1.36E-06	4.78E-08	0	0	8.20931E-10	0	0.0008	Res
582244.85_4130649.3	582244.85	4130649.3	3.54E-05	2.66E-08	1.60E-08	2.66E-08	1.75E-08	4.88E-08	1.15E-06	4.03E-08	0	0	6.59652E-10	0	0.0007	Res
582301.42_4130649.3	582301.42	4130649.3	2.92E-05	2.30E-08	1.38E-08	2.30E-08	1.52E-08	4.22E-08	9.91E-07	3.48E-08	0	0	5.44363E-10	0	0.0005	Res
582357.99_4130649.3	582357.99	4130649.3	2.47E-05	2.03E-08	1.22E-08	2.03E-08	1.35E-08	3.73E-08	8.75E-07	3.07E-08	0	0	4.60248E-10	0	0.0005	Res
582414.56_4130649.3	582414.56	4130649.3	2.13E-05	1.83E-08	1.10E-08	1.83E-08	1.22E-08	3.35E-08	7.87E-07	2.76E-08	0	0	3.97241E-10	0	0.0004	Res
582471.13_4130649.3	582471.13	4130649.3	1.86E-05	1.66E-08	9.95E-09	1.66E-08	1.11E-08	3.04E-08	7.14E-07	2.51E-08	0	0	3.4638E-10	0	0.0003	Res
582527.7_4130649.3	582527.7	4130649.3	1.64E-05	1.52E-08	9.14E-09	1.52E-08	1.02E-08	2.80E-08	6.56E-07	2.30E-08	0	0	3.06494E-10	0	0.0003	Res
582584.27_4130649.3	582584.27	4130649.3	1.48E-05	1.41E-08	8.49E-09	1.41E-08	9.49E-09	2.59E-08	6.09E-07	2.14E-08	0	0	2.75074E-10	0	0.0003	Res
582640.84_4130649.3	582640.84	4130649.3	1.34E-05	1.32E-08	7.95E-09	1.32E-08	8.90E-09	2.43E-08	5.70E-07	2.00E-08	0	0	2.50004E-10	0	0.0003	Res
582697.41_4130649.3	582697.41	4130649.3	1.23E-05	1.25E-08	7.49E-09	1.25E-08	8.40E-09	2.29E-08	5.37E-07	1.88E-08	0	0	2.29457E-10	0	0.0002	Res
582753.98_4130649.3	582753.98	4130649.3	1.14E-05	1.18E-08	7.11E-09	1.18E-08	7.99E-09	2.17E-08	5.09E-07	1.79E-08	0	0	2.1295E-10	0	0.0002	Res
582810.55_4130649.3	582810.55	4130649.3	1.07E-05	1.13E-08	6.78E-09	1.13E-08	7.63E-09	2.07E-08	4.86E-07	1.70E-08	0	0	1.99356E-10	0	0.0002	Res
582867.12_4130649.3	582867.12	4130649.3	1.01E-05	1.08E-08	6.49E-09	1.08E-08	7.31E-09	1.98E-08	4.65E-07	1.63E-08	0	0	1.87378E-10	0	0.0002	Res
581848.86_4130733.21	581848.86	4130733.21	2.19E-04	1.28E-07	7.68E-08	1.28E-07	8.24E-08	2.35E-07	5.52E-06	1.94E-07	0	0	4.08852E-09	0	0.0041	Res
581905.43_4130733.21	581905.43	4130733.21	1.87E-04	1.10E-07	6.61E-08	1.10E-07	7.10E-08	2.03E-07	4.75E-06	1.67E-07	0	0	3.48973E-09	0	0.0035	Res
581962_4130733.21	581962	4130733.21	1.38E-04	8.29E-08	4.97E-08	8.29E-08	5.36E-08	1.52E-07	3.58E-06	1.26E-07	0	0	2.56538E-09	0	0.0026	Res
582018.57_4130733.21	582018.57	4130733.21	9.65E-05	6.03E-08	3.62E-08	6.03E-08	3.91E-08	1.11E-07	2.60E-06	9.15E-08	0	0	1.7994E-09	0	0.0018	Res
582075.14_4130733.21	582075.14	4130733.21	6.82E-05	4.47E-08	2.68E-08	4.47E-08	2.91E-08	8.21E-08	1.93E-06	6.77E-08	0	0	1.27152E-09	0	0.0013	Res
582131.71_4130733.21	582131.71	4130733.21	4.99E-05	3.44E-08	2.07E-08	3.44E-08	2.25E-08	6.33E-08	1.48E-06	5.22E-08	0	0	9.29363E-10	0	0.0009	Res
582188.28_4130733.21	582188.28	4130733.21	3.86E-05	2.81E-08	1.68E-08	2.81E-08	1.84E-08	5.16E-08	1.21E-06	4.25E-08	0	0	7.19553E-10	0	0.0007	Res
582244.85_4130733.21	582244.85	4130733.21	3.10E-05	2.37E-08	1.42E-08	2.37E-08	1.56E-08	4.36E-08	1.02E-06	3.59E-08	0	0	5.77738E-10	0	0.0006	Res
582301.42_4130733.21	582301.42	4130733.21	2.57E-05	2.06E-08	1.24E-08	2.06E-08	1.37E-08	3.79E-08	8.89E-07	3.12E-08	0	0	4.79578E-10	0	0.0005	Res
582357.99_4130733.21	582357.99	4130733.21	2.19E-05	1.84E-08	1.10E-08	1.84E-08	1.22E-08	3.37E-08	7.92E-07	2.78E-08	0	0	4.08905E-10	0	0.0004	Res
582414.56_4130733.21	582414.56	4130733.21	1.91E-05	1.67E-08	1.00E-08	1.67E-08	1.11E-08	3.06E-08	7.17E-07	2.52E-08	0	0	3.56389E-10	0	0.0004	Res
582471.13_4130733.21	582471.13	4130733.21	1.70E-05	1.53E-08	9.20E-09	1.53E-08	1.02E-08	2.81E-08	6.60E-07	2.32E-08	0	0	3.1701E-10	0	0.0003	Res
582527.7_4130733.21	582527.7	4130733.21	1.54E-05	1.43E-08	8.56E-09	1.43E-08	9.55E-09	2.62E-08	6.14E-07	2.15E-08	0	0	2.86501E-10	0	0.0003	Res
582584.27_4130733.21	582584.27	4130733.21	1.41E-05	1.34E-08	8.04E-09	1.34E-08	8.99E-09	2.46E-08	5.77E-07	2.02E-08	0	0	2.62404E-10	0	0.0003	Res
582640.84_4130733.21	582640.84	4130733.21	1.30E-05	1.27E-08	7.60E-09	1.27E-08	8.51E-09	2.32E-08	5.45E-07	1.91E-08	0	0	2.42662E-10	0	0.0002	Res
582697.41_4130733.21	582697.41	4130733.21	1.21E-05	1.20E-08	7.22E-09	1.20E-08	8.10E-09	2.21E-08	5.18E-07	1.82E-08	0	0	2.26144E-10	0	0.0002	Res
582753.98_4130733.21	582753.98	4130733.21	1.14E-05	1.15E-08	6.89E-09	1.15E-08	7.74E-09	2.11E-08	4.94E-07	1.73E-08	0	0	2.11783E-10	0	0.0002	Res
582810.55_4130733.21	582810.55	4130733.21	1.07E-05	1.10E-08	6.60E-09	1.10E-08	7.42E-09	2.02E-08	4.73E-07	1.66E-08	0	0	1.99883E-10	0	0.0002	Res

Risk Calculation Part 2, $\sum R1*C_{TAC}$

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)								3rd Trimester	0<2	2<16	16<30	Cancer Risk - 2029	Receptor Type
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Cobalt	Lead	Nickel	Chromium VI					(per million)	
582867.12_4130733.21	582867.12	4130733.21	1.01E-05	1.05E-08	6.33E-09	1.05E-08	7.13E-09	1.93E-08	4.54E-07	1.59E-08	0	0	1.88705E-10	0	0.0002	Res
581735.72_4130817.12	581735.72	4130817.12	3.22E-04	1.84E-07	1.10E-07	1.84E-07	1.18E-07	3.38E-07	7.94E-06	2.79E-07	0	0	6.00596E-09	0	0.0060	Res
581792.29_4130817.12	581792.29	4130817.12	3.64E-04	2.06E-07	1.24E-07	2.06E-07	1.32E-07	3.79E-07	8.89E-06	3.13E-07	0	0	6.77762E-09	0	0.0068	Res
581848.86_4130817.12	581848.86	4130817.12	3.26E-04	1.85E-07	1.11E-07	1.85E-07	1.19E-07	3.41E-07	8.00E-06	2.81E-07	0	0	6.08053E-09	0	0.0061	Res
581905.43_4130817.12	581905.43	4130817.12	2.47E-04	1.42E-07	8.51E-08	1.42E-07	9.13E-08	2.61E-07	6.12E-06	2.15E-07	0	0	4.59886E-09	0	0.0046	Res
581962_4130817.12	581962	4130817.12	1.50E-04	8.89E-08	5.33E-08	8.89E-08	5.74E-08	1.63E-07	3.84E-06	1.35E-07	0	0	2.79077E-09	0	0.0028	Res
582018.57_4130817.12	582018.57	4130817.12	8.98E-05	5.61E-08	3.36E-08	5.61E-08	3.64E-08	1.03E-07	2.42E-06	8.50E-08	0	0	1.6731E-09	0	0.0017	Res
582075.14_4130817.12	582075.14	4130817.12	5.82E-05	3.87E-08	2.32E-08	3.87E-08	2.52E-08	7.11E-08	1.67E-06	5.86E-08	0	0	1.08452E-09	0	0.0011	Res
582131.71_4130817.12	582131.71	4130817.12	4.20E-05	2.96E-08	1.78E-08	2.96E-08	1.94E-08	5.44E-08	1.28E-06	4.49E-08	0	0	7.8225E-10	0	0.0008	Res
582188.28_4130817.12	582188.28	4130817.12	3.26E-05	2.43E-08	1.46E-08	2.43E-08	1.60E-08	4.47E-08	1.05E-06	3.68E-08	0	0	6.08E-10	0	0.0006	Res
582244.85_4130817.12	582244.85	4130817.12	2.67E-05	2.09E-08	1.25E-08	2.09E-08	1.38E-08	3.84E-08	9.01E-07	3.17E-08	0	0	4.98283E-10	0	0.0005	Res
582301.42_4130817.12	582301.42	4130817.12	2.28E-05	1.86E-08	1.12E-08	1.86E-08	1.23E-08	3.41E-08	8.01E-07	2.81E-08	0	0	4.25436E-10	0	0.0004	Res
582357.99_4130817.12	582357.99	4130817.12	2.01E-05	1.69E-08	1.01E-08	1.69E-08	1.12E-08	3.10E-08	7.28E-07	2.56E-08	0	0	3.73767E-10	0	0.0004	Res
582414.56_4130817.12	582414.56	4130817.12	1.79E-05	1.56E-08	9.34E-09	1.56E-08	1.04E-08	2.86E-08	6.71E-07	2.35E-08	0	0	3.34531E-10	0	0.0003	Res
582471.13_4130817.12	582471.13	4130817.12	1.63E-05	1.45E-08	8.72E-09	1.45E-08	9.70E-09	2.67E-08	6.25E-07	2.20E-08	0	0	3.04399E-10	0	0.0003	Res
582527.7_4130817.12	582527.7	4130817.12	1.50E-05	1.36E-08	8.18E-09	1.36E-08	9.12E-09	2.50E-08	5.87E-07	2.06E-08	0	0	2.78986E-10	0	0.0003	Res
582584.27_4130817.12	582584.27	4130817.12	1.39E-05	1.29E-08	7.72E-09	1.29E-08	8.63E-09	2.36E-08	5.54E-07	1.94E-08	0	0	2.58161E-10	0	0.0003	Res
582640.84_4130817.12	582640.84	4130817.12	1.29E-05	1.22E-08	7.33E-09	1.22E-08	8.19E-09	2.24E-08	5.25E-07	1.84E-08	0	0	2.40303E-10	0	0.0002	Res
582697.41_4130817.12	582697.41	4130817.12	1.21E-05	1.16E-08	6.97E-09	1.16E-08	7.81E-09	2.13E-08	5.00E-07	1.75E-08	0	0	2.2465E-10	0	0.0002	Res
582753.98_4130817.12	582753.98	4130817.12	1.13E-05	1.11E-08	6.64E-09	1.11E-08	7.45E-09	2.03E-08	4.76E-07	1.67E-08	0	0	2.10296E-10	0	0.0002	Res
582810.55_4130817.12	582810.55	4130817.12	1.06E-05	1.06E-08	6.35E-09	1.06E-08	7.14E-09	1.94E-08	4.55E-07	1.60E-08	0	0	1.97826E-10	0	0.0002	Res
582867.12_4130817.12	582867.12	4130817.12	1.00E-05	1.01E-08	6.09E-09	1.01E-08	6.85E-09	1.86E-08	4.36E-07	1.53E-08	0	0	1.8672E-10	0	0.0002	Res
581735.72_4130901.03	581735.72	4130901.03	6.40E-04	3.56E-07	2.13E-07	3.56E-07	2.28E-07	6.55E-07	1.54E-05	5.41E-07	0	0	1.1934E-08	0	0.0119	Res
581792.29_4130901.03	581792.29	4130901.03	6.84E-04	3.79E-07	2.27E-07	3.79E-07	2.43E-07	6.97E-07	1.64E-05	5.76E-07	0	0	1.27439E-08	0	0.0127	Res
581848.86_4130901.03	581848.86	4130901.03	6.09E-04	3.38E-07	2.03E-07	3.38E-07	2.17E-07	6.23E-07	1.46E-05	5.14E-07	0	0	1.13585E-08	0	0.0114	Res
581905.43_4130901.03	581905.43	4130901.03	3.20E-04	1.81E-07	1.09E-07	1.81E-07	1.16E-07	3.33E-07	7.82E-06	2.75E-07	0	0	5.96592E-09	0	0.0060	Res
581962_4130901.03	581962	4130901.03	1.30E-04	7.77E-08	4.66E-08	7.77E-08	5.02E-08	1.43E-07	3.35E-06	1.18E-07	0	0	2.42352E-09	0	0.0024	Res
582018.57_4130901.03	582018.57	4130901.03	6.99E-05	4.48E-08	2.69E-08	4.48E-08	2.91E-08	8.23E-08	1.93E-06	6.79E-08	0	0	1.30205E-09	0	0.0013	Res
582075.14_4130901.03	582075.14	4130901.03	4.69E-05	3.21E-08	1.93E-08	3.21E-08	2.10E-08	5.90E-08	1.39E-06	4.87E-08	0	0	8.74943E-10	0	0.0009	Res
582131.71_4130901.03	582131.71	4130901.03	3.60E-05	2.59E-08	1.56E-08	2.59E-08	1.70E-08	4.77E-08	1.12E-06	3.93E-08	0	0	6.70759E-10	0	0.0007	Res
582188.28_4130901.03	582188.28	4130901.03	2.95E-05	2.22E-08	1.33E-08	2.22E-08	1.46E-08	4.08E-08	9.58E-07	3.37E-08	0	0	5.50296E-10	0	0.0006	Res
582244.85_4130901.03	582244.85	4130901.03	2.51E-05	1.96E-08	1.18E-08	1.96E-08	1.30E-08	3.61E-08	8.46E-07	2.97E-08	0	0	4.68382E-10	0	0.0005	Res
582301.42_4130901.03	582301.42	4130901.03	2.19E-05	1.77E-08	1.06E-08	1.77E-08	1.17E-08	3.25E-08	7.62E-07	2.67E-08	0	0	4.0767E-10	0	0.0004	Res
582357.99_4130901.03	582357.99	4130901.03	1.94E-05	1.61E-08	9.69E-09	1.61E-08	1.07E-08	2.96E-08	6.95E-07	2.44E-08	0	0	3.61281E-10	0	0.0004	Res
582414.56_4130901.03	582414.56	4130901.03	1.74E-05	1.49E-08	8.93E-09	1.49E-08	9.91E-09	2.73E-08	6.41E-07	2.25E-08	0	0	3.23893E-10	0	0.0003	Res
582471.13_4130901.03	582471.13	4130901.03	1.58E-05	1.39E-08	8.31E-09	1.39E-08	9.24E-09	2.54E-08	5.96E-07	2.09E-08	0	0	2.93821E-10	0	0.0003	Res
582527.7_4130901.03	582527.7	4130901.03	1.44E-05	1.30E-08	7.78E-09	1.30E-08	8.67E-09	2.38E-08	5.58E-07	1.96E-08	0	0	2.6857E-10	0	0.0003	Res
582584.27_4130901.03	582584.27	4130901.03	1.33E-05	1.22E-08	7.33E-09	1.22E-08	8.18E-09	2.24E-08	5.26E-07	1.85E-08	0	0	2.47906E-10	0	0.0002	Res
582640.84_4130901.03	582640.84	4130901.03	1.24E-05	1.16E-08	6.94E-09	1.16E-08	7.76E-09	2.12E-08	4.98E-07	1.75E-08	0	0	2.30419E-10	0	0.0002	Res
582697.41_4130901.03	582697.41	4130901.03	1.15E-05	1.10E-08	6.60E-09	1.10E-08	7.39E-09	2.02E-08	4.73E-07	1.66E-08	0	0	2.15255E-10	0	0.0002	Res
582753.98_4130901.03	582753.98	4130901.03	1.08E-05	1.05E-08	6.30E-09	1.05E-08	7.06E-09	1.92E-08	4.51E-07	1.58E-08	0	0	2.01873E-10	0	0.0002	Res
582810.55_4130901.03	582810.55	4130901.03	1.02E-05	1.00E-08	6.01E-09	1.00E-08	6.75E-09	1.84E-08	4.31E-07	1.51E-08	0	0	1.89719E-10	0	0.0002	Res
582867.12_4130901.03	582867.12	4130901.03	9.61E-06	9.60E-09	5.76E-09	9.60E-09	6.48E-09	1.76E-08	4.13E-07	1.45E-08	0	0	1.79198E-10	0	0.0002	Res
581735.72_4130984.94	581735.72	4130984.94	1.71E-03	9.34E-07	5.60E-07	9.34E-07	5.98E-07	1.72E-06	4.03E-05	1.42E-06	0	0	3.18025E-08	0	0.0318	Res
581792.29_4130984.94	581792.29	4130984.94	2.24E-03	1.22E-06	7.34E-07	1.22E-06	7.83E-07	2.25E-06	5.28E-05	1.86E-06	0	0	4.17503E-08	0	0.0418	Res
581848.86_4130984.94	581848.86	4130984.94	2.61E-03	1.42E-06	8.53E-07	1.42E-06	9.10E-07	2.62E-06	6.14E-05	2.16E-06	0	0	4.85706E-08	0	0.0486	Res
581905.43_4130984.94	581905.43	4130984.94	2.08E-04	1.20E-07	7.19E-08	1.20E-07	7.71E-08	2.20E-07	5.17E-06	1.82E-07	0	0	3.86997E-09	0	0.0039	Res
581962_4130984.94	581962	4130984.94	8.92E-05	5.53E-08	3.32E-08	5.53E-08	3.58E-08	1.02E-07	2.39E-06	8.39E-08	0	0	1.66329E-09	0	0.0017	Res
582018.57_4130984.94	582018.57	4130984.94	5.75E-05	3.78E-08	2.27E-08	3.78E-08	2.46E-08	6.95E-08	1.63E-06	5.73E-08	0	0	1.07215E-09	0	0.0011	Res
582075.14_4130984.94	582075.14	4130984.94	4.24E-05	2.94E-08	1.76E-08	2.94E-08	1.92E-08	5.40E-08	1.27E-06	4.46E-08	0	0	7.90944E-10	0	0.0008	Res
582131.71_4130984.94	582131.71	4130984.94	3.36E-05	2.44E-08	1.46E-08	2.44E-08	1.60E-08	4.48E-08	1.05E-06	3.69E-08	0	0	6.25744E-10	0	0.0006	Res
582188.28_4130984.94	582188.28	4130984.94	2.77E-05	2.10E-08	1.26E-08	2.10E-08	1.38E-08	3.85E-08	9.03E-07	3.17E-08	0	0	5.15837E-10	0	0.0005	Res
582244.85_4130984.94	582244.85	4130984.94	2.35E-05	1.85E-08	1.11E-08	1.85E-08	1.22E-08	3.40E-08	7.97E-07	2.80E-08	0	0	4.37772E-10	0	0.0004	Res
582301.42_4130984.94	582301.42	4130984.94	2.04E-05	1.66E-08	9.97E-09	1.66E-08	1.10E-08	3.05E-08	7.16E-07	2.51E-08	0	0	3.79914E-10	0	0.0004	Res
582357.99_4130984.94	582357.99	4130984.94	1.80E-05	1.52E-08	9.09E-09	1.52E-08	1.01E-08	2.78E-08	6.53E-07	2.29E-08	0	0	3.35651E-10	0	0.0003	Res
582414.56_4130984.94	582414.56	4130984.94	1.61E-05	1.40E-08	8.38E-09	1.40E-08	9.30E-09	2.56E-08	6.01E-07	2.11E-08	0	0	3.00563E-10	0	0.0003	Res
582471.13_4130984.94	582471.13	4130984.94	1.46E-05	1.30E-08	7.78E-09	1.30E-08	8.66E-09	2.38E-08	5.59E-07	1.96E-08	0	0	2.72147E-10	0	0.0003	Res

Risk Calculation Part 2, $\sum R1*C_{TAC}$

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)								3rd Trimester	0<2	2<16	16<30	Cancer Risk - 2029	Receptor Type
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Cobalt	Lead	Nickel	Chromium VI					(per million)	
582527.7_4130984.94	582527.7	4130984.94	1.33E-05	1.21E-08	7.28E-09	1.21E-08	8.12E-09	2.23E-08	5.22E-07	1.83E-08	0	0	2.48594E-10	0	0.0002	Res
582584.27_4130984.94	582584.27	4130984.94	1.23E-05	1.14E-08	6.86E-09	1.14E-08	7.67E-09	2.10E-08	4.92E-07	1.73E-08	0	0	2.29539E-10	0	0.0002	Res
582640.84_4130984.94	582640.84	4130984.94	1.15E-05	1.09E-08	6.51E-09	1.09E-08	7.28E-09	1.99E-08	4.67E-07	1.64E-08	0	0	2.13981E-10	0	0.0002	Res
582697.41_4130984.94	582697.41	4130984.94	1.07E-05	1.03E-08	6.19E-09	1.03E-08	6.93E-09	1.89E-08	4.44E-07	1.56E-08	0	0	1.9986E-10	0	0.0002	Res
582753.98_4130984.94	582753.98	4130984.94	1.01E-05	9.85E-09	5.91E-09	9.85E-09	6.63E-09	1.81E-08	4.24E-07	1.49E-08	0	0	1.88212E-10	0	0.0002	Res
582810.55_4130984.94	582810.55	4130984.94	9.53E-06	9.43E-09	5.66E-09	9.43E-09	6.35E-09	1.73E-08	4.06E-07	1.42E-08	0	0	1.77578E-10	0	0.0002	Res
582867.12_4130984.94	582867.12	4130984.94	9.01E-06	9.04E-09	5.43E-09	9.04E-09	6.10E-09	1.66E-08	3.89E-07	1.36E-08	0	0	1.68028E-10	0	0.0002	Res
581735.72_4131068.85	581735.72	4131068.85	2.79E-04	1.59E-07	9.54E-08	1.59E-07	1.02E-07	2.93E-07	6.87E-06	2.42E-07	0	0	5.20021E-09	0	0.0052	Res
581792.29_4131068.85	581792.29	4131068.85	2.23E-04	1.28E-07	7.69E-08	1.28E-07	8.25E-08	2.36E-07	5.54E-06	1.95E-07	0	0	4.1488E-09	0	0.0041	Res
581848.86_4131068.85	581848.86	4131068.85	1.20E-04	7.22E-08	4.33E-08	7.22E-08	4.67E-08	1.33E-07	3.12E-06	1.10E-07	0	0	2.23513E-09	0	0.0022	Res
581905.43_4131068.85	581905.43	4131068.85	7.65E-05	4.84E-08	2.90E-08	4.84E-08	3.14E-08	8.90E-08	2.09E-06	7.34E-08	0	0	1.42521E-09	0	0.0014	Res
581962_4131068.85	581962	4131068.85	5.54E-05	3.68E-08	2.21E-08	3.68E-08	2.40E-08	6.75E-08	1.59E-06	5.57E-08	0	0	1.0333E-09	0	0.0010	Res
582018.57_4131068.85	582018.57	4131068.85	4.21E-05	2.93E-08	1.76E-08	2.93E-08	1.92E-08	5.38E-08	1.26E-06	4.43E-08	0	0	7.83911E-10	0	0.0008	Res
582075.14_4131068.85	582075.14	4131068.85	3.34E-05	2.43E-08	1.46E-08	2.43E-08	1.60E-08	4.47E-08	1.05E-06	3.69E-08	0	0	6.22295E-10	0	0.0006	Res
582131.71_4131068.85	582131.71	4131068.85	2.75E-05	2.10E-08	1.26E-08	2.10E-08	1.38E-08	3.85E-08	9.03E-07	3.17E-08	0	0	5.13258E-10	0	0.0005	Res
582188.28_4131068.85	582188.28	4131068.85	2.33E-05	1.85E-08	1.11E-08	1.85E-08	1.22E-08	3.39E-08	7.95E-07	2.79E-08	0	0	4.33912E-10	0	0.0004	Res
582244.85_4131068.85	582244.85	4131068.85	2.01E-05	1.66E-08	9.93E-09	1.66E-08	1.10E-08	3.04E-08	7.13E-07	2.50E-08	0	0	3.75278E-10	0	0.0004	Res
582301.42_4131068.85	582301.42	4131068.85	1.77E-05	1.51E-08	9.03E-09	1.51E-08	1.00E-08	2.76E-08	6.48E-07	2.28E-08	0	0	3.2996E-10	0	0.0003	Res
582357.99_4131068.85	582357.99	4131068.85	1.58E-05	1.38E-08	8.29E-09	1.38E-08	9.21E-09	2.54E-08	5.95E-07	2.09E-08	0	0	2.94019E-10	0	0.0003	Res
582414.56_4131068.85	582414.56	4131068.85	1.42E-05	1.28E-08	7.70E-09	1.28E-08	8.57E-09	2.35E-08	5.52E-07	1.94E-08	0	0	2.65424E-10	0	0.0003	Res
582471.13_4131068.85	582471.13	4131068.85	1.30E-05	1.20E-08	7.19E-09	1.20E-08	8.01E-09	2.20E-08	5.16E-07	1.81E-08	0	0	2.41839E-10	0	0.0002	Res
582527.7_4131068.85	582527.7	4131068.85	1.19E-05	1.13E-08	6.75E-09	1.13E-08	7.54E-09	2.06E-08	4.84E-07	1.70E-08	0	0	2.22092E-10	0	0.0002	Res
582584.27_4131068.85	582584.27	4131068.85	1.10E-05	1.06E-08	6.36E-09	1.06E-08	7.12E-09	1.95E-08	4.56E-07	1.60E-08	0	0	2.05008E-10	0	0.0002	Res
582640.84_4131068.85	582640.84	4131068.85	1.03E-05	1.01E-08	6.06E-09	1.01E-08	6.79E-09	1.85E-08	4.35E-07	1.53E-08	0	0	1.92382E-10	0	0.0002	Res
582697.41_4131068.85	582697.41	4131068.85	9.70E-06	9.63E-09	5.78E-09	9.63E-09	6.48E-09	1.77E-08	4.14E-07	1.45E-08	0	0	1.80816E-10	0	0.0002	Res
582753.98_4131068.85	582753.98	4131068.85	9.20E-06	9.24E-09	5.54E-09	9.24E-09	6.23E-09	1.69E-08	3.97E-07	1.39E-08	0	0	1.71413E-10	0	0.0002	Res
582810.55_4131068.85	582810.55	4131068.85	8.74E-06	8.88E-09	5.33E-09	8.88E-09	5.99E-09	1.63E-08	3.82E-07	1.34E-08	0	0	1.62989E-10	0	0.0002	Res
582867.12_4131068.85	582867.12	4131068.85	8.27E-06	8.51E-09	5.10E-09	8.51E-09	5.75E-09	1.56E-08	3.66E-07	1.28E-08	0	0	1.54171E-10	0	0.0002	Res
582018.57_4131152.76	582018.57	4131152.76	2.82E-05	2.16E-08	1.30E-08	2.16E-08	1.43E-08	3.97E-08	9.32E-07	3.28E-08	0	0	5.25802E-10	0	0.0005	Res
582244.85_4131152.76	582244.85	4131152.76	1.70E-05	1.48E-08	8.90E-09	1.48E-08	9.87E-09	2.72E-08	6.38E-07	2.24E-08	0	0	3.17651E-10	0	0.0003	Res
582301.42_4131152.76	582301.42	4131152.76	1.53E-05	1.37E-08	8.24E-09	1.37E-08	9.16E-09	2.52E-08	5.91E-07	2.08E-08	0	0	2.86088E-10	0	0.0003	Res
582357.99_4131152.76	582357.99	4131152.76	1.39E-05	1.28E-08	7.66E-09	1.28E-08	8.53E-09	2.34E-08	5.49E-07	1.93E-08	0	0	2.58416E-10	0	0.0003	Res
582414.56_4131152.76	582414.56	4131152.76	1.26E-05	1.19E-08	7.16E-09	1.19E-08	7.99E-09	2.19E-08	5.13E-07	1.80E-08	0	0	2.35492E-10	0	0.0002	Res
582471.13_4131152.76	582471.13	4131152.76	1.15E-05	1.11E-08	6.69E-09	1.11E-08	7.48E-09	2.04E-08	4.80E-07	1.68E-08	0	0	2.13938E-10	0	0.0002	Res
582527.7_4131152.76	582527.7	4131152.76	1.06E-05	1.05E-08	6.30E-09	1.05E-08	7.05E-09	1.92E-08	4.51E-07	1.58E-08	0	0	1.96776E-10	0	0.0002	Res
582584.27_4131152.76	582584.27	4131152.76	9.77E-06	9.91E-09	5.95E-09	9.91E-09	6.67E-09	1.82E-08	4.26E-07	1.50E-08	0	0	1.82051E-10	0	0.0002	Res
582640.84_4131152.76	582640.84	4131152.76	9.13E-06	9.43E-09	5.66E-09	9.43E-09	6.36E-09	1.73E-08	4.06E-07	1.42E-08	0	0	1.70156E-10	0	0.0002	Res
582697.41_4131152.76	582697.41	4131152.76	8.58E-06	9.00E-09	5.40E-09	9.00E-09	6.07E-09	1.65E-08	3.87E-07	1.36E-08	0	0	1.59984E-10	0	0.0002	Res
582753.98_4131152.76	582753.98	4131152.76	8.17E-06	8.65E-09	5.19E-09	8.65E-09	5.84E-09	1.59E-08	3.72E-07	1.31E-08	0	0	1.52333E-10	0	0.0002	Res
582810.55_4131152.76	582810.55	4131152.76	7.79E-06	8.33E-09	5.00E-09	8.33E-09	5.63E-09	1.53E-08	3.58E-07	1.26E-08	0	0	1.45212E-10	0	0.0001	Res
582867.12_4131152.76	582867.12	4131152.76	7.39E-06	7.99E-09	4.79E-09	7.99E-09	5.41E-09	1.46E-08	3.44E-07	1.20E-08	0	0	1.37657E-10	0	0.0001	Res

B-3 $PM_{2.5}$ Concentrations Calculations

HRA Permanente Creek Restoration Project

Annual Average $PM_{2.5}$ Concentration

Emissions Inputs

Construction Activity	Construction Year & Source	PM2.5 Exhaust (tons/year)	PM2.5 Road Dust[1] (tons/year)	PM2.5 Total[1] (tons/year)
Concrete Channel 2024	2024_CONCRTE	0.000		1.00E-05
Paved road	2024_PAVED	1.04E-04		1.04E-04
Unpaved road	2024_CCP_UNPV	3.15E-05		3.15E-05
Channel Widening 2024	2024_CHAN_RCK	0.002		1.93E-03
Paved road	2024_PAVED	9.02E-04		9.02E-04
Rock Pile Area 2025	2025_CHAN_RCK	0.006		5.90E-03
Paved road	2025_PAVED	2.92E-03		2.92E-03
Rock Pile Area 2026	2026_CHAN_RCK	0.022		2.19E-02
Paved road	2026_PAVED	2.82E-03		2.82E-03
Channel Widening 2027	2027_CHAN_RCK	0.002		1.93E-03
Paved road	2027_PAVED	2.67E-03		2.67E-03
Material Removal 2028	2028_MATRMVL	0.001		1.16E-03
Paved road	2028_PAVED	2.62E-03		2.62E-03
Unpaved road	2028_UNPAVED	1.60E-03		1.60E-03
Material Removal 2029	2029_MATRMVL	0.001		1.16E-03
Paved road	2029_PAVED	2.58E-03		2.58E-03
Unpaved road	2029_UNPAVED	1.57E-03		1.57E-03

[1]Values for construction areas (e.g. Concrete Channel, Rock Pile Area, etc.) are PM2.5 exhaust (since on-site fugitive PM2.5 can be mitigated with BMPs); values for paved and unpaved roads are entrained road dust.

Construction Activity	Construction Year	2024	2025	2026	2027	2028	2029
		(g/s)	(g/s)	(g/s)	(g/s)	(g/s)	(g/s)
Concrete Channel 2024	2024_CONCRTE	2.877E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Paved road	2024_PAVED	2.987E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Unpaved road	2024_CCP_UNPV	9.051E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Channel Widening 2024	2024_CHAN_RCK	5.566E-05	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Paved road	2024_PAVED	2.596E-05	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Rock Pile Area 2025	2025_CHAN_RCK	0.000E+00	1.70E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Paved road	2025_PAVED	0.000E+00	8.40E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Rock Pile Area 2026	2026_CHAN_RCK	0.000E+00	0.00E+00	6.31E-04	0.00E+00	0.00E+00	0.00E+00
Paved road	2026_PAVED	0.000E+00	0.00E+00	8.11E-05	0.00E+00	0.00E+00	0.00E+00
Channel Widening 2027	2027_CHAN_RCK	0.000E+00	0.00E+00	0.00E+00	5.57E-05	0.00E+00	0.00E+00
Paved road	2027_PAVED	0.000E+00	0.00E+00	0.00E+00	7.69E-05	0.00E+00	0.00E+00
Material Removal 2028	2028_MATRMVL	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.324E-05	0.000E+00
Paved road	2028_PAVED	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.523E-05	0.000E+00
Unpaved road	2028_UNPAVED	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.596E-05	0.000E+00
Material Removal 2029	2029_MATRMVL	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.32E-05
Paved road	2029_PAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.41E-05
Unpaved road	2029_UNPAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.53E-05

N/A = not including PM10 on-site dust in HRA calculation; it is only for speciating metals.

	Max	
CT House	0.000	2026
Res	0.001	2025

Receptor Lookup	Receptor Location		$PM_{2.5}$ Concentration, $C_{PM2.5}$ ($\mu g/m^3$)						Max	Max Year	Receptor Type
	UTM X	UTM Y	2024	2025	2026	2027	2028	2029	($\mu g/m^3$)		
581336.22_4131207.48	581336.22	4131207.48	3.47E-05	1.00E-04	1.06E-04	8.94E-05	8.80E-05	8.67E-05	1.06E-04	2026	CT House
581554.22_4130688.06	581554.22	4130688.06	2.50E-05	7.11E-05	8.87E-05	6.08E-05	5.91E-05	5.83E-05	8.87E-05	2026	Res
579793.36_4131503.29	579793.36	4131503.29	3.09E-06	9.15E-06	2.51E-05	4.89E-06	5.65E-06	5.58E-06	2.51E-05	2026	Acute
580488.37_4131517.71	580488.37	4131517.71	3.41E-06	9.52E-06	1.86E-05	6.69E-06	7.11E-06	7.01E-06	1.86E-05	2026	Acute
581678.43_4131040.03	581678.43	4131040.03	1.08E-04	3.14E-04	3.15E-04	2.84E-04	2.78E-04	2.74E-04	3.15E-04	2026	Res
581635.43_4130978.54	581635.43	4130978.54	2.18E-04	6.32E-04	6.24E-04	5.75E-04	5.63E-04	5.55E-04	6.32E-04	2025	Res
581830.06_4131027.55	581830.06	4131027.55	9.96E-05	2.89E-04	2.89E-04	2.62E-04	2.56E-04	2.53E-04	2.89E-04	2026	Res
581727.48_4130976.54	581727.48	4130976.54	2.63E-04	7.64E-04	7.50E-04	6.96E-04	6.82E-04	6.72E-04	7.64E-04	2025	Res
581789.11_4130419.65	581789.11	4130419.65	2.00E-05	5.72E-05	8.10E-05	4.68E-05	4.48E-05	4.41E-05	8.10E-05	2026	Res
581700.32_4130781.89	581700.32	4130781.89	5.37E-05	1.55E-04	1.63E-04	1.38E-04	1.35E-04	1.33E-04	1.63E-04	2026	Res
581426.07_4131299.01	581426.07	4131299.01	1.30E-05	3.74E-05	4.48E-05	3.23E-05	3.21E-05	3.17E-05	4.48E-05	2026	Acute
582301.42_4129474.56	582301.42	4129474.56	8.08E-06	2.30E-05	4.59E-05	1.60E-05	1.44E-05	1.42E-05	4.59E-05	2026	Res
582357.99_4129474.56	582357.99	4129474.56	7.57E-06	2.16E-05	4.33E-05	1.50E-05	1.35E-05	1.33E-05	4.33E-05	2026	Res
582414.56_4129474.56	582414.56	4129474.56	7.11E-06	2.03E-05	4.09E-05	1.40E-05	1.27E-05	1.25E-05	4.09E-05	2026	Res
582471.13_4129474.56	582471.13	4129474.56	6.68E-06	1.91E-05	3.87E-05	1.32E-05	1.19E-05	1.18E-05	3.87E-05	2026	Res
582527.7_4129474.56	582527.7	4129474.56	6.32E-06	1.81E-05	3.68E-05	1.25E-05	1.13E-05	1.11E-05	3.68E-05	2026	Res

Receptor Lookup	Receptor Location		$PM_{2.5}$ Concentration, $C_{PM2.5}$ ($\mu g/m^3$)						Max	Max Year	Receptor Type
	UTM X	UTM Y	2024	2025	2026	2027	2028	2029	($\mu g/m^3$)		
582584.27_4129474.56	582584.27	4129474.56	5.95E-06	1.71E-05	3.49E-05	1.17E-05	1.06E-05	1.05E-05	3.49E-05	2026	Res
582640.84_4129474.56	582640.84	4129474.56	5.57E-06	1.61E-05	3.30E-05	1.10E-05	9.92E-06	9.78E-06	3.30E-05	2026	Res
582244.85_4129558.47	582244.85	4129558.47	8.52E-06	2.44E-05	5.09E-05	1.65E-05	1.46E-05	1.44E-05	5.09E-05	2026	Res
582301.42_4129558.47	582301.42	4129558.47	8.23E-06	2.35E-05	4.74E-05	1.62E-05	1.45E-05	1.42E-05	4.74E-05	2026	Res
582357.99_4129558.47	582357.99	4129558.47	7.72E-06	2.21E-05	4.42E-05	1.53E-05	1.37E-05	1.35E-05	4.42E-05	2026	Res
582414.56_4129558.47	582414.56	4129558.47	7.25E-06	2.07E-05	4.17E-05	1.43E-05	1.29E-05	1.27E-05	4.17E-05	2026	Res
582471.13_4129558.47	582471.13	4129558.47	6.76E-06	1.94E-05	3.91E-05	1.34E-05	1.21E-05	1.19E-05	3.91E-05	2026	Res
582527.7_4129558.47	582527.7	4129558.47	6.34E-06	1.82E-05	3.69E-05	1.26E-05	1.14E-05	1.12E-05	3.69E-05	2026	Res
582584.27_4129558.47	582584.27	4129558.47	5.96E-06	1.72E-05	3.50E-05	1.18E-05	1.06E-05	1.05E-05	3.50E-05	2026	Res
582640.84_4129558.47	582640.84	4129558.47	5.63E-06	1.62E-05	3.33E-05	1.11E-05	1.00E-05	9.91E-06	3.33E-05	2026	Res
582697.41_4129558.47	582697.41	4129558.47	5.32E-06	1.54E-05	3.17E-05	1.04E-05	9.47E-06	9.34E-06	3.17E-05	2026	Res
582244.85_4129642.38	582244.85	4129642.38	7.97E-06	2.31E-05	5.12E-05	1.50E-05	1.29E-05	1.27E-05	5.12E-05	2026	Res
582301.42_4129642.38	582301.42	4129642.38	8.16E-06	2.34E-05	4.83E-05	1.59E-05	1.41E-05	1.39E-05	4.83E-05	2026	Res
582357.99_4129642.38	582357.99	4129642.38	7.83E-06	2.24E-05	4.48E-05	1.55E-05	1.39E-05	1.37E-05	4.48E-05	2026	Res
582414.56_4129642.38	582414.56	4129642.38	7.34E-06	2.10E-05	4.19E-05	1.46E-05	1.32E-05	1.30E-05	4.19E-05	2026	Res
582471.13_4129642.38	582471.13	4129642.38	6.87E-06	1.98E-05	3.95E-05	1.37E-05	1.24E-05	1.22E-05	3.95E-05	2026	Res
582527.7_4129642.38	582527.7	4129642.38	6.46E-06	1.86E-05	3.73E-05	1.29E-05	1.17E-05	1.15E-05	3.73E-05	2026	Res
582584.27_4129642.38	582584.27	4129642.38	6.04E-06	1.74E-05	3.52E-05	1.20E-05	1.09E-05	1.08E-05	3.52E-05	2026	Res
582640.84_4129642.38	582640.84	4129642.38	5.68E-06	1.64E-05	3.33E-05	1.13E-05	1.02E-05	1.01E-05	3.33E-05	2026	Res
582697.41_4129642.38	582697.41	4129642.38	5.35E-06	1.55E-05	3.16E-05	1.06E-05	9.61E-06	9.47E-06	3.16E-05	2026	Res
582753.98_4129642.38	582753.98	4129642.38	5.03E-06	1.46E-05	3.01E-05	9.90E-06	9.01E-06	8.88E-06	3.01E-05	2026	Res
582810.55_4129642.38	582810.55	4129642.38	4.75E-06	1.38E-05	2.87E-05	9.30E-06	8.46E-06	8.34E-06	2.87E-05	2026	Res
582867.12_4129642.38	582867.12	4129642.38	4.46E-06	1.29E-05	2.73E-05	8.65E-06	7.88E-06	7.76E-06	2.73E-05	2026	Res
582244.85_4129726.29	582244.85	4129726.29	8.35E-06	2.42E-05	5.13E-05	1.61E-05	1.41E-05	1.39E-05	5.13E-05	2026	Res
582301.42_4129726.29	582301.42	4129726.29	8.00E-06	2.31E-05	4.82E-05	1.56E-05	1.37E-05	1.36E-05	4.82E-05	2026	Res
582357.99_4129726.29	582357.99	4129726.29	7.85E-06	2.25E-05	4.49E-05	1.56E-05	1.40E-05	1.38E-05	4.49E-05	2026	Res
582414.56_4129726.29	582414.56	4129726.29	7.42E-06	2.13E-05	4.21E-05	1.49E-05	1.35E-05	1.33E-05	4.21E-05	2026	Res
582471.13_4129726.29	582471.13	4129726.29	6.98E-06	2.01E-05	3.97E-05	1.40E-05	1.27E-05	1.25E-05	3.97E-05	2026	Res
582527.7_4129726.29	582527.7	4129726.29	6.55E-06	1.89E-05	3.74E-05	1.32E-05	1.20E-05	1.18E-05	3.74E-05	2026	Res
582584.27_4129726.29	582584.27	4129726.29	6.15E-06	1.77E-05	3.53E-05	1.24E-05	1.13E-05	1.11E-05	3.53E-05	2026	Res
582640.84_4129726.29	582640.84	4129726.29	5.77E-06	1.67E-05	3.35E-05	1.15E-05	1.05E-05	1.04E-05	3.35E-05	2026	Res
582697.41_4129726.29	582697.41	4129726.29	5.39E-06	1.56E-05	3.16E-05	1.07E-05	9.79E-06	9.65E-06	3.16E-05	2026	Res
582753.98_4129726.29	582753.98	4129726.29	5.02E-06	1.45E-05	2.99E-05	9.90E-06	9.05E-06	8.92E-06	2.99E-05	2026	Res
582810.55_4129726.29	582810.55	4129726.29	4.64E-06	1.34E-05	2.81E-05	9.06E-06	8.28E-06	8.16E-06	2.81E-05	2026	Res
582244.85_4129810.2	582244.85	4129810.2	8.16E-06	2.37E-05	5.06E-05	1.57E-05	1.37E-05	1.35E-05	5.06E-05	2026	Res
582301.42_4129810.2	582301.42	4129810.2	7.99E-06	2.30E-05	4.75E-05	1.57E-05	1.40E-05	1.38E-05	4.75E-05	2026	Res
582357.99_4129810.2	582357.99	4129810.2	7.75E-06	2.22E-05	4.45E-05	1.54E-05	1.39E-05	1.37E-05	4.45E-05	2026	Res
582414.56_4129810.2	582414.56	4129810.2	7.41E-06	2.13E-05	4.18E-05	1.49E-05	1.36E-05	1.34E-05	4.18E-05	2026	Res
582471.13_4129810.2	582471.13	4129810.2	7.00E-06	2.02E-05	3.93E-05	1.42E-05	1.30E-05	1.28E-05	3.93E-05	2026	Res
582527.7_4129810.2	582527.7	4129810.2	6.58E-06	1.90E-05	3.71E-05	1.33E-05	1.22E-05	1.20E-05	3.71E-05	2026	Res
582584.27_4129810.2	582584.27	4129810.2	6.15E-06	1.78E-05	3.50E-05	1.24E-05	1.14E-05	1.12E-05	3.50E-05	2026	Res
582640.84_4129810.2	582640.84	4129810.2	5.68E-06	1.64E-05	3.28E-05	1.14E-05	1.05E-05	1.03E-05	3.28E-05	2026	Res

Receptor Lookup	Receptor Location		$PM_{2.5}$ Concentration, $C_{PM2.5}$ ($\mu g/m^3$)						Max	Max Year	Receptor Type
	UTM X	UTM Y	2024	2025	2026	2027	2028	2029	($\mu g/m^3$)		
582697.41_4129810.2	582697.41	4129810.2	5.27E-06	1.52E-05	3.09E-05	1.05E-05	9.62E-06	9.48E-06	3.09E-05	2026	Res
581905.43_4129894.11	581905.43	4129894.11	9.32E-06	2.68E-05	5.00E-05	1.94E-05	1.81E-05	1.79E-05	5.00E-05	2026	Res
581962_4129894.11	581962	4129894.11	1.03E-05	2.98E-05	6.09E-05	2.04E-05	1.81E-05	1.78E-05	6.09E-05	2026	Res
582131.71_4129894.11	582131.71	4129894.11	9.25E-06	2.68E-05	5.67E-05	1.80E-05	1.57E-05	1.55E-05	5.67E-05	2026	Res
582188.28_4129894.11	582188.28	4129894.11	8.78E-06	2.55E-05	5.31E-05	1.72E-05	1.52E-05	1.50E-05	5.31E-05	2026	Res
582244.85_4129894.11	582244.85	4129894.11	8.42E-06	2.43E-05	4.96E-05	1.67E-05	1.49E-05	1.47E-05	4.96E-05	2026	Res
582301.42_4129894.11	582301.42	4129894.11	8.04E-06	2.31E-05	4.64E-05	1.60E-05	1.44E-05	1.42E-05	4.64E-05	2026	Res
582357.99_4129894.11	582357.99	4129894.11	7.61E-06	2.19E-05	4.35E-05	1.52E-05	1.38E-05	1.36E-05	4.35E-05	2026	Res
582414.56_4129894.11	582414.56	4129894.11	7.45E-06	2.14E-05	4.10E-05	1.53E-05	1.40E-05	1.38E-05	4.10E-05	2026	Res
582471.13_4129894.11	582471.13	4129894.11	6.96E-06	2.01E-05	3.84E-05	1.43E-05	1.32E-05	1.30E-05	3.84E-05	2026	Res
582527.7_4129894.11	582527.7	4129894.11	6.46E-06	1.86E-05	3.61E-05	1.32E-05	1.22E-05	1.20E-05	3.61E-05	2026	Res
582584.27_4129894.11	582584.27	4129894.11	5.98E-06	1.73E-05	3.39E-05	1.21E-05	1.12E-05	1.10E-05	3.39E-05	2026	Res
582640.84_4129894.11	582640.84	4129894.11	5.52E-06	1.60E-05	3.19E-05	1.11E-05	1.02E-05	1.01E-05	3.19E-05	2026	Res
582697.41_4129894.11	582697.41	4129894.11	5.10E-06	1.48E-05	3.00E-05	1.02E-05	9.35E-06	9.22E-06	3.00E-05	2026	Res
581962_4129978.02	581962	4129978.02	1.05E-05	3.05E-05	6.14E-05	2.11E-05	1.88E-05	1.86E-05	6.14E-05	2026	Res
582018.57_4129978.02	582018.57	4129978.02	1.02E-05	2.95E-05	6.09E-05	2.01E-05	1.77E-05	1.75E-05	6.09E-05	2026	Res
582075.14_4129978.02	582075.14	4129978.02	1.02E-05	2.95E-05	5.92E-05	2.05E-05	1.82E-05	1.80E-05	5.92E-05	2026	Res
582131.71_4129978.02	582131.71	4129978.02	9.90E-06	2.86E-05	5.53E-05	2.02E-05	1.82E-05	1.80E-05	5.53E-05	2026	Res
582188.28_4129978.02	582188.28	4129978.02	9.65E-06	2.76E-05	5.18E-05	1.99E-05	1.82E-05	1.80E-05	5.18E-05	2026	Res
582244.85_4129978.02	582244.85	4129978.02	8.82E-06	2.53E-05	4.82E-05	1.81E-05	1.65E-05	1.63E-05	4.82E-05	2026	Res
582301.42_4129978.02	582301.42	4129978.02	8.51E-06	2.44E-05	4.52E-05	1.77E-05	1.63E-05	1.61E-05	4.52E-05	2026	Res
582357.99_4129978.02	582357.99	4129978.02	7.99E-06	2.30E-05	4.24E-05	1.67E-05	1.55E-05	1.53E-05	4.24E-05	2026	Res
582414.56_4129978.02	582414.56	4129978.02	7.42E-06	2.14E-05	3.97E-05	1.55E-05	1.44E-05	1.42E-05	3.97E-05	2026	Res
582471.13_4129978.02	582471.13	4129978.02	6.85E-06	1.98E-05	3.72E-05	1.42E-05	1.32E-05	1.30E-05	3.72E-05	2026	Res
582527.7_4129978.02	582527.7	4129978.02	6.31E-06	1.82E-05	3.48E-05	1.30E-05	1.20E-05	1.19E-05	3.48E-05	2026	Res
582584.27_4129978.02	582584.27	4129978.02	5.81E-06	1.68E-05	3.27E-05	1.18E-05	1.10E-05	1.08E-05	3.27E-05	2026	Res
582640.84_4129978.02	582640.84	4129978.02	5.36E-06	1.55E-05	3.07E-05	1.08E-05	1.00E-05	9.88E-06	3.07E-05	2026	Res
582697.41_4129978.02	582697.41	4129978.02	4.94E-06	1.43E-05	2.89E-05	9.86E-06	9.14E-06	9.01E-06	2.89E-05	2026	Res
582753.98_4129978.02	582753.98	4129978.02	4.54E-06	1.31E-05	2.71E-05	8.94E-06	8.27E-06	8.15E-06	2.71E-05	2026	Res
582810.55_4129978.02	582810.55	4129978.02	4.10E-06	1.19E-05	2.52E-05	7.94E-06	7.34E-06	7.24E-06	2.52E-05	2026	Res
581905.43_4130061.93	581905.43	4130061.93	1.38E-05	3.96E-05	7.08E-05	2.93E-05	2.69E-05	2.65E-05	7.08E-05	2026	Res
581962_4130061.93	581962	4130061.93	1.30E-05	3.72E-05	6.62E-05	2.76E-05	2.54E-05	2.50E-05	6.62E-05	2026	Res
582018.57_4130061.93	582018.57	4130061.93	1.14E-05	3.28E-05	6.11E-05	2.37E-05	2.16E-05	2.13E-05	6.11E-05	2026	Res
582075.14_4130061.93	582075.14	4130061.93	1.03E-05	2.98E-05	5.65E-05	2.13E-05	1.94E-05	1.91E-05	5.65E-05	2026	Res
582131.71_4130061.93	582131.71	4130061.93	9.92E-06	2.86E-05	5.29E-05	2.07E-05	1.90E-05	1.88E-05	5.29E-05	2026	Res
582188.28_4130061.93	582188.28	4130061.93	9.55E-06	2.74E-05	4.95E-05	2.01E-05	1.86E-05	1.84E-05	4.95E-05	2026	Res
582244.85_4130061.93	582244.85	4130061.93	9.18E-06	2.63E-05	4.65E-05	1.96E-05	1.83E-05	1.80E-05	4.65E-05	2026	Res
582301.42_4130061.93	582301.42	4130061.93	8.53E-06	2.45E-05	4.35E-05	1.82E-05	1.70E-05	1.67E-05	4.35E-05	2026	Res
582357.99_4130061.93	582357.99	4130061.93	7.93E-06	2.28E-05	4.07E-05	1.69E-05	1.58E-05	1.56E-05	4.07E-05	2026	Res
582414.56_4130061.93	582414.56	4130061.93	7.32E-06	2.11E-05	3.81E-05	1.55E-05	1.45E-05	1.43E-05	3.81E-05	2026	Res

Receptor Lookup	Receptor Location		$PM_{2.5}$ Concentration, $C_{PM2.5}$ ($\mu g/m^3$)						Max	Max Year	Receptor Type
	UTM X	UTM Y	2024	2025	2026	2027	2028	2029	($\mu g/m^3$)		
582471.13_4130061.93	582471.13	4130061.93	6.71E-06	1.93E-05	3.56E-05	1.41E-05	1.32E-05	1.30E-05	3.56E-05	2026	Res
582527.7_4130061.93	582527.7	4130061.93	6.14E-06	1.77E-05	3.32E-05	1.28E-05	1.19E-05	1.18E-05	3.32E-05	2026	Res
582584.27_4130061.93	582584.27	4130061.93	5.63E-06	1.62E-05	3.11E-05	1.16E-05	1.08E-05	1.07E-05	3.11E-05	2026	Res
582640.84_4130061.93	582640.84	4130061.93	5.15E-06	1.49E-05	2.92E-05	1.05E-05	9.78E-06	9.64E-06	2.92E-05	2026	Res
582697.41_4130061.93	582697.41	4130061.93	4.74E-06	1.37E-05	2.74E-05	9.51E-06	8.88E-06	8.75E-06	2.74E-05	2026	Res
582753.98_4130061.93	582753.98	4130061.93	4.37E-06	1.27E-05	2.58E-05	8.67E-06	8.09E-06	7.97E-06	2.58E-05	2026	Res
582810.55_4130061.93	582810.55	4130061.93	4.03E-06	1.17E-05	2.44E-05	7.90E-06	7.37E-06	7.26E-06	2.44E-05	2026	Res
581962_4130145.84	581962	4130145.84	1.42E-05	4.04E-05	6.49E-05	3.14E-05	2.96E-05	2.91E-05	6.49E-05	2026	Res
582018.57_4130145.84	582018.57	4130145.84	1.32E-05	3.74E-05	6.04E-05	2.91E-05	2.74E-05	2.70E-05	6.04E-05	2026	Res
582075.14_4130145.84	582075.14	4130145.84	1.15E-05	3.28E-05	5.52E-05	2.49E-05	2.34E-05	2.31E-05	5.52E-05	2026	Res
582131.71_4130145.84	582131.71	4130145.84	1.06E-05	3.04E-05	5.13E-05	2.31E-05	2.17E-05	2.14E-05	5.13E-05	2026	Res
582188.28_4130145.84	582188.28	4130145.84	1.01E-05	2.90E-05	4.81E-05	2.22E-05	2.10E-05	2.07E-05	4.81E-05	2026	Res
582244.85_4130145.84	582244.85	4130145.84	9.27E-06	2.66E-05	4.46E-05	2.03E-05	1.92E-05	1.89E-05	4.46E-05	2026	Res
582301.42_4130145.84	582301.42	4130145.84	8.48E-06	2.44E-05	4.15E-05	1.84E-05	1.75E-05	1.72E-05	4.15E-05	2026	Res
582357.99_4130145.84	582357.99	4130145.84	7.78E-06	2.24E-05	3.87E-05	1.68E-05	1.59E-05	1.57E-05	3.87E-05	2026	Res
582414.56_4130145.84	582414.56	4130145.84	7.13E-06	2.05E-05	3.61E-05	1.53E-05	1.45E-05	1.43E-05	3.61E-05	2026	Res
582471.13_4130145.84	582471.13	4130145.84	6.50E-06	1.87E-05	3.36E-05	1.38E-05	1.31E-05	1.29E-05	3.36E-05	2026	Res
582527.7_4130145.84	582527.7	4130145.84	5.90E-06	1.70E-05	3.13E-05	1.24E-05	1.17E-05	1.15E-05	3.13E-05	2026	Res
582584.27_4130145.84	582584.27	4130145.84	5.35E-06	1.54E-05	2.91E-05	1.11E-05	1.05E-05	1.03E-05	2.91E-05	2026	Res
582640.84_4130145.84	582640.84	4130145.84	4.87E-06	1.41E-05	2.72E-05	9.97E-06	9.41E-06	9.27E-06	2.72E-05	2026	Res
582697.41_4130145.84	582697.41	4130145.84	4.46E-06	1.29E-05	2.55E-05	9.01E-06	8.50E-06	8.38E-06	2.55E-05	2026	Res
582753.98_4130145.84	582753.98	4130145.84	4.12E-06	1.19E-05	2.41E-05	8.22E-06	7.75E-06	7.64E-06	2.41E-05	2026	Res
582810.55_4130145.84	582810.55	4130145.84	3.82E-06	1.11E-05	2.28E-05	7.54E-06	7.11E-06	7.01E-06	2.28E-05	2026	Res
582867.12_4130145.84	582867.12	4130145.84	3.45E-06	1.00E-05	2.12E-05	6.69E-06	6.31E-06	6.22E-06	2.12E-05	2026	Res
581962_4130229.75	581962	4130229.75	1.42E-05	4.06E-05	6.38E-05	3.19E-05	3.02E-05	2.98E-05	6.38E-05	2026	Res
582018.57_4130229.75	582018.57	4130229.75	1.35E-05	3.84E-05	5.97E-05	3.03E-05	2.88E-05	2.84E-05	5.97E-05	2026	Res
582075.14_4130229.75	582075.14	4130229.75	1.25E-05	3.57E-05	5.54E-05	2.82E-05	2.69E-05	2.65E-05	5.54E-05	2026	Res
582131.71_4130229.75	582131.71	4130229.75	1.13E-05	3.24E-05	5.09E-05	2.54E-05	2.42E-05	2.39E-05	5.09E-05	2026	Res
582188.28_4130229.75	582188.28	4130229.75	1.02E-05	2.91E-05	4.67E-05	2.27E-05	2.16E-05	2.13E-05	4.67E-05	2026	Res
582244.85_4130229.75	582244.85	4130229.75	9.18E-06	2.63E-05	4.30E-05	2.04E-05	1.94E-05	1.91E-05	4.30E-05	2026	Res
582301.42_4130229.75	582301.42	4130229.75	8.33E-06	2.39E-05	3.97E-05	1.84E-05	1.75E-05	1.72E-05	3.97E-05	2026	Res
582357.99_4130229.75	582357.99	4130229.75	7.59E-06	2.18E-05	3.69E-05	1.66E-05	1.58E-05	1.56E-05	3.69E-05	2026	Res
582414.56_4130229.75	582414.56	4130229.75	6.86E-06	1.98E-05	3.41E-05	1.49E-05	1.42E-05	1.40E-05	3.41E-05	2026	Res
582471.13_4130229.75	582471.13	4130229.75	6.16E-06	1.78E-05	3.15E-05	1.32E-05	1.26E-05	1.24E-05	3.15E-05	2026	Res
582527.7_4130229.75	582527.7	4130229.75	5.54E-06	1.60E-05	2.92E-05	1.17E-05	1.11E-05	1.10E-05	2.92E-05	2026	Res
582584.27_4130229.75	582584.27	4130229.75	5.01E-06	1.45E-05	2.71E-05	1.04E-05	9.93E-06	9.79E-06	2.71E-05	2026	Res
582640.84_4130229.75	582640.84	4130229.75	4.56E-06	1.32E-05	2.53E-05	9.36E-06	8.92E-06	8.79E-06	2.53E-05	2026	Res
582697.41_4130229.75	582697.41	4130229.75	4.19E-06	1.21E-05	2.38E-05	8.51E-06	8.11E-06	7.99E-06	2.38E-05	2026	Res
582753.98_4130229.75	582753.98	4130229.75	3.88E-06	1.12E-05	2.25E-05	7.78E-06	7.41E-06	7.31E-06	2.25E-05	2026	Res
582810.55_4130229.75	582810.55	4130229.75	3.61E-06	1.05E-05	2.13E-05	7.18E-06	6.84E-06	6.74E-06	2.13E-05	2026	Res
582867.12_4130229.75	582867.12	4130229.75	3.39E-06	9.81E-06	2.03E-05	6.67E-06	6.36E-06	6.27E-06	2.03E-05	2026	Res
582018.57_4130313.66	582018.57	4130313.66	1.42E-05	4.06E-05	6.07E-05	3.25E-05	3.10E-05	3.06E-05	6.07E-05	2026	Res

Receptor Lookup	Receptor Location		$PM_{2.5}$ Concentration, $C_{PM2.5}$ ($\mu g/m^3$)						Max	Max Year	Receptor Type
	UTM X	UTM Y	2024	2025	2026	2027	2028	2029	($\mu g/m^3$)		
582075.14_4130313.66	582075.14	4130313.66	1.31E-05	3.75E-05	5.61E-05	3.01E-05	2.88E-05	2.84E-05	5.61E-05	2026	Res
582131.71_4130313.66	582131.71	4130313.66	1.16E-05	3.32E-05	5.08E-05	2.64E-05	2.53E-05	2.49E-05	5.08E-05	2026	Res
582188.28_4130313.66	582188.28	4130313.66	1.03E-05	2.94E-05	4.61E-05	2.31E-05	2.21E-05	2.18E-05	4.61E-05	2026	Res
582244.85_4130313.66	582244.85	4130313.66	9.15E-06	2.63E-05	4.22E-05	2.05E-05	1.96E-05	1.93E-05	4.22E-05	2026	Res
582301.42_4130313.66	582301.42	4130313.66	8.22E-06	2.36E-05	3.87E-05	1.82E-05	1.74E-05	1.72E-05	3.87E-05	2026	Res
582357.99_4130313.66	582357.99	4130313.66	7.33E-06	2.11E-05	3.55E-05	1.61E-05	1.54E-05	1.52E-05	3.55E-05	2026	Res
582414.56_4130313.66	582414.56	4130313.66	6.51E-06	1.87E-05	3.24E-05	1.41E-05	1.35E-05	1.33E-05	3.24E-05	2026	Res
582471.13_4130313.66	582471.13	4130313.66	5.79E-06	1.67E-05	2.98E-05	1.24E-05	1.18E-05	1.17E-05	2.98E-05	2026	Res
582527.7_4130313.66	582527.7	4130313.66	5.20E-06	1.50E-05	2.75E-05	1.09E-05	1.05E-05	1.03E-05	2.75E-05	2026	Res
582584.27_4130313.66	582584.27	4130313.66	4.71E-06	1.36E-05	2.56E-05	9.78E-06	9.36E-06	9.22E-06	2.56E-05	2026	Res
582640.84_4130313.66	582640.84	4130313.66	4.30E-06	1.24E-05	2.39E-05	8.83E-06	8.46E-06	8.34E-06	2.39E-05	2026	Res
582697.41_4130313.66	582697.41	4130313.66	3.96E-06	1.15E-05	2.25E-05	8.04E-06	7.71E-06	7.60E-06	2.25E-05	2026	Res
582753.98_4130313.66	582753.98	4130313.66	3.67E-06	1.06E-05	2.12E-05	7.37E-06	7.07E-06	6.97E-06	2.12E-05	2026	Res
582810.55_4130313.66	582810.55	4130313.66	3.41E-06	9.87E-06	2.01E-05	6.78E-06	6.51E-06	6.42E-06	2.01E-05	2026	Res
582867.12_4130313.66	582867.12	4130313.66	3.18E-06	9.21E-06	1.91E-05	6.26E-06	6.02E-06	5.93E-06	1.91E-05	2026	Res
581848.86_4130397.57	581848.86	4130397.57	1.90E-05	5.43E-05	7.73E-05	4.43E-05	4.24E-05	4.18E-05	7.73E-05	2026	Res
581905.43_4130397.57	581905.43	4130397.57	1.83E-05	5.23E-05	7.37E-05	4.29E-05	4.11E-05	4.05E-05	7.37E-05	2026	Res
581962_4130397.57	581962	4130397.57	1.72E-05	4.93E-05	6.92E-05	4.05E-05	3.89E-05	3.83E-05	6.92E-05	2026	Res
582018.57_4130397.57	582018.57	4130397.57	1.55E-05	4.45E-05	6.33E-05	3.63E-05	3.49E-05	3.44E-05	6.33E-05	2026	Res
582075.14_4130397.57	582075.14	4130397.57	1.37E-05	3.93E-05	5.72E-05	3.19E-05	3.06E-05	3.02E-05	5.72E-05	2026	Res
582131.71_4130397.57	582131.71	4130397.57	1.19E-05	3.42E-05	5.12E-05	2.74E-05	2.62E-05	2.59E-05	5.12E-05	2026	Res
582188.28_4130397.57	582188.28	4130397.57	1.04E-05	3.01E-05	4.63E-05	2.38E-05	2.28E-05	2.25E-05	4.63E-05	2026	Res
582244.85_4130397.57	582244.85	4130397.57	9.15E-06	2.63E-05	4.18E-05	2.06E-05	1.97E-05	1.94E-05	4.18E-05	2026	Res
582301.42_4130397.57	582301.42	4130397.57	8.02E-06	2.31E-05	3.79E-05	1.78E-05	1.70E-05	1.68E-05	3.79E-05	2026	Res
582357.99_4130397.57	582357.99	4130397.57	7.00E-06	2.02E-05	3.43E-05	1.53E-05	1.46E-05	1.44E-05	3.43E-05	2026	Res
582414.56_4130397.57	582414.56	4130397.57	6.17E-06	1.78E-05	3.13E-05	1.33E-05	1.27E-05	1.25E-05	3.13E-05	2026	Res
582471.13_4130397.57	582471.13	4130397.57	5.50E-06	1.59E-05	2.87E-05	1.17E-05	1.12E-05	1.10E-05	2.87E-05	2026	Res
582527.7_4130397.57	582527.7	4130397.57	4.96E-06	1.43E-05	2.66E-05	1.04E-05	9.91E-06	9.77E-06	2.66E-05	2026	Res
582584.27_4130397.57	582584.27	4130397.57	4.50E-06	1.30E-05	2.47E-05	9.28E-06	8.89E-06	8.76E-06	2.47E-05	2026	Res
582640.84_4130397.57	582640.84	4130397.57	4.11E-06	1.19E-05	2.31E-05	8.38E-06	8.03E-06	7.92E-06	2.31E-05	2026	Res
582697.41_4130397.57	582697.41	4130397.57	3.77E-06	1.09E-05	2.17E-05	7.59E-06	7.28E-06	7.18E-06	2.17E-05	2026	Res
582753.98_4130397.57	582753.98	4130397.57	3.48E-06	1.01E-05	2.04E-05	6.92E-06	6.65E-06	6.55E-06	2.04E-05	2026	Res
582810.55_4130397.57	582810.55	4130397.57	3.22E-06	9.33E-06	1.93E-05	6.34E-06	6.10E-06	6.02E-06	1.93E-05	2026	Res
582867.12_4130397.57	582867.12	4130397.57	3.00E-06	8.68E-06	1.82E-05	5.84E-06	5.63E-06	5.55E-06	1.82E-05	2026	Res
581848.86_4130481.48	581848.86	4130481.48	2.33E-05	6.66E-05	8.51E-05	5.65E-05	5.47E-05	5.39E-05	8.51E-05	2026	Res
581905.43_4130481.48	581905.43	4130481.48	2.16E-05	6.19E-05	7.99E-05	5.24E-05	5.07E-05	4.99E-05	7.99E-05	2026	Res
581962_4130481.48	581962	4130481.48	1.86E-05	5.35E-05	7.11E-05	4.47E-05	4.32E-05	4.26E-05	7.11E-05	2026	Res
582018.57_4130481.48	582018.57	4130481.48	1.65E-05	4.75E-05	6.45E-05	3.94E-05	3.81E-05	3.75E-05	6.45E-05	2026	Res
582075.14_4130481.48	582075.14	4130481.48	1.41E-05	4.07E-05	5.72E-05	3.34E-05	3.22E-05	3.17E-05	5.72E-05	2026	Res
582131.71_4130481.48	582131.71	4130481.48	1.22E-05	3.51E-05	5.10E-05	2.84E-05	2.73E-05	2.69E-05	5.10E-05	2026	Res
582188.28_4130481.48	582188.28	4130481.48	1.05E-05	3.02E-05	4.56E-05	2.41E-05	2.31E-05	2.28E-05	4.56E-05	2026	Res
582244.85_4130481.48	582244.85	4130481.48	8.91E-06	2.57E-05	4.06E-05	2.01E-05	1.93E-05	1.90E-05	4.06E-05	2026	Res

Receptor Lookup	Receptor Location		$PM_{2.5}$ Concentration, $C_{PM2.5}$ ($\mu g/m^3$)						Max	Max Year	Receptor Type
	UTM X	UTM Y	2024	2025	2026	2027	2028	2029	($\mu g/m^3$)		
582301.42_4130481.48	582301.42	4130481.48	7.64E-06	2.20E-05	3.64E-05	1.69E-05	1.62E-05	1.60E-05	3.64E-05	2026	Res
582357.99_4130481.48	582357.99	4130481.48	6.65E-06	1.92E-05	3.30E-05	1.45E-05	1.38E-05	1.36E-05	3.30E-05	2026	Res
582414.56_4130481.48	582414.56	4130481.48	5.89E-06	1.70E-05	3.03E-05	1.26E-05	1.20E-05	1.18E-05	3.03E-05	2026	Res
582471.13_4130481.48	582471.13	4130481.48	5.27E-06	1.52E-05	2.79E-05	1.11E-05	1.06E-05	1.04E-05	2.79E-05	2026	Res
582527.7_4130481.48	582527.7	4130481.48	4.74E-06	1.37E-05	2.59E-05	9.80E-06	9.35E-06	9.22E-06	2.59E-05	2026	Res
582584.27_4130481.48	582584.27	4130481.48	4.30E-06	1.24E-05	2.41E-05	8.76E-06	8.36E-06	8.24E-06	2.41E-05	2026	Res
582640.84_4130481.48	582640.84	4130481.48	3.91E-06	1.13E-05	2.25E-05	7.86E-06	7.51E-06	7.40E-06	2.25E-05	2026	Res
582697.41_4130481.48	582697.41	4130481.48	3.58E-06	1.04E-05	2.11E-05	7.10E-06	6.79E-06	6.70E-06	2.11E-05	2026	Res
582753.98_4130481.48	582753.98	4130481.48	3.31E-06	9.57E-06	1.99E-05	6.48E-06	6.21E-06	6.12E-06	1.99E-05	2026	Res
582810.55_4130481.48	582810.55	4130481.48	3.08E-06	8.90E-06	1.88E-05	5.95E-06	5.71E-06	5.63E-06	1.88E-05	2026	Res
582867.12_4130481.48	582867.12	4130481.48	2.87E-06	8.30E-06	1.78E-05	5.50E-06	5.29E-06	5.21E-06	1.78E-05	2026	Res
581735.72_4130565.39	581735.72	4130565.39	2.77E-05	7.89E-05	9.47E-05	6.82E-05	6.65E-05	6.55E-05	9.47E-05	2026	Res
581792.29_4130565.39	581792.29	4130565.39	2.72E-05	7.76E-05	9.29E-05	6.72E-05	6.55E-05	6.45E-05	9.29E-05	2026	Res
581848.86_4130565.39	581848.86	4130565.39	2.58E-05	7.40E-05	8.89E-05	6.39E-05	6.23E-05	6.14E-05	8.89E-05	2026	Res
581905.43_4130565.39	581905.43	4130565.39	2.46E-05	7.07E-05	8.51E-05	6.11E-05	5.95E-05	5.86E-05	8.51E-05	2026	Res
581962_4130565.39	581962	4130565.39	2.14E-05	6.15E-05	7.58E-05	5.27E-05	5.14E-05	5.06E-05	7.58E-05	2026	Res
582018.57_4130565.39	582018.57	4130565.39	1.75E-05	5.05E-05	6.48E-05	4.28E-05	4.16E-05	4.10E-05	6.48E-05	2026	Res
582075.14_4130565.39	582075.14	4130565.39	1.45E-05	4.17E-05	5.60E-05	3.48E-05	3.38E-05	3.33E-05	5.60E-05	2026	Res
582131.71_4130565.39	582131.71	4130565.39	1.21E-05	3.49E-05	4.90E-05	2.86E-05	2.77E-05	2.73E-05	4.90E-05	2026	Res
582188.28_4130565.39	582188.28	4130565.39	9.98E-06	2.88E-05	4.27E-05	2.31E-05	2.23E-05	2.20E-05	4.27E-05	2026	Res
582244.85_4130565.39	582244.85	4130565.39	8.34E-06	2.40E-05	3.78E-05	1.89E-05	1.82E-05	1.79E-05	3.78E-05	2026	Res
582301.42_4130565.39	582301.42	4130565.39	7.20E-06	2.07E-05	3.41E-05	1.59E-05	1.53E-05	1.51E-05	3.41E-05	2026	Res
582357.99_4130565.39	582357.99	4130565.39	6.26E-06	1.80E-05	3.11E-05	1.36E-05	1.30E-05	1.28E-05	3.11E-05	2026	Res
582414.56_4130565.39	582414.56	4130565.39	5.52E-06	1.59E-05	2.86E-05	1.17E-05	1.12E-05	1.10E-05	2.86E-05	2026	Res
582471.13_4130565.39	582471.13	4130565.39	4.93E-06	1.42E-05	2.65E-05	1.03E-05	9.79E-06	9.65E-06	2.65E-05	2026	Res
582527.7_4130565.39	582527.7	4130565.39	4.44E-06	1.28E-05	2.47E-05	9.08E-06	8.65E-06	8.53E-06	2.47E-05	2026	Res
582584.27_4130565.39	582584.27	4130565.39	4.04E-06	1.17E-05	2.32E-05	8.13E-06	7.74E-06	7.63E-06	2.32E-05	2026	Res
582640.84_4130565.39	582640.84	4130565.39	3.69E-06	1.07E-05	2.18E-05	7.30E-06	6.95E-06	6.85E-06	2.18E-05	2026	Res
582697.41_4130565.39	582697.41	4130565.39	3.40E-06	9.84E-06	2.05E-05	6.64E-06	6.32E-06	6.23E-06	2.05E-05	2026	Res
582753.98_4130565.39	582753.98	4130565.39	3.16E-06	9.14E-06	1.95E-05	6.09E-06	5.80E-06	5.72E-06	1.95E-05	2026	Res
582810.55_4130565.39	582810.55	4130565.39	2.96E-06	8.55E-06	1.85E-05	5.63E-06	5.37E-06	5.30E-06	1.85E-05	2026	Res
582867.12_4130565.39	582867.12	4130565.39	2.78E-06	8.04E-06	1.76E-05	5.25E-06	5.01E-06	4.94E-06	1.76E-05	2026	Res
581735.72_4130649.3	581735.72	4130649.3	2.94E-05	8.43E-05	9.77E-05	7.37E-05	7.20E-05	7.10E-05	9.77E-05	2026	Res
581792.29_4130649.3	581792.29	4130649.3	2.84E-05	8.16E-05	9.43E-05	7.13E-05	6.97E-05	6.87E-05	9.43E-05	2026	Res
581905.43_4130649.3	581905.43	4130649.3	2.82E-05	8.12E-05	9.23E-05	7.13E-05	6.97E-05	6.87E-05	9.23E-05	2026	Res
581962_4130649.3	581962	4130649.3	2.36E-05	6.79E-05	7.92E-05	5.92E-05	5.79E-05	5.70E-05	7.92E-05	2026	Res
582018.57_4130649.3	582018.57	4130649.3	1.82E-05	5.24E-05	6.40E-05	4.50E-05	4.40E-05	4.34E-05	6.40E-05	2026	Res
582075.14_4130649.3	582075.14	4130649.3	1.44E-05	4.14E-05	5.32E-05	3.50E-05	3.42E-05	3.37E-05	5.32E-05	2026	Res
582131.71_4130649.3	582131.71	4130649.3	1.14E-05	3.29E-05	4.48E-05	2.73E-05	2.66E-05	2.62E-05	4.48E-05	2026	Res
582188.28_4130649.3	582188.28	4130649.3	9.24E-06	2.66E-05	3.85E-05	2.16E-05	2.10E-05	2.07E-05	3.85E-05	2026	Res
582244.85_4130649.3	582244.85	4130649.3	7.65E-06	2.20E-05	3.39E-05	1.74E-05	1.69E-05	1.66E-05	3.39E-05	2026	Res
582301.42_4130649.3	582301.42	4130649.3	6.51E-06	1.87E-05	3.06E-05	1.44E-05	1.40E-05	1.38E-05	3.06E-05	2026	Res

Receptor Lookup	Receptor Location		$PM_{2.5}$ Concentration, $C_{PM2.5}$ ($\mu g/m^3$)						Max	Max Year	Receptor Type
	UTM X	UTM Y	2024	2025	2026	2027	2028	2029	($\mu g/m^3$)		
582357.99_4130649.3	582357.99	4130649.3	5.66E-06	1.63E-05	2.80E-05	1.23E-05	1.18E-05	1.17E-05	2.80E-05	2026	Res
582414.56_4130649.3	582414.56	4130649.3	5.03E-06	1.45E-05	2.60E-05	1.07E-05	1.02E-05	1.01E-05	2.60E-05	2026	Res
582471.13_4130649.3	582471.13	4130649.3	4.50E-06	1.30E-05	2.43E-05	9.34E-06	8.95E-06	8.82E-06	2.43E-05	2026	Res
582527.7_4130649.3	582527.7	4130649.3	4.09E-06	1.18E-05	2.29E-05	8.31E-06	7.93E-06	7.82E-06	2.29E-05	2026	Res
582584.27_4130649.3	582584.27	4130649.3	3.75E-06	1.08E-05	2.17E-05	7.49E-06	7.14E-06	7.04E-06	2.17E-05	2026	Res
582640.84_4130649.3	582640.84	4130649.3	3.48E-06	1.00E-05	2.06E-05	6.83E-06	6.50E-06	6.41E-06	2.06E-05	2026	Res
582697.41_4130649.3	582697.41	4130649.3	3.24E-06	9.36E-06	1.97E-05	6.29E-06	5.98E-06	5.89E-06	1.97E-05	2026	Res
582753.98_4130649.3	582753.98	4130649.3	3.05E-06	8.81E-06	1.89E-05	5.85E-06	5.56E-06	5.48E-06	1.89E-05	2026	Res
582810.55_4130649.3	582810.55	4130649.3	2.89E-06	8.35E-06	1.81E-05	5.49E-06	5.21E-06	5.14E-06	1.81E-05	2026	Res
582867.12_4130649.3	582867.12	4130649.3	2.74E-06	7.92E-06	1.74E-05	5.16E-06	4.90E-06	4.84E-06	1.74E-05	2026	Res
581848.86_4130733.21	581848.86	4130733.21	4.11E-05	1.18E-04	1.27E-04	1.06E-04	1.04E-04	1.02E-04	1.27E-04	2026	Res
581905.43_4130733.21	581905.43	4130733.21	3.52E-05	1.01E-04	1.10E-04	9.02E-05	8.84E-05	8.71E-05	1.10E-04	2026	Res
581962_4130733.21	581962	4130733.21	2.61E-05	7.52E-05	8.42E-05	6.63E-05	6.50E-05	6.41E-05	8.42E-05	2026	Res
582018.57_4130733.21	582018.57	4130733.21	1.86E-05	5.36E-05	6.30E-05	4.66E-05	4.57E-05	4.50E-05	6.30E-05	2026	Res
582075.14_4130733.21	582075.14	4130733.21	1.34E-05	3.86E-05	4.84E-05	3.30E-05	3.23E-05	3.19E-05	4.84E-05	2026	Res
582131.71_4130733.21	582131.71	4130733.21	1.01E-05	2.90E-05	3.89E-05	2.42E-05	2.37E-05	2.33E-05	3.89E-05	2026	Res
582188.28_4130733.21	582188.28	4130733.21	8.03E-06	2.30E-05	3.31E-05	1.88E-05	1.84E-05	1.81E-05	3.31E-05	2026	Res
582244.85_4130733.21	582244.85	4130733.21	6.64E-06	1.90E-05	2.91E-05	1.51E-05	1.48E-05	1.46E-05	2.91E-05	2026	Res
582301.42_4130733.21	582301.42	4130733.21	5.68E-06	1.63E-05	2.63E-05	1.26E-05	1.23E-05	1.21E-05	2.63E-05	2026	Res
582357.99_4130733.21	582357.99	4130733.21	4.98E-06	1.43E-05	2.43E-05	1.08E-05	1.05E-05	1.04E-05	2.43E-05	2026	Res
582414.56_4130733.21	582414.56	4130733.21	4.46E-06	1.28E-05	2.28E-05	9.48E-06	9.19E-06	9.06E-06	2.28E-05	2026	Res
582471.13_4130733.21	582471.13	4130733.21	4.07E-06	1.17E-05	2.17E-05	8.48E-06	8.19E-06	8.08E-06	2.17E-05	2026	Res
582527.7_4130733.21	582527.7	4130733.21	3.76E-06	1.08E-05	2.07E-05	7.70E-06	7.42E-06	7.31E-06	2.07E-05	2026	Res
582584.27_4130733.21	582584.27	4130733.21	3.51E-06	1.01E-05	1.99E-05	7.09E-06	6.81E-06	6.71E-06	1.99E-05	2026	Res
582640.84_4130733.21	582640.84	4130733.21	3.31E-06	9.53E-06	1.92E-05	6.58E-06	6.30E-06	6.22E-06	1.92E-05	2026	Res
582697.41_4130733.21	582697.41	4130733.21	3.13E-06	9.03E-06	1.86E-05	6.16E-06	5.88E-06	5.80E-06	1.86E-05	2026	Res
582753.98_4130733.21	582753.98	4130733.21	2.97E-06	8.59E-06	1.80E-05	5.79E-06	5.52E-06	5.44E-06	1.80E-05	2026	Res
582810.55_4130733.21	582810.55	4130733.21	2.84E-06	8.21E-06	1.74E-05	5.48E-06	5.21E-06	5.14E-06	1.74E-05	2026	Res
582867.12_4130733.21	582867.12	4130733.21	2.71E-06	7.85E-06	1.69E-05	5.19E-06	4.93E-06	4.86E-06	1.69E-05	2026	Res
581735.72_4130817.12	581735.72	4130817.12	5.99E-05	1.73E-04	1.80E-04	1.55E-04	1.52E-04	1.50E-04	1.80E-04	2026	Res
581792.29_4130817.12	581792.29	4130817.12	6.72E-05	1.94E-04	2.00E-04	1.75E-04	1.71E-04	1.69E-04	2.00E-04	2026	Res
581848.86_4130817.12	581848.86	4130817.12	6.03E-05	1.74E-04	1.80E-04	1.57E-04	1.54E-04	1.52E-04	1.80E-04	2026	Res
581905.43_4130817.12	581905.43	4130817.12	4.58E-05	1.32E-04	1.39E-04	1.19E-04	1.16E-04	1.15E-04	1.39E-04	2026	Res
581962_4130817.12	581962	4130817.12	2.82E-05	8.13E-05	8.90E-05	7.21E-05	7.07E-05	6.97E-05	8.90E-05	2026	Res
582018.57_4130817.12	582018.57	4130817.12	1.73E-05	4.96E-05	5.80E-05	4.33E-05	4.25E-05	4.18E-05	5.80E-05	2026	Res
582075.14_4130817.12	582075.14	4130817.12	1.15E-05	3.30E-05	4.15E-05	2.81E-05	2.76E-05	2.72E-05	4.15E-05	2026	Res
582131.71_4130817.12	582131.71	4130817.12	8.51E-06	2.44E-05	3.30E-05	2.03E-05	2.00E-05	1.97E-05	3.30E-05	2026	Res
582188.28_4130817.12	582188.28	4130817.12	6.79E-06	1.94E-05	2.80E-05	1.58E-05	1.56E-05	1.53E-05	2.80E-05	2026	Res
582244.85_4130817.12	582244.85	4130817.12	5.70E-06	1.63E-05	2.48E-05	1.30E-05	1.28E-05	1.26E-05	2.48E-05	2026	Res
582301.42_4130817.12	582301.42	4130817.12	4.97E-06	1.42E-05	2.27E-05	1.11E-05	1.09E-05	1.08E-05	2.27E-05	2026	Res
582357.99_4130817.12	582357.99	4130817.12	4.46E-06	1.28E-05	2.12E-05	9.78E-06	9.62E-06	9.48E-06	2.12E-05	2026	Res
582414.56_4130817.12	582414.56	4130817.12	4.08E-06	1.17E-05	2.01E-05	8.79E-06	8.63E-06	8.50E-06	2.01E-05	2026	Res

Receptor Lookup	Receptor Location		$PM_{2.5}$ Concentration, $C_{PM2.5}$ ($\mu g/m^3$)						Max	Max Year	Receptor Type
	UTM X	UTM Y	2024	2025	2026	2027	2028	2029	($\mu g/m^3$)		
582471.13_4130817.12	582471.13	4130817.12	3.78E-06	1.08E-05	1.93E-05	8.03E-06	7.86E-06	7.75E-06	1.93E-05	2026	Res
582527.7_4130817.12	582527.7	4130817.12	3.53E-06	1.01E-05	1.86E-05	7.40E-06	7.22E-06	7.12E-06	1.86E-05	2026	Res
582584.27_4130817.12	582584.27	4130817.12	3.33E-06	9.57E-06	1.80E-05	6.88E-06	6.69E-06	6.59E-06	1.80E-05	2026	Res
582640.84_4130817.12	582640.84	4130817.12	3.15E-06	9.08E-06	1.75E-05	6.43E-06	6.23E-06	6.15E-06	1.75E-05	2026	Res
582697.41_4130817.12	582697.41	4130817.12	3.00E-06	8.64E-06	1.71E-05	6.05E-06	5.84E-06	5.75E-06	1.71E-05	2026	Res
582753.98_4130817.12	582753.98	4130817.12	2.86E-06	8.24E-06	1.66E-05	5.69E-06	5.47E-06	5.39E-06	1.66E-05	2026	Res
582810.55_4130817.12	582810.55	4130817.12	2.73E-06	7.88E-06	1.62E-05	5.38E-06	5.15E-06	5.08E-06	1.62E-05	2026	Res
582867.12_4130817.12	582867.12	4130817.12	2.62E-06	7.56E-06	1.58E-05	5.10E-06	4.87E-06	4.80E-06	1.58E-05	2026	Res
581735.72_4130901.03	581735.72	4130901.03	1.17E-04	3.40E-04	3.41E-04	3.08E-04	3.02E-04	2.97E-04	3.41E-04	2026	Res
581792.29_4130901.03	581792.29	4130901.03	1.25E-04	3.62E-04	3.62E-04	3.29E-04	3.22E-04	3.17E-04	3.62E-04	2025	Res
581848.86_4130901.03	581848.86	4130901.03	1.12E-04	3.23E-04	3.23E-04	2.93E-04	2.87E-04	2.83E-04	3.23E-04	2025	Res
581905.43_4130901.03	581905.43	4130901.03	5.90E-05	1.71E-04	1.75E-04	1.54E-04	1.51E-04	1.49E-04	1.75E-04	2026	Res
581962_4130901.03	581962	4130901.03	2.45E-05	7.08E-05	7.83E-05	6.26E-05	6.14E-05	6.05E-05	7.83E-05	2026	Res
582018.57_4130901.03	582018.57	4130901.03	1.36E-05	3.90E-05	4.71E-05	3.37E-05	3.31E-05	3.26E-05	4.71E-05	2026	Res
582075.14_4130901.03	582075.14	4130901.03	9.37E-06	2.69E-05	3.50E-05	2.26E-05	2.23E-05	2.20E-05	3.50E-05	2026	Res
582131.71_4130901.03	582131.71	4130901.03	7.34E-06	2.10E-05	2.89E-05	1.74E-05	1.71E-05	1.69E-05	2.89E-05	2026	Res
582188.28_4130901.03	582188.28	4130901.03	6.12E-06	1.75E-05	2.52E-05	1.42E-05	1.41E-05	1.39E-05	2.52E-05	2026	Res
582244.85_4130901.03	582244.85	4130901.03	5.30E-06	1.51E-05	2.27E-05	1.21E-05	1.20E-05	1.18E-05	2.27E-05	2026	Res
582301.42_4130901.03	582301.42	4130901.03	4.68E-06	1.34E-05	2.08E-05	1.06E-05	1.05E-05	1.03E-05	2.08E-05	2026	Res
582357.99_4130901.03	582357.99	4130901.03	4.21E-06	1.20E-05	1.93E-05	9.37E-06	9.30E-06	9.16E-06	1.93E-05	2026	Res
582414.56_4130901.03	582414.56	4130901.03	3.84E-06	1.10E-05	1.82E-05	8.42E-06	8.35E-06	8.23E-06	1.82E-05	2026	Res
582471.13_4130901.03	582471.13	4130901.03	3.54E-06	1.01E-05	1.73E-05	7.66E-06	7.59E-06	7.48E-06	1.73E-05	2026	Res
582527.7_4130901.03	582527.7	4130901.03	3.29E-06	9.43E-06	1.66E-05	7.03E-06	6.94E-06	6.85E-06	1.66E-05	2026	Res
582584.27_4130901.03	582584.27	4130901.03	3.09E-06	8.86E-06	1.60E-05	6.51E-06	6.42E-06	6.33E-06	1.60E-05	2026	Res
582640.84_4130901.03	582640.84	4130901.03	2.92E-06	8.39E-06	1.56E-05	6.08E-06	5.97E-06	5.89E-06	1.56E-05	2026	Res
582697.41_4130901.03	582697.41	4130901.03	2.78E-06	7.98E-06	1.52E-05	5.71E-06	5.59E-06	5.51E-06	1.52E-05	2026	Res
582753.98_4130901.03	582753.98	4130901.03	2.65E-06	7.63E-06	1.49E-05	5.38E-06	5.25E-06	5.17E-06	1.49E-05	2026	Res
582810.55_4130901.03	582810.55	4130901.03	2.54E-06	7.31E-06	1.46E-05	5.09E-06	4.94E-06	4.87E-06	1.46E-05	2026	Res
582867.12_4130901.03	582867.12	4130901.03	2.44E-06	7.03E-06	1.43E-05	4.83E-06	4.67E-06	4.60E-06	1.43E-05	2026	Res
581735.72_4130984.94	581735.72	4130984.94	3.10E-04	9.00E-04	8.81E-04	8.21E-04	8.04E-04	7.92E-04	9.00E-04	2025	Res
581792.29_4130984.94	581792.29	4130984.94	4.07E-04	1.18E-03	1.15E-03	1.08E-03	1.05E-03	1.04E-03	1.18E-03	2025	Res
581848.86_4130984.94	581848.86	4130984.94	4.73E-04	1.37E-03	1.34E-03	1.25E-03	1.23E-03	1.21E-03	1.37E-03	2025	Res
581905.43_4130984.94	581905.43	4130984.94	3.86E-05	1.12E-04	1.18E-04	1.00E-04	9.79E-05	9.65E-05	1.18E-04	2026	Res
581962_4130984.94	581962	4130984.94	1.71E-05	4.93E-05	5.72E-05	4.30E-05	4.22E-05	4.16E-05	5.72E-05	2026	Res
582018.57_4130984.94	582018.57	4130984.94	1.13E-05	3.25E-05	4.05E-05	2.78E-05	2.73E-05	2.69E-05	4.05E-05	2026	Res
582075.14_4130984.94	582075.14	4130984.94	8.51E-06	2.44E-05	3.23E-05	2.05E-05	2.02E-05	1.99E-05	3.23E-05	2026	Res
582131.71_4130984.94	582131.71	4130984.94	6.85E-06	1.96E-05	2.73E-05	1.62E-05	1.60E-05	1.58E-05	2.73E-05	2026	Res
582188.28_4130984.94	582188.28	4130984.94	5.74E-06	1.64E-05	2.38E-05	1.33E-05	1.32E-05	1.30E-05	2.38E-05	2026	Res
582244.85_4130984.94	582244.85	4130984.94	4.94E-06	1.41E-05	2.12E-05	1.13E-05	1.12E-05	1.11E-05	2.12E-05	2026	Res
582301.42_4130984.94	582301.42	4130984.94	4.34E-06	1.24E-05	1.93E-05	9.82E-06	9.76E-06	9.62E-06	1.93E-05	2026	Res
582357.99_4130984.94	582357.99	4130984.94	3.88E-06	1.11E-05	1.78E-05	8.67E-06	8.64E-06	8.52E-06	1.78E-05	2026	Res
582414.56_4130984.94	582414.56	4130984.94	3.52E-06	1.01E-05	1.66E-05	7.76E-06	7.75E-06	7.64E-06	1.66E-05	2026	Res

Receptor Lookup	Receptor Location		$PM_{2.5}$ Concentration, $C_{PM2.5}$ ($\mu g/m^3$)						Max	Max Year	Receptor Type
	UTM X	UTM Y	2024	2025	2026	2027	2028	2029	($\mu g/m^3$)		
582471.13_4130984.94	582471.13	4130984.94	3.23E-06	9.25E-06	1.56E-05	7.04E-06	7.03E-06	6.93E-06	1.56E-05	2026	Res
582527.7_4130984.94	582527.7	4130984.94	2.99E-06	8.56E-06	1.48E-05	6.44E-06	6.43E-06	6.34E-06	1.48E-05	2026	Res
582584.27_4130984.94	582584.27	4130984.94	2.80E-06	8.02E-06	1.42E-05	5.96E-06	5.95E-06	5.86E-06	1.42E-05	2026	Res
582640.84_4130984.94	582640.84	4130984.94	2.64E-06	7.59E-06	1.38E-05	5.57E-06	5.55E-06	5.47E-06	1.38E-05	2026	Res
582697.41_4130984.94	582697.41	4130984.94	2.51E-06	7.20E-06	1.34E-05	5.22E-06	5.19E-06	5.12E-06	1.34E-05	2026	Res
582753.98_4130984.94	582753.98	4130984.94	2.40E-06	6.90E-06	1.31E-05	4.94E-06	4.90E-06	4.83E-06	1.31E-05	2026	Res
582810.55_4130984.94	582810.55	4130984.94	2.30E-06	6.62E-06	1.28E-05	4.68E-06	4.62E-06	4.56E-06	1.28E-05	2026	Res
582867.12_4130984.94	582867.12	4130984.94	2.21E-06	6.37E-06	1.26E-05	4.45E-06	4.38E-06	4.32E-06	1.26E-05	2026	Res
581735.72_4131068.85	581735.72	4131068.85	5.17E-05	1.50E-04	1.56E-04	1.34E-04	1.32E-04	1.30E-04	1.56E-04	2026	Res
581792.29_4131068.85	581792.29	4131068.85	4.14E-05	1.20E-04	1.26E-04	1.07E-04	1.05E-04	1.03E-04	1.26E-04	2026	Res
581848.86_4131068.85	581848.86	4131068.85	2.27E-05	6.56E-05	7.36E-05	5.78E-05	5.67E-05	5.58E-05	7.36E-05	2026	Res
581905.43_4131068.85	581905.43	4131068.85	1.48E-05	4.26E-05	5.09E-05	3.69E-05	3.62E-05	3.57E-05	5.09E-05	2026	Res
581962_4131068.85	581962	4131068.85	1.09E-05	3.14E-05	3.97E-05	2.68E-05	2.63E-05	2.59E-05	3.97E-05	2026	Res
582018.57_4131068.85	582018.57	4131068.85	8.45E-06	2.43E-05	3.23E-05	2.03E-05	2.00E-05	1.97E-05	3.23E-05	2026	Res
582075.14_4131068.85	582075.14	4131068.85	6.83E-06	1.96E-05	2.74E-05	1.61E-05	1.59E-05	1.57E-05	2.74E-05	2026	Res
582131.71_4131068.85	582131.71	4131068.85	5.73E-06	1.64E-05	2.39E-05	1.33E-05	1.31E-05	1.29E-05	2.39E-05	2026	Res
582188.28_4131068.85	582188.28	4131068.85	4.91E-06	1.41E-05	2.13E-05	1.12E-05	1.11E-05	1.10E-05	2.13E-05	2026	Res
582244.85_4131068.85	582244.85	4131068.85	4.30E-06	1.23E-05	1.93E-05	9.70E-06	9.64E-06	9.51E-06	1.93E-05	2026	Res
582301.42_4131068.85	582301.42	4131068.85	3.82E-06	1.09E-05	1.76E-05	8.52E-06	8.50E-06	8.37E-06	1.76E-05	2026	Res
582357.99_4131068.85	582357.99	4131068.85	3.44E-06	9.85E-06	1.62E-05	7.58E-06	7.58E-06	7.48E-06	1.62E-05	2026	Res
582414.56_4131068.85	582414.56	4131068.85	3.13E-06	8.97E-06	1.51E-05	6.83E-06	6.86E-06	6.76E-06	1.51E-05	2026	Res
582471.13_4131068.85	582471.13	4131068.85	2.88E-06	8.25E-06	1.42E-05	6.22E-06	6.26E-06	6.17E-06	1.42E-05	2026	Res
582527.7_4131068.85	582527.7	4131068.85	2.67E-06	7.64E-06	1.34E-05	5.71E-06	5.76E-06	5.68E-06	1.34E-05	2026	Res
582584.27_4131068.85	582584.27	4131068.85	2.48E-06	7.12E-06	1.27E-05	5.27E-06	5.32E-06	5.25E-06	1.27E-05	2026	Res
582640.84_4131068.85	582640.84	4131068.85	2.35E-06	6.75E-06	1.22E-05	4.95E-06	5.00E-06	4.93E-06	1.22E-05	2026	Res
582697.41_4131068.85	582697.41	4131068.85	2.23E-06	6.41E-06	1.18E-05	4.66E-06	4.71E-06	4.64E-06	1.18E-05	2026	Res
582753.98_4131068.85	582753.98	4131068.85	2.14E-06	6.15E-06	1.15E-05	4.43E-06	4.47E-06	4.40E-06	1.15E-05	2026	Res
582810.55_4131068.85	582810.55	4131068.85	2.06E-06	5.92E-06	1.13E-05	4.23E-06	4.25E-06	4.19E-06	1.13E-05	2026	Res
582867.12_4131068.85	582867.12	4131068.85	1.97E-06	5.68E-06	1.10E-05	4.01E-06	4.03E-06	3.97E-06	1.10E-05	2026	Res
582018.57_4131152.76	582018.57	4131152.76	5.90E-06	1.69E-05	2.49E-05	1.36E-05	1.35E-05	1.33E-05	2.49E-05	2026	Res
582244.85_4131152.76	582244.85	4131152.76	3.72E-06	1.07E-05	1.75E-05	8.20E-06	8.19E-06	8.07E-06	1.75E-05	2026	Res
582301.42_4131152.76	582301.42	4131152.76	3.38E-06	9.68E-06	1.63E-05	7.38E-06	7.39E-06	7.28E-06	1.63E-05	2026	Res
582357.99_4131152.76	582357.99	4131152.76	3.08E-06	8.81E-06	1.51E-05	6.65E-06	6.68E-06	6.59E-06	1.51E-05	2026	Res
582414.56_4131152.76	582414.56	4131152.76	2.82E-06	8.09E-06	1.41E-05	6.05E-06	6.10E-06	6.01E-06	1.41E-05	2026	Res
582471.13_4131152.76	582471.13	4131152.76	2.58E-06	7.40E-06	1.32E-05	5.48E-06	5.55E-06	5.47E-06	1.32E-05	2026	Res
582527.7_4131152.76	582527.7	4131152.76	2.39E-06	6.85E-06	1.24E-05	5.03E-06	5.12E-06	5.04E-06	1.24E-05	2026	Res
582584.27_4131152.76	582584.27	4131152.76	2.23E-06	6.38E-06	1.17E-05	4.65E-06	4.74E-06	4.67E-06	1.17E-05	2026	Res
582640.84_4131152.76	582640.84	4131152.76	2.09E-06	6.00E-06	1.12E-05	4.34E-06	4.44E-06	4.38E-06	1.12E-05	2026	Res
582697.41_4131152.76	582697.41	4131152.76	1.98E-06	5.67E-06	1.07E-05	4.08E-06	4.18E-06	4.12E-06	1.07E-05	2026	Res
582753.98_4131152.76	582753.98	4131152.76	1.89E-06	5.44E-06	1.04E-05	3.88E-06	3.98E-06	3.93E-06	1.04E-05	2026	Res
582810.55_4131152.76	582810.55	4131152.76	1.82E-06	5.22E-06	1.01E-05	3.71E-06	3.80E-06	3.75E-06	1.01E-05	2026	Res
582867.12_4131152.76	582867.12	4131152.76	1.74E-06	5.00E-06	9.76E-06	3.52E-06	3.61E-06	3.56E-06	9.76E-06	2026	Res

B-4 Chronic Hazard Index Calculations

HRA Permanente Creek Restoration Project

Construction Year 2024

Emissions Inputs

Construction Activity	Construction Year & Source	DPM Exhaust (tons/year)	PM10 Dust for speciation (tons/year)	Arsenic (tons/year)	Beryllium (tons/year)	Cadmium (tons/year)	Cobalt (tons/year)	Copper (tons/year)	Lead (tons/year)	Mercury (tons/year)	Nickel (tons/year)	Selenium (tons/year)	Chromium VI (tons/year)	Crystalline Silica (tons/year)
Concrete Channel 2024	2024_CONCRTE	0.000	0.00	2.91E-12	1.74E-12	2.91E-12	1.49E-11	3.26E-11	2.91E-12	4.65E-13	5.35E-11	5.81E-12	2.33E-13	8.63E-09
Paved road	2024_PAVED	2.07E-04	0.08	1.04E-07	6.26E-08	1.04E-07	6.68E-08	2.09E-06	1.92E-07	1.17E-08	4.51E-06	2.09E-07	1.59E-07	5.93E-04
Unpaved road	2024_CCP_UNPV	6.27E-05	0.20	2.56E-07	1.54E-07	2.56E-07	1.64E-07	5.12E-06	4.71E-07	2.87E-08	1.11E-05	5.12E-07	3.89E-07	1.46E-03
Channel Widening 2024	2024_CHAN_RCK	0.002	0.16	2.05E-07	1.23E-07	2.05E-07	1.05E-06	2.29E-06	2.05E-07	3.28E-08	3.77E-06	4.09E-07	1.64E-08	6.08E-04
Paved road	2024_PAVED	1.80E-03	2.39	2.99E-06	1.79E-06	2.99E-06	1.91E-06	5.98E-05	5.50E-06	3.35E-07	1.29E-04	5.98E-06	4.54E-06	1.70E-02
Rock Pile Area 2025	2025_CHAN_RCK	0.006	0.25	3.16E-07	1.89E-07	3.16E-07	1.62E-06	3.54E-06	3.16E-07	5.05E-08	5.81E-06	6.31E-07	2.53E-08	9.37E-04
Paved road	2025_PAVED	5.95E-03	2.44	3.05E-06	1.83E-06	3.05E-06	1.95E-06	6.10E-05	5.61E-06	3.41E-07	1.32E-04	6.10E-06	4.63E-06	1.73E-02
Rock Pile Area 2026	2026_CHAN_RCK	0.006	0.25	3.16E-07	1.89E-07	3.16E-07	1.62E-06	3.54E-06	3.16E-07	5.05E-08	5.81E-06	6.31E-07	2.53E-08	9.37E-04
Paved road	2026_PAVED	5.84E-03	2.44	3.05E-06	1.83E-06	3.05E-06	1.95E-06	6.10E-05	5.61E-06	3.41E-07	1.32E-04	6.10E-06	4.63E-06	1.73E-02
Channel Widening 2027	2027_CHAN_RCK	0.002	0.98	1.23E-06	7.36E-07	1.23E-06	6.28E-06	1.37E-05	1.23E-06	1.96E-07	2.26E-05	2.45E-06	9.82E-08	3.64E-03
Paved road	2027_PAVED	5.61E-03	2.39	2.99E-06	1.79E-06	2.99E-06	1.91E-06	5.98E-05	5.50E-06	3.35E-07	1.29E-04	5.98E-06	4.54E-06	1.70E-02
Material Removal 2028	2028_MATRMVL	0.001	0.25	3.15E-07	1.89E-07	3.15E-07	1.62E-06	3.53E-06	3.15E-07	5.05E-08	5.80E-06	6.31E-07	2.52E-08	9.37E-04
Paved road	2028_PAVED	5.57E-03	2.39	2.99E-06	1.80E-06	2.99E-06	1.92E-06	5.98E-05	5.51E-06	3.35E-07	1.29E-04	5.98E-06	4.55E-06	1.70E-02
Unpaved road	2028_UNPAVED	3.40E-03	11.84	1.48E-05	8.88E-06	1.48E-05	9.47E-06	2.96E-04	2.72E-05	1.66E-06	6.40E-04	2.96E-05	2.25E-05	8.41E-02
Material Removal 2029	2029_MATRMVL	0.001	0.25	3.15E-07	1.89E-07	3.15E-07	1.62E-06	3.53E-06	3.15E-07	5.05E-08	5.80E-06	6.31E-07	2.52E-08	9.37E-04
Paved road	2029_PAVED	5.56E-03	2.41	3.01E-06	1.81E-06	3.01E-06	1.93E-06	6.03E-05	5.55E-06	3.38E-07	1.30E-04	6.03E-06	4.58E-06	1.71E-02
Unpaved road	2029_UNPAVED	3.39E-03	11.93	1.49E-05	8.95E-06	1.49E-05	9.55E-06	2.98E-04	2.74E-05	1.67E-06	6.44E-04	2.98E-05	2.27E-05	8.47E-02

Construction Activity	Construction Year	DPM (g/s)	Arsenic (g/s)	Beryllium (g/s)	Cadmium (g/s)	Cobalt (g/s)	Copper (g/s)	Lead (g/s)	Mercury (g/s)	Nickel (g/s)	Selenium (g/s)	Chromium VI (g/s)	Crystalline Silica (g/s)
Concrete Channel 2024	2024_CONCRTE	2.877E-07	8.36E-14	5.02E-14	8.36E-14	4.28E-13	9.37E-13	8.36E-14	1.34E-14	1.54E-12	1.67E-13	6.69E-15	2.48E-10
Paved road	2024_PAVED	5.948E-06	3.00E-09	1.80E-09	3.00E-09	1.92E-09	6.01E-08	5.53E-09	3.36E-10	1.30E-07	6.01E-09	4.56E-09	1.71E-05
Unpaved road	2024_CCP_UNPV	1.802E-06	7.37E-09	4.42E-09	7.37E-09	4.72E-09	1.47E-07	1.36E-08	8.26E-10	3.18E-07	1.47E-08	1.12E-08	4.19E-05
Channel Widening 2024	2024_CHAN_RCK	5.566E-05	5.889E-09	3.533E-09	5.889E-09	3.015E-08	6.595E-08	5.889E-09	9.422E-10	1.084E-07	1.178E-08	4.711E-10	1.749E-05
Paved road	2024_PAVED	5.173E-05	8.597E-08	5.158E-08	8.597E-08	5.502E-08	1.719E-06	1.582E-07	9.629E-09	3.714E-06	1.719E-07	1.307E-07	4.883E-04
Rock Pile Area 2025	2025_CHAN_RCK	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Paved road	2025_PAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Rock Pile Area 2026	2026_CHAN_RCK	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Paved road	2026_PAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Channel Widening 2027	2027_CHAN_RCK	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Paved road	2027_PAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Material Removal 2028	2028_MATRMVL	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Paved road	2028_PAVED	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Unpaved road	2028_UNPAVED	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Material Removal 2029	2029_MATRMVL	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Paved road	2029_PAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Unpaved road	2029_UNPAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

N/A = not including PM10 on-site dust in HRA calculation; it is only for speciating metals.

Chronic REL

TAC	UOM	
DPM	µg/m^3	5
Arsenic	µg/m^3	0.015
Beryllium	µg/m^3	0.007
Cadmium	µg/m^3	0.02
Copper	µg/m^3	100
Mercury	µg/m^3	0.032
Nickel	µg/m^3	0.014
Selenium	µg/m^3	20
Chromium VI	µg/m^3	0.2
Crystalline Silica	µg/m^3	3

	Max
CT House	0.001
Res	0.008

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} (µg/m^3)										Chronic Calculation, $\sum C_{TAC}$ /REL	
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Copper	Mercury	Nickel	Selenium	Chromium VI	Crystalline Silica	Total HI	Receptor Type
			5	0.015	0.007	0.02	100	0.032	0.014	20	0.2	3		
581336.22_4131207.48	581336.22	4131207.48	6.80E-05	1.05E-07	6.28E-08	1.05E-07	2.09E-06	1.17E-08	4.51E-06	2.09E-07	1.59E-07	5.94E-04	0.00055633	CT House
581554.22_4130688.06	581554.22	4130688.06	4.73E-05	7.23E-08	4.34E-08	7.23E-08	1.44E-06	8.11E-09	3.12E-06	1.45E-07	1.09E-07	4.10E-04	0.000383995	Res
579793.36_4131503.29	579793.36	4131503.29	4.22E-06	3.82E-09	2.29E-09	3.82E-09	7.46E-08	4.38E-10	1.60E-07	7.64E-09	5.51E-09	2.11E-05	2.0132E-05	Acute
580488.37_4131517.71	580488.37	4131517.71	5.66E-06	7.89E-09	4.73E-09	7.89E-09	1.57E-07	8.89E-10	3.38E-07	1.58E-08	1.18E-08	4.45E-05	4.17598E-05	Acute
581678.43_4131040.03	581678.43	4131040.03	2.14E-04	3.30E-07	1.98E-07	3.30E-07	6.60E-06	3.70E-08	1.43E-05	6.60E-07	5.01E-07	1.87E-03	0.001756077	Res
581635.43_4130978.54	581635.43	4130978.54	4.33E-04	6.68E-07	4.01E-07	6.68E-07	1.34E-05	7.48E-08	2.88E-05	1.34E-06	1.01E-06	3.79E-03	0.003554185	Res
581830.06_4131027.55	581830.06	4131027.55	1.97E-04	3.03E-07	1.82E-07	3.03E-07	6.07E-06	3.40E-08	1.31E-05	6.07E-07	4.61E-07	1.72E-03	0.00161475	Res
581727.48_4130976.54	581727.48	4130976.54	5.24E-04	8.07E-07	4.84E-07	8.07E-07	1.61E-05	9.04E-08	3.49E-05	1.61E-06	1.23E-06	4.58E-03	0.004295471	Res
581789.11_4130419.65	581789.11	4130419.65	3.68E-05	5.44E-08	3.27E-08	5.44E-08	1.09E-06	6.11E-09	2.34E-06	1.09E-07	8.23E-08	3.08E-04	0.000289155	Res
581700.32_4130781.89	581700.32	4130781.89	1.05E-04	1.62E-07	9.74E-08	1.62E-07	3.25E-06	1.82E-08	7.01E-06	3.25E-07	2.47E-07	9.22E-04	0.000863806	Res
581426.07_4131299.01	581426.07	4131299.01	2.49E-05	3.77E-08	2.26E-08	3.77E-08	7.53E-07	4.23E-09	1.63E-06	7.54E-08	5.72E-08	2.14E-04	0.000200494	Acute
582301.42_4129474.56	582301.42	4129474.56	1.32E-05	1.75E-08	1.05E-08	1.75E-08	3.48E-07	1.98E-09	7.50E-07	3.51E-08	2.62E-08	9.88E-05	9.29423E-05	Res
582357.99_4129474.56	582357.99	4129474.56	1.24E-05	1.63E-08	9.79E-09	1.63E-08	3.24E-07	1.84E-09	6.98E-07	3.26E-08	2.44E-08	9.19E-05	8.64056E-05	Res
582414.56_4129474.56	582414.56	4129474.56	1.16E-05	1.52E-08	9.11E-09	1.52E-08	3.01E-07	1.71E-09	6.49E-07	3.04E-08	2.27E-08	8.55E-05	8.04285E-05	Res
582471.13_4129474.56	582471.13	4129474.56	1.09E-05	1.42E-08	8.49E-09	1.42E-08	2.81E-07	1.60E-09	6.05E-07	2.83E-08	2.11E-08	7.97E-05	7.49901E-05	Res
582527.7_4129474.56	582527.7	4129474.56	1.03E-05	1.33E-08	7.97E-09	1.33E-08	2.63E-07	1.50E-09	5.68E-07	2.66E-08	1.98E-08	7.48E-05	7.0359E-05	Res
582584.27_4129474.56	582584.27	4129474.56	9.65E-06	1.24E-08	7.44E-09	1.24E-08	2.46E-07	1.40E-09	5.30E-07	2.48E-08	1.85E-08	6.98E-05	6.56808E-05	Res
582640.84_4129474.56	582640.84	4129474.56	9.01E-06	1.15E-08	6.90E-09	1.15E-08	2.28E-07	1.30E-09	4.91E-07	2.30E-08	1.71E-08	6.47E-05	6.08835E-05	Res
582244.85_4129558.47	582244.85	4129558.47	1.37E-05	1.76E-08	1.06E-08	1.76E-08	3.50E-07	1.99E-09	7.53E-07	3.53E-08	2.63E-08	9.92E-05	9.34052E-05	Res
582301.42_4129558.47	582301.42	4129558.47	1.34E-05	1.77E-08	1.06E-08	1.77E-08	3.51E-07	1.99E-09	7.55E-07	3.53E-08	2.64E-08	9.95E-05	9.35626E-05	Res
582357.99_4129558.47	582357.99	4129558.47	1.26E-05	1.66E-08	9.97E-09	1.66E-08	3.30E-07	1.88E-09	7.11E-07	3.32E-08	2.48E-08	9.36E-05	8.80389E-05	Res
582414.56_4129558.47	582414.56	4129558.47	1.18E-05	1.55E-08	9.28E-09	1.55E-08	3.07E-07	1.75E-09	6.61E-07	3.09E-08	2.31E-08	8.71E-05	8.1947E-05	Res
582471.13_4129558.47	582471.13	4129558.47	1.10E-05	1.43E-08	8.59E-09	1.43E-08	2.84E-07	1.62E-09	6.12E-07	2.86E-08	2.14E-08	8.06E-05	7.5834E-05	Res
582527.7_4129558.47	582527.7	4129558.47	1.03E-05	1.33E-08	7.99E-09	1.33E-08	2.64E-07	1.50E-09	5.69E-07	2.66E-08	1.99E-08	7.49E-05	7.05197E-05	Res
582584.27_4129558.47	582584.27	4129558.47	9.66E-06	1.24E-08	7.43E-09	1.24E-08	2.46E-07	1.40E-09	5.29E-07	2.48E-08	1.85E-08	6.97E-05	6.55829E-05	Res
582640.84_4129558.47	582640.84	4129558.47	9.11E-06	1.16E-08	6.96E-09	1.16E-08	2.30E-07	1.31E-09	4.96E-07	2.32E-08	1.73E-08	6.53E-05	6.14681E-05	Res
582697.41_4129558.47	582697.41	4129558.47	8.58E-06	1.09E-08	6.52E-09	1.09E-08	2.15E-07	1.23E-09	4.64E-07	2.17E-08	1.62E-08	6.11E-05	5.75696E-05	Res
582244.85_4129642.38	582244.85	4129642.38	1.24E-05	1.50E-08	9.00E-09	1.50E-08	2.97E-07	1.70E-09	6.39E-07	3.00E-08	2.23E-08	8.42E-05	7.94233E-05	Res
582301.42_4129642.38	582301.42	4129642.38	1.32E-05	1.70E-08	1.02E-08	1.70E-08	3.37E-07	1.92E-09	7.25E-07	3.40E-08	2.53E-08	9.55E-05	8.9913E-05	Res
582357.99_4129642.38	582357.99	4129642.38	1.28E-05	1.68E-08	1.01E-08	1.68E-08	3.34E-07	1.90E-09	7.20E-07	3.37E-08	2.52E-08	9.48E-05	8.91874E-05	Res
582414.56_4129642.38	582414.56	4129642.38	1.20E-05	1.57E-08	9.43E-09	1.57E-08	3.12E-07	1.77E-09	6.72E-07	3.14E-08	2.35E-08	8.85E-05	8.33083E-05	Res
582471.13_4129642.38	582471.13	4129642.38	1.13E-05	1.46E-08	8.78E-09	1.46E-08	2.90E-07	1.65E-09	6.26E-07	2.93E-08	2.19E-08	8.24E-05	7.75148E-05	Res
582527.7_4129642.38	582527.7	4129642.38	1.06E-05	1.37E-08	8.20E-09	1.37E-08	2.71E-07	1.54E-09	5.84E-07	2.73E-08	2.04E-08	7.69E-05	7.23905E-05	Res
582584.27_4129642.38	582584.27	4129642.38	9.84E-06	1.26E-08	7.58E-09	1.26E-08	2.51E-07	1.43E-09	5.40E-07	2.53E-08	1.89E-08	7.12E-05	6.69914E-05	Res

Chronic Calculation, $\sum C_{TAC}$ /REL

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)										Total HI	Receptor Type
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Copper	Mercury	Nickel	Selenium	Chromium VI	Crystalline Silica		
582640.84_4129642.38	582640.84	4129642.38	9.22E-06	1.18E-08	7.06E-09	1.18E-08	2.33E-07	1.33E-09	5.03E-07	2.35E-08	1.76E-08	6.63E-05	6.23743E-05	Res
582697.41_4129642.38	582697.41	4129642.38	8.66E-06	1.10E-08	6.59E-09	1.10E-08	2.18E-07	1.24E-09	4.69E-07	2.20E-08	1.64E-08	6.18E-05	5.81932E-05	Res
582753.98_4129642.38	582753.98	4129642.38	8.11E-06	1.02E-08	6.14E-09	1.02E-08	2.03E-07	1.16E-09	4.37E-07	2.05E-08	1.53E-08	5.75E-05	5.41808E-05	Res
582810.55_4129642.38	582810.55	4129642.38	7.63E-06	9.55E-09	5.73E-09	9.55E-09	1.89E-07	1.08E-09	4.08E-07	1.91E-08	1.42E-08	5.37E-05	5.06132E-05	Res
582867.12_4129642.38	582867.12	4129642.38	7.11E-06	8.83E-09	5.30E-09	8.83E-09	1.75E-07	9.98E-10	3.77E-07	1.77E-08	1.32E-08	4.96E-05	4.67699E-05	Res
582244.85_4129726.29	582244.85	4129726.29	1.33E-05	1.66E-08	9.94E-09	1.66E-08	3.28E-07	1.87E-09	7.07E-07	3.31E-08	2.47E-08	9.32E-05	8.77756E-05	Res
582301.42_4129726.29	582301.42	4129726.29	1.29E-05	1.63E-08	9.77E-09	1.63E-08	3.23E-07	1.84E-09	6.96E-07	3.26E-08	2.43E-08	9.16E-05	8.62702E-05	Res
582357.99_4129726.29	582357.99	4129726.29	1.29E-05	1.69E-08	1.01E-08	1.69E-08	3.35E-07	1.90E-09	7.22E-07	3.38E-08	2.52E-08	9.51E-05	8.94463E-05	Res
582414.56_4129726.29	582414.56	4129726.29	1.22E-05	1.60E-08	9.59E-09	1.60E-08	3.17E-07	1.80E-09	6.84E-07	3.20E-08	2.39E-08	9.00E-05	8.47099E-05	Res
582471.13_4129726.29	582471.13	4129726.29	1.15E-05	1.50E-08	8.98E-09	1.50E-08	2.97E-07	1.69E-09	6.40E-07	2.99E-08	2.24E-08	8.43E-05	7.93159E-05	Res
582527.7_4129726.29	582527.7	4129726.29	1.08E-05	1.40E-08	8.38E-09	1.40E-08	2.77E-07	1.58E-09	5.98E-07	2.79E-08	2.09E-08	7.87E-05	7.40541E-05	Res
582584.27_4129726.29	582584.27	4129726.29	1.01E-05	1.30E-08	7.81E-09	1.30E-08	2.58E-07	1.47E-09	5.57E-07	2.60E-08	1.95E-08	7.33E-05	6.90072E-05	Res
582640.84_4129726.29	582640.84	4129726.29	9.43E-06	1.21E-08	7.26E-09	1.21E-08	2.40E-07	1.37E-09	5.18E-07	2.42E-08	1.81E-08	6.82E-05	6.41581E-05	Res
582697.41_4129726.29	582697.41	4129726.29	8.76E-06	1.12E-08	6.70E-09	1.12E-08	2.21E-07	1.26E-09	4.77E-07	2.23E-08	1.67E-08	6.28E-05	5.91443E-05	Res
582753.98_4129726.29	582753.98	4129726.29	8.11E-06	1.02E-08	6.14E-09	1.02E-08	2.03E-07	1.16E-09	4.37E-07	2.05E-08	1.53E-08	5.76E-05	5.42463E-05	Res
582810.55_4129726.29	582810.55	4129726.29	7.44E-06	9.29E-09	5.58E-09	9.29E-09	1.84E-07	1.05E-09	3.97E-07	1.86E-08	1.38E-08	5.23E-05	4.92253E-05	Res
582244.85_4129810.2	582244.85	4129810.2	1.30E-05	1.59E-08	9.57E-09	1.59E-08	3.16E-07	1.80E-09	6.80E-07	3.19E-08	2.37E-08	8.96E-05	8.44644E-05	Res
582301.42_4129810.2	582301.42	4129810.2	1.29E-05	1.65E-08	9.88E-09	1.65E-08	3.27E-07	1.86E-09	7.03E-07	3.29E-08	2.46E-08	9.27E-05	8.72287E-05	Res
582357.99_4129810.2	582357.99	4129810.2	1.27E-05	1.65E-08	9.93E-09	1.65E-08	3.28E-07	1.87E-09	7.08E-07	3.31E-08	2.47E-08	9.32E-05	8.76812E-05	Res
582414.56_4129810.2	582414.56	4129810.2	1.22E-05	1.61E-08	9.63E-09	1.61E-08	3.19E-07	1.81E-09	6.87E-07	3.21E-08	2.40E-08	9.04E-05	8.50737E-05	Res
582471.13_4129810.2	582471.13	4129810.2	1.16E-05	1.52E-08	9.11E-09	1.52E-08	3.01E-07	1.71E-09	6.50E-07	3.04E-08	2.27E-08	8.55E-05	8.04707E-05	Res
582527.7_4129810.2	582527.7	4129810.2	1.09E-05	1.42E-08	8.50E-09	1.42E-08	2.81E-07	1.60E-09	6.06E-07	2.83E-08	2.12E-08	7.98E-05	7.50549E-05	Res
582584.27_4129810.2	582584.27	4129810.2	1.01E-05	1.31E-08	7.87E-09	1.31E-08	2.60E-07	1.48E-09	5.61E-07	2.62E-08	1.96E-08	7.39E-05	6.95468E-05	Res
582640.84_4129810.2	582640.84	4129810.2	9.30E-06	1.19E-08	7.17E-09	1.19E-08	2.37E-07	1.35E-09	5.11E-07	2.39E-08	1.79E-08	6.73E-05	6.33373E-05	Res
582697.41_4129810.2	582697.41	4129810.2	8.56E-06	1.09E-08	6.54E-09	1.09E-08	2.16E-07	1.23E-09	4.66E-07	2.18E-08	1.63E-08	6.14E-05	5.78019E-05	Res
581905.43_4129894.11	581905.43	4129894.11	1.57E-05	2.11E-08	1.26E-08	2.11E-08	4.19E-07	2.37E-09	9.03E-07	4.21E-08	3.16E-08	1.19E-04	0.000111724	Res
581962_4129894.11	581962	4129894.11	1.67E-05	2.11E-08	1.27E-08	2.11E-08	4.19E-07	2.39E-09	9.03E-07	4.23E-08	3.15E-08	1.19E-04	0.000111941	Res
582131.71_4129894.11	582131.71	4129894.11	1.48E-05	1.83E-08	1.10E-08	1.83E-08	3.62E-07	2.07E-09	7.81E-07	3.66E-08	2.72E-08	1.03E-04	9.68905E-05	Res
582188.28_4129894.11	582188.28	4129894.11	1.41E-05	1.76E-08	1.06E-08	1.76E-08	3.50E-07	1.99E-09	7.53E-07	3.53E-08	2.63E-08	9.92E-05	9.34546E-05	Res
582244.85_4129894.11	582244.85	4129894.11	1.37E-05	1.75E-08	1.05E-08	1.75E-08	3.46E-07	1.97E-09	7.46E-07	3.49E-08	2.61E-08	9.82E-05	9.24921E-05	Res
582301.42_4129894.11	582301.42	4129894.11	1.31E-05	1.70E-08	1.02E-08	1.70E-08	3.38E-07	1.92E-09	7.28E-07	3.41E-08	2.54E-08	9.59E-05	9.02437E-05	Res
582357.99_4129894.11	582357.99	4129894.11	1.25E-05	1.63E-08	9.79E-09	1.63E-08	3.24E-07	1.84E-09	6.98E-07	3.26E-08	2.44E-08	9.19E-05	8.64831E-05	Res
582414.56_4129894.11	582414.56	4129894.11	1.24E-05	1.64E-08	9.87E-09	1.64E-08	3.27E-07	1.85E-09	7.04E-07	3.29E-08	2.46E-08	9.27E-05	8.71815E-05	Res
582471.13_4129894.11	582471.13	4129894.11	1.16E-05	1.53E-08	9.17E-09	1.53E-08	3.03E-07	1.72E-09	6.54E-07	3.06E-08	2.29E-08	8.61E-05	8.10175E-05	Res
582527.7_4129894.11	582527.7	4129894.11	1.07E-05	1.40E-08	8.41E-09	1.40E-08	2.78E-07	1.58E-09	6.00E-07	2.80E-08	2.10E-08	7.90E-05	7.43108E-05	Res
582584.27_4129894.11	582584.27	4129894.11	9.85E-06	1.28E-08	7.67E-09	1.28E-08	2.54E-07	1.44E-09	5.47E-07	2.56E-08	1.91E-08	7.20E-05	6.77906E-05	Res
582640.84_4129894.11	582640.84	4129894.11	9.04E-06	1.16E-08	6.98E-09	1.16E-08	2.31E-07	1.31E-09	4.97E-07	2.33E-08	1.74E-08	6.55E-05	6.16308E-05	Res
582697.41_4129894.11	582697.41	4129894.11	8.29E-06	1.06E-08	6.33E-09	1.06E-08	2.09E-07	1.19E-09	4.51E-07	2.11E-08	1.58E-08	5.94E-05	5.59269E-05	Res
581962_4129978.02	581962	4129978.02	1.72E-05	2.19E-08	1.32E-08	2.19E-08	4.35E-07	2.48E-09	9.37E-07	4.39E-08	3.28E-08	1.23E-04	0.000116223	Res
582018.57_4129978.02	582018.57	4129978.02	1.64E-05	2.05E-08	1.23E-08	2.05E-08	4.07E-07	2.32E-09	8.77E-07	4.11E-08	3.06E-08	1.16E-04	0.000108837	Res
582075.14_4129978.02	582075.14	4129978.02	1.67E-05	2.14E-08	1.28E-08	2.14E-08	4.24E-07	2.41E-09	9.14E-07	4.28E-08	3.19E-08	1.20E-04	0.000113347	Res
582131.71_4129978.02	582131.71	4129978.02	1.64E-05	2.16E-08	1.29E-08	2.16E-08	4.28E-07	2.43E-09	9.22E-07	4.31E-08	3.23E-08	1.21E-04	0.000114269	Res
582188.28_4129978.02	582188.28	4129978.02	1.62E-05	2.19E-08	1.31E-08	2.19E-08	4.35E-07	2.47E-09	9.38E-07	4.38E-08	3.28E-08	1.24E-04	0.000116136	Res
582244.85_4129978.02	582244.85	4129978.02	1.47E-05	1.97E-08	1.18E-08	1.97E-08	3.91E-07	2.22E-09	8.44E-07	3.94E-08	2.95E-08	1.11E-04	0.000104445	Res
582301.42_4129978.02	582301.42	4129978.02	1.44E-05	1.94E-08	1.16E-08	1.94E-08	3.86E-07	2.19E-09	8.32E-07	3.88E-08	2.91E-08	1.09E-04	0.000102914	Res
582357.99_4129978.02	582357.99	4129978.02	1.35E-05	1.82E-08	1.09E-08	1.82E-08	3.61E-07	2.05E-09	7.79E-07	3.64E-08	2.73E-08	1.03E-04	9.64085E-05	Res
582414.56_4129978.02	582414.56	4129978.02	1.25E-05	1.67E-08	1.00E-08	1.67E-08	3.32E-07	1.88E-09	7.16E-07	3.34E-08	2.51E-08	9.43E-05	8.86615E-05	Res

Chronic Calculation, $\sum C_{TAC}$ /REL

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)										Total HI	Receptor Type
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Copper	Mercury	Nickel	Selenium	Chromium VI	Crystalline Silica		
582471.13_4129978.02	582471.13	4129978.02	1.15E-05	1.52E-08	9.15E-09	1.52E-08	3.03E-07	1.72E-09	6.53E-07	3.05E-08	2.28E-08	8.60E-05	8.08426E-05	Res
582527.7_4129978.02	582527.7	4129978.02	1.05E-05	1.38E-08	8.30E-09	1.38E-08	2.75E-07	1.56E-09	5.92E-07	2.77E-08	2.07E-08	7.79E-05	7.33072E-05	Res
582584.27_4129978.02	582584.27	4129978.02	9.61E-06	1.25E-08	7.51E-09	1.25E-08	2.48E-07	1.41E-09	5.36E-07	2.50E-08	1.87E-08	7.05E-05	6.63521E-05	Res
582640.84_4129978.02	582640.84	4129978.02	8.79E-06	1.13E-08	6.81E-09	1.13E-08	2.25E-07	1.28E-09	4.85E-07	2.27E-08	1.70E-08	6.39E-05	6.01225E-05	Res
582697.41_4129978.02	582697.41	4129978.02	8.05E-06	1.03E-08	6.16E-09	1.03E-08	2.04E-07	1.16E-09	4.39E-07	2.05E-08	1.53E-08	5.78E-05	5.44045E-05	Res
582753.98_4129978.02	582753.98	4129978.02	7.32E-06	9.21E-09	5.53E-09	9.21E-09	1.83E-07	1.04E-09	3.93E-07	1.84E-08	1.37E-08	5.18E-05	4.88064E-05	Res
582810.55_4129978.02	582810.55	4129978.02	6.53E-06	8.08E-09	4.85E-09	8.08E-09	1.60E-07	9.13E-10	3.45E-07	1.62E-08	1.20E-08	4.54E-05	4.27722E-05	Res
581905.43_4130061.93	581905.43	4130061.93	2.37E-05	3.27E-08	1.96E-08	3.27E-08	6.50E-07	3.68E-09	1.40E-06	6.54E-08	4.91E-08	1.85E-04	0.000173386	Res
581962_4130061.93	581962	4130061.93	2.23E-05	3.07E-08	1.84E-08	3.07E-08	6.11E-07	3.46E-09	1.32E-06	6.14E-08	4.61E-08	1.73E-04	0.000162865	Res
582018.57_4130061.93	582018.57	4130061.93	1.92E-05	2.56E-08	1.54E-08	2.56E-08	5.09E-07	2.88E-09	1.10E-06	5.12E-08	3.84E-08	1.44E-04	0.000135751	Res
582075.14_4130061.93	582075.14	4130061.93	1.72E-05	2.27E-08	1.36E-08	2.27E-08	4.50E-07	2.56E-09	9.70E-07	4.53E-08	3.39E-08	1.28E-04	0.00012019	Res
582131.71_4130061.93	582131.71	4130061.93	1.67E-05	2.25E-08	1.35E-08	2.25E-08	4.47E-07	2.53E-09	9.63E-07	4.50E-08	3.37E-08	1.27E-04	0.000119231	Res
582188.28_4130061.93	582188.28	4130061.93	1.63E-05	2.22E-08	1.33E-08	2.22E-08	4.42E-07	2.50E-09	9.53E-07	4.45E-08	3.34E-08	1.25E-04	0.000117924	Res
582244.85_4130061.93	582244.85	4130061.93	1.58E-05	2.17E-08	1.30E-08	2.17E-08	4.32E-07	2.45E-09	9.32E-07	4.35E-08	3.26E-08	1.23E-04	0.000115261	Res
582301.42_4130061.93	582301.42	4130061.93	1.46E-05	2.00E-08	1.20E-08	2.00E-08	3.98E-07	2.26E-09	8.59E-07	4.01E-08	3.01E-08	1.13E-04	0.000106255	Res
582357.99_4130061.93	582357.99	4130061.93	1.36E-05	1.85E-08	1.11E-08	1.85E-08	3.67E-07	2.08E-09	7.91E-07	3.69E-08	2.77E-08	1.04E-04	9.79115E-05	Res
582414.56_4130061.93	582414.56	4130061.93	1.25E-05	1.68E-08	1.01E-08	1.68E-08	3.35E-07	1.90E-09	7.22E-07	3.37E-08	2.53E-08	9.50E-05	8.93053E-05	Res
582471.13_4130061.93	582471.13	4130061.93	1.13E-05	1.52E-08	9.12E-09	1.52E-08	3.02E-07	1.71E-09	6.52E-07	3.04E-08	2.28E-08	8.58E-05	8.06551E-05	Res
582527.7_4130061.93	582527.7	4130061.93	1.03E-05	1.37E-08	8.20E-09	1.37E-08	2.72E-07	1.54E-09	5.85E-07	2.73E-08	2.05E-08	7.71E-05	7.24791E-05	Res
582584.27_4130061.93	582584.27	4130061.93	9.36E-06	1.23E-08	7.38E-09	1.23E-08	2.44E-07	1.39E-09	5.26E-07	2.46E-08	1.84E-08	6.93E-05	6.51932E-05	Res
582640.84_4130061.93	582640.84	4130061.93	8.50E-06	1.10E-08	6.62E-09	1.10E-08	2.19E-07	1.24E-09	4.72E-07	2.21E-08	1.65E-08	6.21E-05	5.84579E-05	Res
582697.41_4130061.93	582697.41	4130061.93	7.74E-06	9.92E-09	5.95E-09	9.92E-09	1.97E-07	1.12E-09	4.24E-07	1.98E-08	1.48E-08	5.59E-05	5.26006E-05	Res
582753.98_4130061.93	582753.98	4130061.93	7.08E-06	8.96E-09	5.38E-09	8.96E-09	1.78E-07	1.01E-09	3.83E-07	1.79E-08	1.34E-08	5.04E-05	4.7475E-05	Res
582810.55_4130061.93	582810.55	4130061.93	6.47E-06	8.08E-09	4.85E-09	8.08E-09	1.60E-07	9.13E-10	3.45E-07	1.62E-08	1.20E-08	4.55E-05	4.28251E-05	Res
581962_4130145.84	581962	4130145.84	2.52E-05	3.64E-08	2.18E-08	3.64E-08	7.25E-07	4.09E-09	1.56E-06	7.28E-08	5.49E-08	2.06E-04	0.000193231	Res
582018.57_4130145.84	582018.57	4130145.84	2.33E-05	3.35E-08	2.01E-08	3.35E-08	6.68E-07	3.77E-09	1.44E-06	6.70E-08	5.05E-08	1.90E-04	0.0001779	Res
582075.14_4130145.84	582075.14	4130145.84	2.00E-05	2.81E-08	1.69E-08	2.81E-08	5.60E-07	3.17E-09	1.21E-06	5.63E-08	4.23E-08	1.59E-04	0.000149284	Res
582131.71_4130145.84	582131.71	4130145.84	1.85E-05	2.61E-08	1.56E-08	2.61E-08	5.19E-07	2.93E-09	1.12E-06	5.21E-08	3.92E-08	1.47E-04	0.000138323	Res
582188.28_4130145.84	582188.28	4130145.84	1.77E-05	2.50E-08	1.50E-08	2.50E-08	4.98E-07	2.81E-09	1.07E-06	5.00E-08	3.76E-08	1.41E-04	0.000132727	Res
582244.85_4130145.84	582244.85	4130145.84	1.62E-05	2.27E-08	1.36E-08	2.27E-08	4.51E-07	2.55E-09	9.73E-07	4.53E-08	3.41E-08	1.28E-04	0.000120296	Res
582301.42_4130145.84	582301.42	4130145.84	1.47E-05	2.05E-08	1.23E-08	2.05E-08	4.07E-07	2.30E-09	8.78E-07	4.09E-08	3.08E-08	1.16E-04	0.0001086	Res
582357.99_4130145.84	582357.99	4130145.84	1.35E-05	1.85E-08	1.11E-08	1.85E-08	3.69E-07	2.09E-09	7.96E-07	3.71E-08	2.79E-08	1.05E-04	9.84296E-05	Res
582414.56_4130145.84	582414.56	4130145.84	1.23E-05	1.68E-08	1.01E-08	1.68E-08	3.33E-07	1.89E-09	7.19E-07	3.35E-08	2.52E-08	9.46E-05	8.89291E-05	Res
582471.13_4130145.84	582471.13	4130145.84	1.11E-05	1.50E-08	9.01E-09	1.50E-08	2.99E-07	1.69E-09	6.44E-07	3.00E-08	2.25E-08	8.48E-05	7.96893E-05	Res
582527.7_4130145.84	582527.7	4130145.84	9.97E-06	1.33E-08	8.01E-09	1.33E-08	2.65E-07	1.50E-09	5.72E-07	2.67E-08	2.00E-08	7.53E-05	7.08045E-05	Res
582584.27_4130145.84	582584.27	4130145.84	8.96E-06	1.18E-08	7.10E-09	1.18E-08	2.35E-07	1.33E-09	5.07E-07	2.37E-08	1.77E-08	6.67E-05	6.27729E-05	Res
582640.84_4130145.84	582640.84	4130145.84	8.08E-06	1.05E-08	6.32E-09	1.05E-08	2.09E-07	1.19E-09	4.51E-07	2.11E-08	1.58E-08	5.94E-05	5.58585E-05	Res
582697.41_4130145.84	582697.41	4130145.84	7.33E-06	9.43E-09	5.66E-09	9.43E-09	1.87E-07	1.06E-09	4.03E-07	1.89E-08	1.41E-08	5.31E-05	5.00022E-05	Res
582753.98_4130145.84	582753.98	4130145.84	6.70E-06	8.52E-09	5.11E-09	8.52E-09	1.69E-07	9.61E-10	3.64E-07	1.70E-08	1.27E-08	4.79E-05	4.51345E-05	Res
582810.55_4130145.84	582810.55	4130145.84	6.17E-06	7.75E-09	4.65E-09	7.75E-09	1.54E-07	8.75E-10	3.31E-07	1.55E-08	1.16E-08	4.36E-05	4.10445E-05	Res
582867.12_4130145.84	582867.12	4130145.84	5.49E-06	6.77E-09	4.06E-09	6.77E-09	1.34E-07	7.66E-10	2.89E-07	1.35E-08	1.01E-08	3.81E-05	3.5889E-05	Res
581962_4130229.75	581962	4130229.75	2.54E-05	3.67E-08	2.20E-08	3.67E-08	7.31E-07	4.12E-09	1.58E-06	7.33E-08	5.53E-08	2.07E-04	0.00019462	Res
582018.57_4130229.75	582018.57	4130229.75	2.42E-05	3.50E-08	2.10E-08	3.50E-08	6.98E-07	3.94E-09	1.51E-06	7.00E-08	5.28E-08	1.98E-04	0.000185903	Res
582075.14_4130229.75	582075.14	4130229.75	2.24E-05	3.23E-08	1.94E-08	3.23E-08	6.44E-07	3.63E-09	1.39E-06	6.46E-08	4.87E-08	1.83E-04	0.000171461	Res
582131.71_4130229.75	582131.71	4130229.75	2.02E-05	2.89E-08	1.73E-08	2.89E-08	5.76E-07	3.25E-09	1.24E-06	5.78E-08	4.36E-08	1.63E-04	0.000153363	Res
582188.28_4130229.75	582188.28	4130229.75	1.80E-05	2.56E-08	1.54E-08	2.56E-08	5.11E-07	2.88E-09	1.10E-06	5.13E-08	3.86E-08	1.45E-04	0.000136076	Res
582244.85_4130229.75	582244.85	4130229.75	1.62E-05	2.28E-08	1.37E-08	2.28E-08	4.54E-07	2.57E-09	9.80E-07	4.56E-08	3.44E-08	1.29E-04	0.000121124	Res

Chronic Calculation, $\sum C_{TAC}$ /REL

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)										Total HI	Receptor Type
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Copper	Mercury	Nickel	Selenium	Chromium VI	Crystalline Silica		
582301.42_4130229.75	582301.42	4130229.75	1.46E-05	2.04E-08	1.23E-08	2.04E-08	4.07E-07	2.30E-09	8.78E-07	4.09E-08	3.08E-08	1.16E-04	0.000108495	Res
582357.99_4130229.75	582357.99	4130229.75	1.32E-05	1.84E-08	1.10E-08	1.84E-08	3.65E-07	2.07E-09	7.88E-07	3.67E-08	2.76E-08	1.04E-04	9.74384E-05	Res
582414.56_4130229.75	582414.56	4130229.75	1.19E-05	1.63E-08	9.79E-09	1.63E-08	3.25E-07	1.84E-09	7.00E-07	3.26E-08	2.45E-08	9.22E-05	8.65957E-05	Res
582471.13_4130229.75	582471.13	4130229.75	1.06E-05	1.43E-08	8.61E-09	1.43E-08	2.85E-07	1.62E-09	6.15E-07	2.87E-08	2.15E-08	8.10E-05	7.61256E-05	Res
582527.7_4130229.75	582527.7	4130229.75	9.40E-06	1.26E-08	7.57E-09	1.26E-08	2.51E-07	1.42E-09	5.41E-07	2.52E-08	1.89E-08	7.12E-05	6.69097E-05	Res
582584.27_4130229.75	582584.27	4130229.75	8.41E-06	1.11E-08	6.68E-09	1.11E-08	2.21E-07	1.26E-09	4.77E-07	2.23E-08	1.67E-08	6.28E-05	5.90824E-05	Res
582640.84_4130229.75	582640.84	4130229.75	7.58E-06	9.91E-09	5.95E-09	9.91E-09	1.97E-07	1.12E-09	4.24E-07	1.98E-08	1.48E-08	5.58E-05	5.25419E-05	Res
582697.41_4130229.75	582697.41	4130229.75	6.91E-06	8.92E-09	5.35E-09	8.92E-09	1.77E-07	1.01E-09	3.82E-07	1.78E-08	1.33E-08	5.03E-05	4.73148E-05	Res
582753.98_4130229.75	582753.98	4130229.75	6.33E-06	8.08E-09	4.85E-09	8.08E-09	1.60E-07	9.12E-10	3.46E-07	1.62E-08	1.21E-08	4.55E-05	4.28522E-05	Res
582810.55_4130229.75	582810.55	4130229.75	5.86E-06	7.40E-09	4.44E-09	7.40E-09	1.47E-07	8.36E-10	3.16E-07	1.48E-08	1.10E-08	4.16E-05	3.92168E-05	Res
582867.12_4130229.75	582867.12	4130229.75	5.45E-06	6.83E-09	4.10E-09	6.83E-09	1.35E-07	7.71E-10	2.92E-07	1.37E-08	1.02E-08	3.84E-05	3.61737E-05	Res
582018.57_4130313.66	582018.57	4130313.66	2.57E-05	3.74E-08	2.25E-08	3.74E-08	7.46E-07	4.21E-09	1.61E-06	7.49E-08	5.65E-08	2.12E-04	0.000198819	Res
582075.14_4130313.66	582075.14	4130313.66	2.37E-05	3.44E-08	2.06E-08	3.44E-08	6.85E-07	3.86E-09	1.48E-06	6.87E-08	5.19E-08	1.94E-04	0.000182496	Res
582131.71_4130313.66	582131.71	4130313.66	2.08E-05	3.00E-08	1.80E-08	3.00E-08	5.97E-07	3.37E-09	1.29E-06	5.99E-08	4.52E-08	1.69E-04	0.000159057	Res
582188.28_4130313.66	582188.28	4130313.66	1.83E-05	2.61E-08	1.57E-08	2.61E-08	5.20E-07	2.93E-09	1.12E-06	5.22E-08	3.93E-08	1.48E-04	0.000138525	Res
582244.85_4130313.66	582244.85	4130313.66	1.62E-05	2.29E-08	1.38E-08	2.29E-08	4.57E-07	2.58E-09	9.86E-07	4.59E-08	3.46E-08	1.30E-04	0.000121773	Res
582301.42_4130313.66	582301.42	4130313.66	1.45E-05	2.03E-08	1.22E-08	2.03E-08	4.04E-07	2.28E-09	8.71E-07	4.06E-08	3.05E-08	1.15E-04	0.000107678	Res
582357.99_4130313.66	582357.99	4130313.66	1.28E-05	1.78E-08	1.07E-08	1.78E-08	3.53E-07	2.00E-09	7.62E-07	3.55E-08	2.67E-08	1.00E-04	9.42564E-05	Res
582414.56_4130313.66	582414.56	4130313.66	1.12E-05	1.54E-08	9.25E-09	1.54E-08	3.07E-07	1.74E-09	6.61E-07	3.08E-08	2.32E-08	8.71E-05	8.18088E-05	Res
582471.13_4130313.66	582471.13	4130313.66	9.90E-06	1.34E-08	8.05E-09	1.34E-08	2.67E-07	1.51E-09	5.75E-07	2.68E-08	2.01E-08	7.57E-05	7.1149E-05	Res
582527.7_4130313.66	582527.7	4130313.66	8.80E-06	1.18E-08	7.06E-09	1.18E-08	2.34E-07	1.33E-09	5.04E-07	2.35E-08	1.77E-08	6.64E-05	6.24323E-05	Res
582584.27_4130313.66	582584.27	4130313.66	7.89E-06	1.04E-08	6.25E-09	1.04E-08	2.07E-07	1.17E-09	4.46E-07	2.08E-08	1.56E-08	5.87E-05	5.52428E-05	Res
582640.84_4130313.66	582640.84	4130313.66	7.15E-06	9.33E-09	5.60E-09	9.33E-09	1.85E-07	1.05E-09	3.99E-07	1.87E-08	1.40E-08	5.26E-05	4.94843E-05	Res
582697.41_4130313.66	582697.41	4130313.66	6.53E-06	8.43E-09	5.06E-09	8.43E-09	1.67E-07	9.51E-10	3.61E-07	1.69E-08	1.26E-08	4.75E-05	4.46991E-05	Res
582753.98_4130313.66	582753.98	4130313.66	6.00E-06	7.67E-09	4.60E-09	7.67E-09	1.52E-07	8.66E-10	3.28E-07	1.53E-08	1.15E-08	4.32E-05	4.0654E-05	Res
582810.55_4130313.66	582810.55	4130313.66	5.53E-06	7.00E-09	4.20E-09	7.00E-09	1.39E-07	7.90E-10	2.99E-07	1.40E-08	1.04E-08	3.94E-05	3.70903E-05	Res
582867.12_4130313.66	582867.12	4130313.66	5.12E-06	6.42E-09	3.85E-09	6.42E-09	1.27E-07	7.25E-10	2.74E-07	1.28E-08	9.57E-09	3.61E-05	3.39924E-05	Res
581848.86_4130397.57	581848.86	4130397.57	3.49E-05	5.15E-08	3.09E-08	5.15E-08	1.03E-06	5.78E-09	2.22E-06	1.03E-07	7.78E-08	2.92E-04	0.000273597	Res
581905.43_4130397.57	581905.43	4130397.57	3.37E-05	4.99E-08	2.99E-08	4.99E-08	9.95E-07	5.60E-09	2.15E-06	9.98E-08	7.54E-08	2.83E-04	0.000265068	Res
581962_4130397.57	581962	4130397.57	3.17E-05	4.68E-08	2.81E-08	4.68E-08	9.34E-07	5.26E-09	2.02E-06	9.36E-08	7.08E-08	2.65E-04	0.000248717	Res
582018.57_4130397.57	582018.57	4130397.57	2.85E-05	4.17E-08	2.50E-08	4.17E-08	8.32E-07	4.68E-09	1.79E-06	8.34E-08	6.30E-08	2.36E-04	0.000221499	Res
582075.14_4130397.57	582075.14	4130397.57	2.50E-05	3.63E-08	2.18E-08	3.63E-08	7.24E-07	4.08E-09	1.56E-06	7.27E-08	5.49E-08	2.06E-04	0.000192973	Res
582131.71_4130397.57	582131.71	4130397.57	2.15E-05	3.10E-08	1.86E-08	3.10E-08	6.17E-07	3.48E-09	1.33E-06	6.19E-08	4.67E-08	1.75E-04	0.000164419	Res
582188.28_4130397.57	582188.28	4130397.57	1.87E-05	2.68E-08	1.61E-08	2.68E-08	5.33E-07	3.01E-09	1.15E-06	5.35E-08	4.04E-08	1.51E-04	0.000142111	Res
582244.85_4130397.57	582244.85	4130397.57	1.63E-05	2.30E-08	1.38E-08	2.30E-08	4.58E-07	2.58E-09	9.88E-07	4.60E-08	3.46E-08	1.30E-04	0.000122015	Res
582301.42_4130397.57	582301.42	4130397.57	1.41E-05	1.97E-08	1.18E-08	1.97E-08	3.92E-07	2.22E-09	8.46E-07	3.94E-08	2.97E-08	1.11E-04	0.000104581	Res
582357.99_4130397.57	582357.99	4130397.57	1.22E-05	1.68E-08	1.01E-08	1.68E-08	3.34E-07	1.89E-09	7.20E-07	3.35E-08	2.52E-08	9.48E-05	8.90323E-05	Res
582414.56_4130397.57	582414.56	4130397.57	1.06E-05	1.44E-08	8.66E-09	1.44E-08	2.87E-07	1.63E-09	6.19E-07	2.89E-08	2.17E-08	8.15E-05	7.6598E-05	Res
582471.13_4130397.57	582471.13	4130397.57	9.36E-06	1.26E-08	7.55E-09	1.26E-08	2.50E-07	1.42E-09	5.39E-07	2.52E-08	1.89E-08	7.10E-05	6.6735E-05	Res
582527.7_4130397.57	582527.7	4130397.57	8.34E-06	1.11E-08	6.64E-09	1.11E-08	2.20E-07	1.25E-09	4.74E-07	2.21E-08	1.66E-08	6.25E-05	5.87433E-05	Res
582584.27_4130397.57	582584.27	4130397.57	7.50E-06	9.84E-09	5.91E-09	9.84E-09	1.96E-07	1.11E-09	4.21E-07	1.97E-08	1.47E-08	5.55E-05	5.21991E-05	Res
582640.84_4130397.57	582640.84	4130397.57	6.80E-06	8.82E-09	5.29E-09	8.82E-09	1.75E-07	9.95E-10	3.78E-07	1.76E-08	1.32E-08	4.97E-05	4.678E-05	Res
582697.41_4130397.57	582697.41	4130397.57	6.17E-06	7.92E-09	4.75E-09	7.92E-09	1.57E-07	8.94E-10	3.39E-07	1.58E-08	1.18E-08	4.46E-05	4.19852E-05	Res
582753.98_4130397.57	582753.98	4130397.57	5.65E-06	7.17E-09	4.30E-09	7.17E-09	1.42E-07	8.09E-10	3.06E-07	1.43E-08	1.07E-08	4.03E-05	3.79933E-05	Res
582810.55_4130397.57	582810.55	4130397.57	5.19E-06	6.53E-09	3.92E-09	6.53E-09	1.29E-07	7.37E-10	2.79E-07	1.31E-08	9.73E-09	3.67E-05	3.45763E-05	Res
582867.12_4130397.57	582867.12	4130397.57	4.80E-06	5.97E-09	3.58E-09	5.97E-09	1.18E-07	6.74E-10	2.55E-07	1.19E-08	8.89E-09	3.35E-05	3.16043E-05	Res
581848.86_4130481.48	581848.86	4130481.48	4.39E-05	6.62E-08	3.97E-08	6.62E-08	1.32E-06	7.42E-09	2.85E-06	1.32E-07	1.00E-07	3.75E-04	0.000351582	Res
581905.43_4130481.48	581905.43	4130481.48	4.06E-05	6.08E-08	3.65E-08	6.08E-08	1.21E-06	6.83E-09	2.62E-06	1.22E-07	9.21E-08	3.45E-04	0.000323395	Res
581962_4130481.48	581962	4130481.48	3.48E-05	5.17E-08	3.10E-08	5.17E-08	1.03E-06	5.80E-09	2.23E-06	1.03E-07	7.82E-08	2.93E-04	0.000274656	Res

Chronic Calculation, $\sum C_{TAC}$ /REL

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)										Total HI	Receptor Type
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Copper	Mercury	Nickel	Selenium	Chromium VI	Crystalline Silica		
582018.57_4130481.48	582018.57	4130481.48	3.07E-05	4.52E-08	2.71E-08	4.52E-08	9.02E-07	5.08E-09	1.95E-06	9.04E-08	6.84E-08	2.56E-04	0.000240329	Res
582075.14_4130481.48	582075.14	4130481.48	2.60E-05	3.80E-08	2.28E-08	3.80E-08	7.59E-07	4.27E-09	1.64E-06	7.61E-08	5.75E-08	2.15E-04	0.000202145	Res
582131.71_4130481.48	582131.71	4130481.48	2.22E-05	3.21E-08	1.93E-08	3.21E-08	6.41E-07	3.61E-09	1.38E-06	6.43E-08	4.85E-08	1.82E-04	0.000170689	Res
582188.28_4130481.48	582188.28	4130481.48	1.89E-05	2.70E-08	1.62E-08	2.70E-08	5.39E-07	3.04E-09	1.16E-06	5.40E-08	4.08E-08	1.53E-04	0.000143507	Res
582244.85_4130481.48	582244.85	4130481.48	1.59E-05	2.24E-08	1.34E-08	2.24E-08	4.46E-07	2.52E-09	9.62E-07	4.48E-08	3.37E-08	1.27E-04	0.000118914	Res
582301.42_4130481.48	582301.42	4130481.48	1.34E-05	1.87E-08	1.12E-08	1.87E-08	3.72E-07	2.10E-09	8.02E-07	3.73E-08	2.81E-08	1.05E-04	9.90804E-05	Res
582357.99_4130481.48	582357.99	4130481.48	1.15E-05	1.58E-08	9.48E-09	1.58E-08	3.14E-07	1.78E-09	6.78E-07	3.16E-08	2.37E-08	8.92E-05	8.38458E-05	Res
582414.56_4130481.48	582414.56	4130481.48	1.01E-05	1.36E-08	8.18E-09	1.36E-08	2.71E-07	1.53E-09	5.84E-07	2.73E-08	2.05E-08	7.69E-05	7.22975E-05	Res
582471.13_4130481.48	582471.13	4130481.48	8.90E-06	1.19E-08	7.13E-09	1.19E-08	2.36E-07	1.34E-09	5.09E-07	2.38E-08	1.78E-08	6.70E-05	6.30381E-05	Res
582527.7_4130481.48	582527.7	4130481.48	7.92E-06	1.04E-08	6.26E-09	1.04E-08	2.07E-07	1.18E-09	4.47E-07	2.09E-08	1.56E-08	5.88E-05	5.53109E-05	Res
582584.27_4130481.48	582584.27	4130481.48	7.11E-06	9.24E-09	5.54E-09	9.24E-09	1.83E-07	1.04E-09	3.95E-07	1.85E-08	1.38E-08	5.21E-05	4.89969E-05	Res
582640.84_4130481.48	582640.84	4130481.48	6.40E-06	8.22E-09	4.93E-09	8.22E-09	1.63E-07	9.28E-10	3.52E-07	1.64E-08	1.23E-08	4.63E-05	4.35804E-05	Res
582697.41_4130481.48	582697.41	4130481.48	5.81E-06	7.37E-09	4.42E-09	7.37E-09	1.46E-07	8.32E-10	3.15E-07	1.47E-08	1.10E-08	4.15E-05	3.90634E-05	Res
582753.98_4130481.48	582753.98	4130481.48	5.32E-06	6.68E-09	4.01E-09	6.68E-09	1.32E-07	7.54E-10	2.85E-07	1.34E-08	9.95E-09	3.76E-05	3.53696E-05	Res
582810.55_4130481.48	582810.55	4130481.48	4.90E-06	6.09E-09	3.65E-09	6.09E-09	1.21E-07	6.88E-10	2.60E-07	1.22E-08	9.07E-09	3.42E-05	3.22565E-05	Res
582867.12_4130481.48	582867.12	4130481.48	4.54E-06	5.59E-09	3.35E-09	5.59E-09	1.11E-07	6.32E-10	2.38E-07	1.12E-08	8.31E-09	3.14E-05	2.95844E-05	Res
581735.72_4130565.39	581735.72	4130565.39	5.30E-05	8.13E-08	4.88E-08	8.13E-08	1.62E-06	9.12E-09	3.51E-06	1.63E-07	1.23E-07	4.61E-04	0.000432363	Res
581792.29_4130565.39	581792.29	4130565.39	5.19E-05	7.93E-08	4.76E-08	7.93E-08	1.58E-06	8.89E-09	3.42E-06	1.59E-07	1.20E-07	4.50E-04	0.000421547	Res
581848.86_4130565.39	581848.86	4130565.39	4.93E-05	7.49E-08	4.49E-08	7.49E-08	1.50E-06	8.40E-09	3.23E-06	1.50E-07	1.13E-07	4.25E-04	0.000398	Res
581905.43_4130565.39	581905.43	4130565.39	4.70E-05	7.10E-08	4.26E-08	7.10E-08	1.42E-06	7.96E-09	3.06E-06	1.42E-07	1.08E-07	4.02E-04	0.00037732	Res
581962_4130565.39	581962	4130565.39	4.06E-05	6.10E-08	3.66E-08	6.10E-08	1.22E-06	6.84E-09	2.63E-06	1.22E-07	9.24E-08	3.46E-04	0.000324213	Res
582018.57_4130565.39	582018.57	4130565.39	3.30E-05	4.92E-08	2.95E-08	4.92E-08	9.82E-07	5.52E-09	2.12E-06	9.84E-08	7.45E-08	2.79E-04	0.000261471	Res
582075.14_4130565.39	582075.14	4130565.39	2.70E-05	3.98E-08	2.39E-08	3.98E-08	7.94E-07	4.47E-09	1.71E-06	7.96E-08	6.02E-08	2.26E-04	0.000211541	Res
582131.71_4130565.39	582131.71	4130565.39	2.23E-05	3.25E-08	1.95E-08	3.25E-08	6.49E-07	3.65E-09	1.40E-06	6.50E-08	4.91E-08	1.84E-04	0.000172777	Res
582188.28_4130565.39	582188.28	4130565.39	1.81E-05	2.60E-08	1.56E-08	2.60E-08	5.19E-07	2.92E-09	1.12E-06	5.21E-08	3.93E-08	1.47E-04	0.000138252	Res
582244.85_4130565.39	582244.85	4130565.39	1.49E-05	2.10E-08	1.26E-08	2.10E-08	4.19E-07	2.37E-09	9.05E-07	4.21E-08	3.17E-08	1.19E-04	0.000111782	Res
582301.42_4130565.39	582301.42	4130565.39	1.26E-05	1.76E-08	1.06E-08	1.76E-08	3.51E-07	1.98E-09	7.57E-07	3.53E-08	2.65E-08	9.97E-05	9.36053E-05	Res
582357.99_4130565.39	582357.99	4130565.39	1.08E-05	1.49E-08	8.91E-09	1.49E-08	2.96E-07	1.67E-09	6.37E-07	2.97E-08	2.23E-08	8.39E-05	7.88261E-05	Res
582414.56_4130565.39	582414.56	4130565.39	9.41E-06	1.27E-08	7.62E-09	1.27E-08	2.53E-07	1.43E-09	5.45E-07	2.54E-08	1.91E-08	7.17E-05	6.7386E-05	Res
582471.13_4130565.39	582471.13	4130565.39	8.28E-06	1.10E-08	6.60E-09	1.10E-08	2.19E-07	1.24E-09	4.71E-07	2.20E-08	1.65E-08	6.21E-05	5.83704E-05	Res
582527.7_4130565.39	582527.7	4130565.39	7.36E-06	9.64E-09	5.78E-09	9.64E-09	1.91E-07	1.09E-09	4.13E-07	1.93E-08	1.44E-08	5.43E-05	5.11072E-05	Res
582584.27_4130565.39	582584.27	4130565.39	6.63E-06	8.55E-09	5.13E-09	8.55E-09	1.70E-07	9.65E-10	3.66E-07	1.71E-08	1.28E-08	4.82E-05	4.53215E-05	Res
582640.84_4130565.39	582640.84	4130565.39	5.98E-06	7.60E-09	4.56E-09	7.60E-09	1.51E-07	8.58E-10	3.25E-07	1.52E-08	1.13E-08	4.28E-05	4.02816E-05	Res
582697.41_4130565.39	582697.41	4130565.39	5.46E-06	6.85E-09	4.11E-09	6.85E-09	1.36E-07	7.74E-10	2.93E-07	1.37E-08	1.02E-08	3.85E-05	3.63068E-05	Res
582753.98_4130565.39	582753.98	4130565.39	5.03E-06	6.23E-09	3.74E-09	6.23E-09	1.23E-07	7.05E-10	2.66E-07	1.25E-08	9.28E-09	3.50E-05	3.30151E-05	Res
582810.55_4130565.39	582810.55	4130565.39	4.67E-06	5.72E-09	3.43E-09	5.72E-09	1.13E-07	6.47E-10	2.44E-07	1.14E-08	8.52E-09	3.22E-05	3.03128E-05	Res
582867.12_4130565.39	582867.12	4130565.39	4.36E-06	5.30E-09	3.18E-09	5.30E-09	1.05E-07	5.99E-10	2.26E-07	1.06E-08	7.87E-09	2.97E-05	2.80406E-05	Res
581735.72_4130649.3	581735.72	4130649.3	5.67E-05	8.68E-08	5.21E-08	8.68E-08	1.73E-06	9.73E-09	3.74E-06	1.74E-07	1.32E-07	4.92E-04	0.000461367	Res
581792.29_4130649.3	581792.29	4130649.3	5.48E-05	8.36E-08	5.02E-08	8.36E-08	1.67E-06	9.37E-09	3.61E-06	1.67E-07	1.27E-07	4.74E-04	0.000444514	Res
581905.43_4130649.3	581905.43	4130649.3	5.45E-05	8.29E-08	4.98E-08	8.29E-08	1.66E-06	9.30E-09	3.58E-06	1.66E-07	1.26E-07	4.70E-04	0.000440996	Res
581962_4130649.3	581962	4130649.3	4.53E-05	6.86E-08	4.12E-08	6.86E-08	1.37E-06	7.70E-09	2.96E-06	1.37E-07	1.04E-07	3.89E-04	0.000365074	Res
582018.57_4130649.3	582018.57	4130649.3	3.46E-05	5.20E-08	3.12E-08	5.20E-08	1.04E-06	5.84E-09	2.24E-06	1.04E-07	7.89E-08	2.95E-04	0.00027673	Res
582075.14_4130649.3	582075.14	4130649.3	2.71E-05	4.03E-08	2.42E-08	4.03E-08	8.05E-07	4.52E-09	1.74E-06	8.06E-08	6.10E-08	2.29E-04	0.000214298	Res
582131.71_4130649.3	582131.71	4130649.3	2.12E-05	3.12E-08	1.87E-08	3.12E-08	6.23E-07	3.50E-09	1.34E-06	6.24E-08	4.72E-08	1.77E-04	0.000165935	Res
582188.28_4130649.3	582188.28	4130649.3	1.69E-05	2.45E-08	1.47E-08	2.45E-08	4.88E-07	2.75E-09	1.05E-06	4.89E-08	3.70E-08	1.39E-04	0.000129997	Res
582244.85_4130649.3	582244.85	4130649.3	1.37E-05	1.96E-08	1.18E-08	1.96E-08	3.90E-07	2.20E-09	8.42E-07	3.92E-08	2.95E-08	1.11E-04	0.000104028	Res
582301.42_4130649.3	582301.42	4130649.3	1.15E-05	1.61E-08	9.65E-09	1.61E-08	3.20E-07	1.81E-09	6.91E-07	3.22E-08	2.42E-08	9.09E-05	8.54087E-05	Res
582357.99_4130649.3	582357.99	4130649.3	9.81E-06	1.35E-08	8.12E-09	1.35E-08	2.69E-07	1.52E-09	5.81E-07	2.71E-08	2.03E-08	7.64E-05	7.1819E-05	Res
582414.56_4130649.3	582414.56	4130649.3	8.57E-06	1.16E-08	6.97E-09	1.16E-08	2.31E-07	1.31E-09	4.98E-07	2.32E-08	1.74E-08	6.56E-05	6.1634E-05	Res

Chronic Calculation, $\sum C_{TAC}$ /REL

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)										Total HI	Receptor Type
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Copper	Mercury	Nickel	Selenium	Chromium VI	Crystalline Silica		
582471.13_4130649.3	582471.13	4130649.3	7.56E-06	1.01E-08	6.04E-09	1.01E-08	2.00E-07	1.13E-09	4.31E-07	2.01E-08	1.51E-08	5.68E-05	5.33819E-05	Res
582527.7_4130649.3	582527.7	4130649.3	6.76E-06	8.85E-09	5.31E-09	8.85E-09	1.76E-07	9.98E-10	3.79E-07	1.77E-08	1.32E-08	4.99E-05	4.6913E-05	Res
582584.27_4130649.3	582584.27	4130649.3	6.13E-06	7.89E-09	4.73E-09	7.89E-09	1.57E-07	8.90E-10	3.37E-07	1.58E-08	1.18E-08	4.44E-05	4.18145E-05	Res
582640.84_4130649.3	582640.84	4130649.3	5.61E-06	7.12E-09	4.27E-09	7.12E-09	1.41E-07	8.05E-10	3.04E-07	1.42E-08	1.06E-08	4.01E-05	3.7747E-05	Res
582697.41_4130649.3	582697.41	4130649.3	5.19E-06	6.50E-09	3.90E-09	6.50E-09	1.29E-07	7.34E-10	2.77E-07	1.30E-08	9.68E-09	3.65E-05	3.44107E-05	Res
582753.98_4130649.3	582753.98	4130649.3	4.84E-06	5.99E-09	3.60E-09	5.99E-09	1.19E-07	6.77E-10	2.56E-07	1.20E-08	8.92E-09	3.37E-05	3.17314E-05	Res
582810.55_4130649.3	582810.55	4130649.3	4.55E-06	5.58E-09	3.35E-09	5.58E-09	1.10E-07	6.31E-10	2.38E-07	1.12E-08	8.30E-09	3.13E-05	2.9534E-05	Res
582867.12_4130649.3	582867.12	4130649.3	4.29E-06	5.21E-09	3.13E-09	5.21E-09	1.03E-07	5.90E-10	2.22E-07	1.04E-08	7.75E-09	2.93E-05	2.75929E-05	Res
581848.86_4130733.21	581848.86	4130733.21	8.03E-05	1.23E-07	7.39E-08	1.23E-07	2.46E-06	1.38E-08	5.32E-06	2.46E-07	1.87E-07	6.99E-04	0.000655353	Res
581905.43_4130733.21	581905.43	4130733.21	6.86E-05	1.05E-07	6.30E-08	1.05E-07	2.10E-06	1.18E-08	4.53E-06	2.10E-07	1.59E-07	5.96E-04	0.000558316	Res
581962_4130733.21	581962	4130733.21	5.06E-05	7.71E-08	4.63E-08	7.71E-08	1.54E-06	8.64E-09	3.33E-06	1.54E-07	1.17E-07	4.38E-04	0.000410136	Res
582018.57_4130733.21	582018.57	4130733.21	3.57E-05	5.41E-08	3.24E-08	5.41E-08	1.08E-06	6.06E-09	2.33E-06	1.08E-07	8.20E-08	3.07E-04	0.000287515	Res
582075.14_4130733.21	582075.14	4130733.21	2.54E-05	3.82E-08	2.29E-08	3.82E-08	7.62E-07	4.28E-09	1.65E-06	7.63E-08	5.78E-08	2.16E-04	0.000202926	Res
582131.71_4130733.21	582131.71	4130733.21	1.88E-05	2.78E-08	1.67E-08	2.78E-08	5.56E-07	3.13E-09	1.20E-06	5.57E-08	4.21E-08	1.58E-04	0.000147985	Res
582188.28_4130733.21	582188.28	4130733.21	1.47E-05	2.15E-08	1.29E-08	2.15E-08	4.29E-07	2.41E-09	9.25E-07	4.30E-08	3.25E-08	1.22E-04	0.000114188	Res
582244.85_4130733.21	582244.85	4130733.21	1.19E-05	1.72E-08	1.03E-08	1.72E-08	3.43E-07	1.93E-09	7.39E-07	3.44E-08	2.59E-08	9.73E-05	9.1279E-05	Res
582301.42_4130733.21	582301.42	4130733.21	1.00E-05	1.42E-08	8.52E-09	1.42E-08	2.83E-07	1.60E-09	6.10E-07	2.84E-08	2.14E-08	8.03E-05	7.53837E-05	Res
582357.99_4130733.21	582357.99	4130733.21	8.66E-06	1.20E-08	7.23E-09	1.20E-08	2.40E-07	1.36E-09	5.17E-07	2.41E-08	1.81E-08	6.80E-05	6.39112E-05	Res
582414.56_4130733.21	582414.56	4130733.21	7.63E-06	1.04E-08	6.26E-09	1.04E-08	2.08E-07	1.18E-09	4.48E-07	2.09E-08	1.57E-08	5.89E-05	5.53637E-05	Res
582471.13_4130733.21	582471.13	4130733.21	6.86E-06	9.23E-09	5.54E-09	9.23E-09	1.83E-07	1.04E-09	3.95E-07	1.85E-08	1.38E-08	5.21E-05	4.89438E-05	Res
582527.7_4130733.21	582527.7	4130733.21	6.26E-06	8.29E-09	4.97E-09	8.29E-09	1.65E-07	9.35E-10	3.55E-07	1.66E-08	1.24E-08	4.67E-05	4.39582E-05	Res
582584.27_4130733.21	582584.27	4130733.21	5.79E-06	7.55E-09	4.53E-09	7.55E-09	1.50E-07	8.52E-10	3.23E-07	1.51E-08	1.13E-08	4.25E-05	4.00164E-05	Res
582640.84_4130733.21	582640.84	4130733.21	5.39E-06	6.94E-09	4.17E-09	6.94E-09	1.38E-07	7.84E-10	2.97E-07	1.39E-08	1.04E-08	3.91E-05	3.67897E-05	Res
582697.41_4130733.21	582697.41	4130733.21	5.06E-06	6.43E-09	3.86E-09	6.43E-09	1.28E-07	7.27E-10	2.75E-07	1.29E-08	9.60E-09	3.62E-05	3.40922E-05	Res
582753.98_4130733.21	582753.98	4130733.21	4.77E-06	5.99E-09	3.60E-09	5.99E-09	1.19E-07	6.77E-10	2.56E-07	1.20E-08	8.94E-09	3.37E-05	3.1753E-05	Res
582810.55_4130733.21	582810.55	4130733.21	4.53E-06	5.63E-09	3.38E-09	5.63E-09	1.12E-07	6.37E-10	2.40E-07	1.13E-08	8.39E-09	3.17E-05	2.98283E-05	Res
582867.12_4130733.21	582867.12	4130733.21	4.30E-06	5.29E-09	3.17E-09	5.29E-09	1.05E-07	5.98E-10	2.26E-07	1.06E-08	7.87E-09	2.97E-05	2.80162E-05	Res
581735.72_4130817.12	581735.72	4130817.12	1.18E-04	1.81E-07	1.09E-07	1.81E-07	3.63E-06	2.03E-08	7.83E-06	3.63E-07	2.76E-07	1.03E-03	0.000965298	Res
581792.29_4130817.12	581792.29	4130817.12	1.32E-04	2.04E-07	1.22E-07	2.04E-07	4.08E-06	2.28E-08	8.80E-06	4.08E-07	3.10E-07	1.16E-03	0.001084507	Res
581848.86_4130817.12	581848.86	4130817.12	1.19E-04	1.83E-07	1.10E-07	1.83E-07	3.65E-06	2.05E-08	7.89E-06	3.65E-07	2.77E-07	1.04E-03	0.00097174	Res
581905.43_4130817.12	581905.43	4130817.12	9.00E-05	1.38E-07	8.28E-08	1.38E-07	2.76E-06	1.55E-08	5.96E-06	2.76E-07	2.10E-07	7.84E-04	0.000734578	Res
581962_4130817.12	581962	4130817.12	5.49E-05	8.39E-08	5.03E-08	8.39E-08	1.68E-06	9.40E-09	3.62E-06	1.68E-07	1.27E-07	4.76E-04	0.00044604	Res
582018.57_4130817.12	582018.57	4130817.12	3.32E-05	5.03E-08	3.02E-08	5.03E-08	1.01E-06	5.64E-09	2.17E-06	1.01E-07	7.63E-08	2.85E-04	0.000267524	Res
582075.14_4130817.12	582075.14	4130817.12	2.17E-05	3.26E-08	1.96E-08	3.26E-08	6.51E-07	3.66E-09	1.41E-06	6.52E-08	4.94E-08	1.85E-04	0.000173314	Res
582131.71_4130817.12	582131.71	4130817.12	1.58E-05	2.35E-08	1.41E-08	2.35E-08	4.68E-07	2.63E-09	1.01E-06	4.69E-08	3.55E-08	1.33E-04	0.000124727	Res
582188.28_4130817.12	582188.28	4130817.12	1.24E-05	1.82E-08	1.09E-08	1.82E-08	3.63E-07	2.04E-09	7.83E-07	3.64E-08	2.75E-08	1.03E-04	9.65923E-05	Res
582244.85_4130817.12	582244.85	4130817.12	1.03E-05	1.48E-08	8.90E-09	1.48E-08	2.96E-07	1.67E-09	6.38E-07	2.97E-08	2.24E-08	8.40E-05	7.87866E-05	Res
582301.42_4130817.12	582301.42	4130817.12	8.83E-06	1.26E-08	7.56E-09	1.26E-08	2.51E-07	1.42E-09	5.42E-07	2.52E-08	1.90E-08	7.13E-05	6.69181E-05	Res
582357.99_4130817.12	582357.99	4130817.12	7.82E-06	1.10E-08	6.61E-09	1.10E-08	2.19E-07	1.24E-09	4.73E-07	2.20E-08	1.66E-08	6.23E-05	5.84666E-05	Res
582414.56_4130817.12	582414.56	4130817.12	7.06E-06	9.81E-09	5.88E-09	9.81E-09	1.95E-07	1.10E-09	4.21E-07	1.96E-08	1.47E-08	5.54E-05	5.20323E-05	Res
582471.13_4130817.12	582471.13	4130817.12	6.47E-06	8.88E-09	5.33E-09	8.88E-09	1.77E-07	1.00E-09	3.81E-07	1.78E-08	1.33E-08	5.01E-05	4.70918E-05	Res
582527.7_4130817.12	582527.7	4130817.12	5.98E-06	8.09E-09	4.86E-09	8.09E-09	1.61E-07	9.12E-10	3.47E-07	1.62E-08	1.21E-08	4.57E-05	4.29201E-05	Res
582584.27_4130817.12	582584.27	4130817.12	5.58E-06	7.45E-09	4.47E-09	7.45E-09	1.48E-07	8.40E-10	3.19E-07	1.49E-08	1.12E-08	4.20E-05	3.951E-05	Res
582640.84_4130817.12	582640.84	4130817.12	5.24E-06	6.90E-09	4.14E-09	6.90E-09	1.37E-07	7.78E-10	2.95E-07	1.38E-08	1.03E-08	3.89E-05	3.65971E-05	Res
582697.41_4130817.12	582697.41	4130817.12	4.93E-06	6.42E-09	3.85E-09	6.42E-09	1.27E-07	7.25E-10	2.75E-07	1.28E-08	9.61E-09	3.62E-05	3.40463E-05	Res
582753.98_4130817.12	582753.98	4130817.12	4.66E-06	5.98E-09	3.59E-09	5.98E-09	1.19E-07	6.75E-10	2.56E-07	1.20E-08	8.94E-09	3.37E-05	3.17093E-05	Res
582810.55_4130817.12	582810.55	4130817.12	4.41E-06	5.60E-09	3.36E-09	5.60E-09	1.11E-07	6.33E-10	2.39E-07	1.12E-08	8.36E-09	3.15E-05	2.96839E-05	Res
582867.12_4130817.12	582867.12	4130817.12	4.20E-06	5.27E-09	3.16E-09	5.27E-09	1.04E-07	5.95E-10	2.25E-07	1.05E-08	7.85E-09	2.96E-05	2.78927E-05	Res
581735.72_4130901.03	581735.72	4130901.03	2.32E-04	3.58E-07	2.15E-07	3.58E-07	7.16E-06	4.01E-08	1.55E-05	7.16E-07	5.44E-07	2.03E-03	0.001905448	Res

Chronic Calculation, $\sum C_{TAC}$ /REL

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)										Total HI	Receptor Type
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Copper	Mercury	Nickel	Selenium	Chromium VI	Crystalline Silica		
581792.29_4130901.03	581792.29	4130901.03	2.48E-04	3.82E-07	2.29E-07	3.82E-07	7.64E-06	4.28E-08	1.65E-05	7.64E-07	5.80E-07	2.17E-03	0.002031828	Res
581848.86_4130901.03	581848.86	4130901.03	2.21E-04	3.40E-07	2.04E-07	3.40E-07	6.80E-06	3.81E-08	1.47E-05	6.80E-07	5.17E-07	1.93E-03	0.001809943	Res
581905.43_4130901.03	581905.43	4130901.03	1.16E-04	1.79E-07	1.07E-07	1.79E-07	3.57E-06	2.00E-08	7.72E-06	3.58E-07	2.72E-07	1.02E-03	0.000951306	Res
581962_4130901.03	581962	4130901.03	4.77E-05	7.28E-08	4.37E-08	7.28E-08	1.45E-06	8.16E-09	3.14E-06	1.46E-07	1.10E-07	4.13E-04	0.00038719	Res
582018.57_4130901.03	582018.57	4130901.03	2.59E-05	3.91E-08	2.35E-08	3.91E-08	7.82E-07	4.39E-09	1.69E-06	7.83E-08	5.93E-08	2.22E-04	0.000208148	Res
582075.14_4130901.03	582075.14	4130901.03	1.76E-05	2.63E-08	1.58E-08	2.63E-08	5.25E-07	2.95E-09	1.13E-06	5.26E-08	3.98E-08	1.49E-04	0.000139708	Res
582131.71_4130901.03	582131.71	4130901.03	1.36E-05	2.01E-08	1.21E-08	2.01E-08	4.01E-07	2.26E-09	8.66E-07	4.02E-08	3.04E-08	1.14E-04	0.000106781	Res
582188.28_4130901.03	582188.28	4130901.03	1.12E-05	1.64E-08	9.86E-09	1.64E-08	3.28E-07	1.84E-09	7.07E-07	3.29E-08	2.48E-08	9.30E-05	8.72586E-05	Res
582244.85_4130901.03	582244.85	4130901.03	9.58E-06	1.39E-08	8.35E-09	1.39E-08	2.78E-07	1.56E-09	5.99E-07	2.78E-08	2.10E-08	7.88E-05	7.39296E-05	Res
582301.42_4130901.03	582301.42	4130901.03	8.38E-06	1.21E-08	7.24E-09	1.21E-08	2.40E-07	1.36E-09	5.18E-07	2.41E-08	1.82E-08	6.82E-05	6.40247E-05	Res
582357.99_4130901.03	582357.99	4130901.03	7.46E-06	1.06E-08	6.38E-09	1.06E-08	2.12E-07	1.20E-09	4.57E-07	2.13E-08	1.60E-08	6.01E-05	5.64458E-05	Res
582414.56_4130901.03	582414.56	4130901.03	6.73E-06	9.48E-09	5.69E-09	9.48E-09	1.89E-07	1.07E-09	4.07E-07	1.90E-08	1.43E-08	5.36E-05	5.03348E-05	Res
582471.13_4130901.03	582471.13	4130901.03	6.14E-06	8.56E-09	5.14E-09	8.56E-09	1.70E-07	9.63E-10	3.67E-07	1.71E-08	1.29E-08	4.84E-05	4.54246E-05	Res
582527.7_4130901.03	582527.7	4130901.03	5.65E-06	7.79E-09	4.67E-09	7.79E-09	1.55E-07	8.76E-10	3.34E-07	1.56E-08	1.17E-08	4.40E-05	4.13022E-05	Res
582584.27_4130901.03	582584.27	4130901.03	5.26E-06	7.15E-09	4.29E-09	7.15E-09	1.42E-07	8.06E-10	3.07E-07	1.43E-08	1.07E-08	4.04E-05	3.79359E-05	Res
582640.84_4130901.03	582640.84	4130901.03	4.92E-06	6.62E-09	3.97E-09	6.62E-09	1.32E-07	7.46E-10	2.84E-07	1.32E-08	9.92E-09	3.73E-05	3.50976E-05	Res
582697.41_4130901.03	582697.41	4130901.03	4.64E-06	6.16E-09	3.69E-09	6.16E-09	1.22E-07	6.94E-10	2.64E-07	1.23E-08	9.22E-09	3.47E-05	3.26387E-05	Res
582753.98_4130901.03	582753.98	4130901.03	4.38E-06	5.75E-09	3.45E-09	5.75E-09	1.14E-07	6.48E-10	2.46E-07	1.15E-08	8.60E-09	3.24E-05	3.04753E-05	Res
582810.55_4130901.03	582810.55	4130901.03	4.16E-06	5.38E-09	3.23E-09	5.38E-09	1.07E-07	6.07E-10	2.30E-07	1.08E-08	8.04E-09	3.03E-05	2.85112E-05	Res
582867.12_4130901.03	582867.12	4130901.03	3.96E-06	5.06E-09	3.04E-09	5.06E-09	1.00E-07	5.71E-10	2.16E-07	1.01E-08	7.56E-09	2.85E-05	2.6821E-05	Res
581735.72_4130984.94	581735.72	4130984.94	6.17E-04	9.51E-07	5.71E-07	9.51E-07	1.90E-05	1.07E-07	4.11E-05	1.90E-06	1.45E-06	5.40E-03	0.00506204	Res
581792.29_4130984.94	581792.29	4130984.94	8.09E-04	1.25E-06	7.49E-07	1.25E-06	2.50E-05	1.40E-07	5.39E-05	2.50E-06	1.90E-06	7.09E-03	0.006641924	Res
581848.86_4130984.94	581848.86	4130984.94	9.41E-04	1.45E-06	8.71E-07	1.45E-06	2.90E-05	1.63E-07	6.27E-05	2.90E-06	2.21E-06	8.24E-03	0.007725023	Res
581905.43_4130984.94	581905.43	4130984.94	7.57E-05	1.16E-07	6.96E-08	1.16E-07	2.32E-06	1.30E-08	5.01E-06	2.32E-07	1.76E-07	6.58E-04	0.000617128	Res
581962_4130984.94	581962	4130984.94	3.29E-05	4.99E-08	3.00E-08	4.99E-08	9.97E-07	5.60E-09	2.15E-06	9.99E-08	7.57E-08	2.83E-04	0.000265518	Res
582018.57_4130984.94	582018.57	4130984.94	2.14E-05	3.22E-08	1.93E-08	3.22E-08	6.42E-07	3.61E-09	1.39E-06	6.43E-08	4.87E-08	1.82E-04	0.000170933	Res
582075.14_4130984.94	582075.14	4130984.94	1.59E-05	2.37E-08	1.42E-08	2.37E-08	4.72E-07	2.66E-09	1.02E-06	4.73E-08	3.58E-08	1.34E-04	0.000125769	Res
582131.71_4130984.94	582131.71	4130984.94	1.27E-05	1.87E-08	1.12E-08	1.87E-08	3.72E-07	2.09E-09	8.03E-07	3.73E-08	2.82E-08	1.06E-04	9.91415E-05	Res
582188.28_4130984.94	582188.28	4130984.94	1.05E-05	1.53E-08	9.19E-09	1.53E-08	3.05E-07	1.72E-09	6.59E-07	3.06E-08	2.31E-08	8.67E-05	8.13723E-05	Res
582244.85_4130984.94	582244.85	4130984.94	8.93E-06	1.29E-08	7.76E-09	1.29E-08	2.58E-07	1.45E-09	5.57E-07	2.59E-08	1.95E-08	7.32E-05	6.87203E-05	Res
582301.42_4130984.94	582301.42	4130984.94	7.78E-06	1.12E-08	6.70E-09	1.12E-08	2.23E-07	1.26E-09	4.80E-07	2.23E-08	1.69E-08	6.32E-05	5.93293E-05	Res
582357.99_4130984.94	582357.99	4130984.94	6.89E-06	9.82E-09	5.89E-09	9.82E-09	1.96E-07	1.10E-09	4.22E-07	1.96E-08	1.48E-08	5.55E-05	5.21364E-05	Res
582414.56_4130984.94	582414.56	4130984.94	6.19E-06	8.75E-09	5.25E-09	8.75E-09	1.74E-07	9.84E-10	3.76E-07	1.75E-08	1.32E-08	4.95E-05	4.6435E-05	Res
582471.13_4130984.94	582471.13	4130984.94	5.63E-06	7.88E-09	4.73E-09	7.88E-09	1.57E-07	8.87E-10	3.38E-07	1.58E-08	1.19E-08	4.45E-05	4.1817E-05	Res
582527.7_4130984.94	582527.7	4130984.94	5.17E-06	7.16E-09	4.30E-09	7.16E-09	1.42E-07	8.06E-10	3.07E-07	1.43E-08	1.08E-08	4.04E-05	3.79936E-05	Res
582584.27_4130984.94	582584.27	4130984.94	4.80E-06	6.58E-09	3.95E-09	6.58E-09	1.31E-07	7.41E-10	2.82E-07	1.32E-08	9.88E-09	3.71E-05	3.49075E-05	Res
582640.84_4130984.94	582640.84	4130984.94	4.50E-06	6.11E-09	3.66E-09	6.11E-09	1.21E-07	6.88E-10	2.62E-07	1.22E-08	9.17E-09	3.45E-05	3.23985E-05	Res
582697.41_4130984.94	582697.41	4130984.94	4.23E-06	5.68E-09	3.41E-09	5.68E-09	1.13E-07	6.40E-10	2.43E-07	1.14E-08	8.52E-09	3.20E-05	3.01207E-05	Res
582753.98_4130984.94	582753.98	4130984.94	4.01E-06	5.33E-09	3.20E-09	5.33E-09	1.06E-07	6.01E-10	2.28E-07	1.07E-08	7.98E-09	3.00E-05	2.82549E-05	Res
582810.55_4130984.94	582810.55	4130984.94	3.81E-06	5.01E-09	3.01E-09	5.01E-09	9.95E-08	5.65E-10	2.14E-07	1.00E-08	7.50E-09	2.82E-05	2.65523E-05	Res
582867.12_4130984.94	582867.12	4130984.94	3.63E-06	4.72E-09	2.83E-09	4.72E-09	9.37E-08	5.33E-10	2.02E-07	9.44E-09	7.06E-09	2.66E-05	2.50248E-05	Res
581735.72_4131068.85	581735.72	4131068.85	1.02E-04	1.56E-07	9.36E-08	1.56E-07	3.12E-06	1.75E-08	6.74E-06	3.12E-07	2.37E-07	8.86E-04	0.000830152	Res
581792.29_4131068.85	581792.29	4131068.85	8.12E-05	1.24E-07	7.47E-08	1.24E-07	2.49E-06	1.39E-08	5.37E-06	2.49E-07	1.89E-07	7.06E-04	0.000661965	Res
581848.86_4131068.85	581848.86	4131068.85	4.41E-05	6.71E-08	4.03E-08	6.71E-08	1.34E-06	7.52E-09	2.90E-06	1.34E-07	1.02E-07	3.81E-04	0.000356906	Res
581905.43_4131068.85	581905.43	4131068.85	2.83E-05	4.28E-08	2.57E-08	4.28E-08	8.54E-07	4.80E-09	1.84E-06	8.56E-08	6.48E-08	2.43E-04	0.000227449	Res
581962_4131068.85	581962	4131068.85	2.07E-05	3.10E-08	1.86E-08	3.10E-08	6.18E-07	3.47E-09	1.33E-06	6.19E-08	4.69E-08	1.76E-04	0.00016462	Res
582018.57_4131068.85	582018.57	4131068.85	1.58E-05	2.34E-08	1.41E-08	2.34E-08	4.68E-07	2.63E-09	1.01E-06	4.69E-08	3.55E-08	1.33E-04	0.000124519	Res
582075.14_4131068.85	582075.14	4131068.85	1.26E-05	1.85E-08	1.11E-08	1.85E-08	3.70E-07	2.08E-09	7.98E-07	3.71E-08	2.80E-08	1.05E-04	9.84515E-05	Res
582131.71_4131068.85	582131.71	4131068.85	1.04E-05	1.52E-08	9.13E-09	1.52E-08	3.03E-07	1.71E-09	6.55E-07	3.04E-08	2.30E-08	8.61E-05	8.08178E-05	Res

Chronic Calculation, $\sum C_{TAC}$ /REL

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)										Total HI	Receptor Type
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Copper	Mercury	Nickel	Selenium	Chromium VI	Crystalline Silica		
582188.28_4131068.85	582188.28	4131068.85	8.86E-06	1.28E-08	7.68E-09	1.28E-08	2.55E-07	1.44E-09	5.50E-07	2.56E-08	1.93E-08	7.24E-05	6.79589E-05	Res
582244.85_4131068.85	582244.85	4131068.85	7.68E-06	1.10E-08	6.60E-09	1.10E-08	2.19E-07	1.24E-09	4.73E-07	2.20E-08	1.66E-08	6.23E-05	5.84452E-05	Res
582301.42_4131068.85	582301.42	4131068.85	6.77E-06	9.62E-09	5.77E-09	9.62E-09	1.92E-07	1.08E-09	4.13E-07	1.92E-08	1.45E-08	5.44E-05	5.10824E-05	Res
582357.99_4131068.85	582357.99	4131068.85	6.05E-06	8.52E-09	5.11E-09	8.52E-09	1.70E-07	9.59E-10	3.66E-07	1.70E-08	1.28E-08	4.82E-05	4.52432E-05	Res
582414.56_4131068.85	582414.56	4131068.85	5.47E-06	7.65E-09	4.59E-09	7.65E-09	1.52E-07	8.61E-10	3.28E-07	1.53E-08	1.15E-08	4.32E-05	4.0595E-05	Res
582471.13_4131068.85	582471.13	4131068.85	4.99E-06	6.93E-09	4.16E-09	6.93E-09	1.38E-07	7.80E-10	2.97E-07	1.39E-08	1.04E-08	3.91E-05	3.67696E-05	Res
582527.7_4131068.85	582527.7	4131068.85	4.59E-06	6.33E-09	3.80E-09	6.33E-09	1.26E-07	7.12E-10	2.71E-07	1.27E-08	9.51E-09	3.57E-05	3.35686E-05	Res
582584.27_4131068.85	582584.27	4131068.85	4.25E-06	5.81E-09	3.48E-09	5.81E-09	1.15E-07	6.54E-10	2.49E-07	1.16E-08	8.72E-09	3.28E-05	3.08026E-05	Res
582640.84_4131068.85	582640.84	4131068.85	4.00E-06	5.43E-09	3.26E-09	5.43E-09	1.08E-07	6.11E-10	2.33E-07	1.09E-08	8.14E-09	3.06E-05	2.87784E-05	Res
582697.41_4131068.85	582697.41	4131068.85	3.77E-06	5.08E-09	3.05E-09	5.08E-09	1.01E-07	5.72E-10	2.18E-07	1.02E-08	7.62E-09	2.86E-05	2.69287E-05	Res
582753.98_4131068.85	582753.98	4131068.85	3.59E-06	4.80E-09	2.88E-09	4.80E-09	9.53E-08	5.41E-10	2.05E-07	9.59E-09	7.19E-09	2.70E-05	2.54338E-05	Res
582810.55_4131068.85	582810.55	4131068.85	3.43E-06	4.55E-09	2.73E-09	4.55E-09	9.03E-08	5.12E-10	1.95E-07	9.09E-09	6.81E-09	2.56E-05	2.41006E-05	Res
582867.12_4131068.85	582867.12	4131068.85	3.27E-06	4.28E-09	2.57E-09	4.28E-09	8.50E-08	4.83E-10	1.83E-07	8.56E-09	6.41E-09	2.41E-05	2.26966E-05	Res
582018.57_4131152.76	582018.57	4131152.76	1.07E-05	1.56E-08	9.36E-09	1.56E-08	3.11E-07	1.75E-09	6.72E-07	3.12E-08	2.36E-08	8.83E-05	8.28988E-05	Res
582244.85_4131152.76	582244.85	4131152.76	6.54E-06	9.24E-09	5.55E-09	9.24E-09	1.84E-07	1.04E-09	3.97E-07	1.85E-08	1.39E-08	5.23E-05	4.9068E-05	Res
582301.42_4131152.76	582301.42	4131152.76	5.90E-06	8.28E-09	4.97E-09	8.28E-09	1.65E-07	9.31E-10	3.55E-07	1.66E-08	1.25E-08	4.68E-05	4.39276E-05	Res
582357.99_4131152.76	582357.99	4131152.76	5.34E-06	7.43E-09	4.46E-09	7.43E-09	1.48E-07	8.36E-10	3.19E-07	1.49E-08	1.12E-08	4.20E-05	3.9421E-05	Res
582414.56_4131152.76	582414.56	4131152.76	4.87E-06	6.73E-09	4.04E-09	6.73E-09	1.34E-07	7.57E-10	2.89E-07	1.35E-08	1.01E-08	3.80E-05	3.56938E-05	Res
582471.13_4131152.76	582471.13	4131152.76	4.42E-06	6.07E-09	3.64E-09	6.07E-09	1.21E-07	6.83E-10	2.60E-07	1.21E-08	9.11E-09	3.43E-05	3.21855E-05	Res
582527.7_4131152.76	582527.7	4131152.76	4.07E-06	5.54E-09	3.33E-09	5.54E-09	1.10E-07	6.24E-10	2.38E-07	1.11E-08	8.32E-09	3.13E-05	2.94021E-05	Res
582584.27_4131152.76	582584.27	4131152.76	3.76E-06	5.09E-09	3.06E-09	5.09E-09	1.01E-07	5.74E-10	2.18E-07	1.02E-08	7.64E-09	2.87E-05	2.70195E-05	Res
582640.84_4131152.76	582640.84	4131152.76	3.52E-06	4.73E-09	2.84E-09	4.73E-09	9.41E-08	5.33E-10	2.03E-07	9.47E-09	7.10E-09	2.67E-05	2.51029E-05	Res
582697.41_4131152.76	582697.41	4131152.76	3.31E-06	4.43E-09	2.66E-09	4.43E-09	8.80E-08	4.99E-10	1.90E-07	8.85E-09	6.63E-09	2.50E-05	2.34727E-05	Res
582753.98_4131152.76	582753.98	4131152.76	3.16E-06	4.20E-09	2.52E-09	4.20E-09	8.34E-08	4.73E-10	1.80E-07	8.40E-09	6.29E-09	2.37E-05	2.22655E-05	Res
582810.55_4131152.76	582810.55	4131152.76	3.02E-06	3.99E-09	2.39E-09	3.99E-09	7.92E-08	4.50E-10	1.71E-07	7.98E-09	5.97E-09	2.25E-05	2.11408E-05	Res
582867.12_4131152.76	582867.12	4131152.76	2.87E-06	3.76E-09	2.26E-09	3.76E-09	7.47E-08	4.24E-10	1.61E-07	7.52E-09	5.63E-09	2.12E-05	1.99394E-05	Res

HRA Permanente Creek Restoration Project

Construction Year 2025

Emissions Inputs

Construction Activity	Construction Year & Source	DPM Exhaust (tons/year)	PM10 Dust for speciation (tons/year)	Arsenic (tons/year)	Beryllium (tons/year)	Cadmium (tons/year)	Cobalt (tons/year)	Copper (tons/year)	Lead (tons/year)	Mercury (tons/year)	Nickel (tons/year)	Selenium (tons/year)	Chromium VI (tons/year)	Crystalline Silica (tons/year)
Concrete Channel 2024	2024_CONCRTE	0.000	0.00	2.91E-12	1.74E-12	2.91E-12	1.49E-11	3.26E-11	2.91E-12	4.65E-13	5.35E-11	5.81E-12	2.33E-13	8.63E-09
Paved road	2024_PAVED	2.07E-04	0.08	1.04E-07	6.26E-08	1.04E-07	6.68E-08	2.09E-06	1.92E-07	1.17E-08	4.51E-06	2.09E-07	1.59E-07	5.93E-04
Unpaved road	2024_CCP_UNPV	6.27E-05	0.20	2.56E-07	1.54E-07	2.56E-07	1.64E-07	5.12E-06	4.71E-07	2.87E-08	1.11E-05	5.12E-07	3.89E-07	1.46E-03
Channel Widening 2024	2024_CHAN_RCK	0.002	0.16	2.05E-07	1.23E-07	2.05E-07	1.05E-06	2.29E-06	2.05E-07	3.28E-08	3.77E-06	4.09E-07	1.64E-08	6.08E-04
Paved road	2024_PAVED	1.80E-03	2.39	2.99E-06	1.79E-06	2.99E-06	1.91E-06	5.98E-05	5.50E-06	3.35E-07	1.29E-04	5.98E-06	4.54E-06	1.70E-02
Rock Pile Area 2025	2025_CHAN_RCK	0.006	0.25	3.16E-07	1.89E-07	3.16E-07	1.62E-06	3.54E-06	3.16E-07	5.05E-08	5.81E-06	6.31E-07	2.53E-08	9.37E-04
Paved road	2025_PAVED	5.95E-03	2.44	3.05E-06	1.83E-06	3.05E-06	1.95E-06	6.10E-05	5.61E-06	3.41E-07	1.32E-04	6.10E-06	4.63E-06	1.73E-02
Rock Pile Area 2026	2026_CHAN_RCK	0.006	0.25	3.16E-07	1.89E-07	3.16E-07	1.62E-06	3.54E-06	3.16E-07	5.05E-08	5.81E-06	6.31E-07	2.53E-08	9.37E-04
Paved road	2026_PAVED	5.84E-03	2.44	3.05E-06	1.83E-06	3.05E-06	1.95E-06	6.10E-05	5.61E-06	3.41E-07	1.32E-04	6.10E-06	4.63E-06	1.73E-02
Channel Widening 2027	2027_CHAN_RCK	0.002	0.98	1.23E-06	7.36E-07	1.23E-06	6.28E-06	1.37E-05	1.23E-06	1.96E-07	2.26E-05	2.45E-06	9.82E-08	3.64E-03
Paved road	2027_PAVED	5.61E-03	2.39	2.99E-06	1.79E-06	2.99E-06	1.91E-06	5.98E-05	5.50E-06	3.35E-07	1.29E-04	5.98E-06	4.54E-06	1.70E-02
Material Removal 2028	2028_MATRMVL	0.001	0.25	3.15E-07	1.89E-07	3.15E-07	1.62E-06	3.53E-06	3.15E-07	5.05E-08	5.80E-06	6.31E-07	2.52E-08	9.37E-04
Paved road	2028_PAVED	5.57E-03	2.39	2.99E-06	1.80E-06	2.99E-06	1.92E-06	5.98E-05	5.51E-06	3.35E-07	1.29E-04	5.98E-06	4.55E-06	1.70E-02
Unpaved road	2028_UNPAVED	3.40E-03	11.84	1.48E-05	8.88E-06	1.48E-05	9.47E-06	2.96E-04	2.72E-05	1.66E-06	6.40E-04	2.96E-05	2.25E-05	8.41E-02
Material Removal 2029	2029_MATRMVL	0.001	0.25	3.15E-07	1.89E-07	3.15E-07	1.62E-06	3.53E-06	3.15E-07	5.05E-08	5.80E-06	6.31E-07	2.52E-08	9.37E-04
Paved road	2029_PAVED	5.56E-03	2.41	3.01E-06	1.81E-06	3.01E-06	1.93E-06	6.03E-05	5.55E-06	3.38E-07	1.30E-04	6.03E-06	4.58E-06	1.71E-02
Unpaved road	2029_UNPAVED	3.39E-03	11.93	1.49E-05	8.95E-06	1.49E-05	9.55E-06	2.98E-04	2.74E-05	1.67E-06	6.44E-04	2.98E-05	2.27E-05	8.47E-02

Construction Activity	Construction Year	DPM (g/s)	Arsenic (g/s)	Beryllium (g/s)	Cadmium (g/s)	Cobalt (g/s)	Copper (g/s)	Lead (g/s)	Mercury (g/s)	Nickel (g/s)	Selenium (g/s)	Chromium VI (g/s)	Crystalline Silica (g/s)
Concrete Channel 2024	2024_CONCRTE	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Paved road	2024_PAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Unpaved road	2024_CCP_UNPV	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Channel Widening 2024	2024_CHAN_RCK	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Paved road	2024_PAVED	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Rock Pile Area 2025	2025_CHAN_RCK	1.698E-04	9.08E-09	5.45E-09	9.08E-09	4.65E-08	1.02E-07	9.08E-09	1.45E-09	1.67E-07	1.82E-08	7.26E-10	2.70E-05
Paved road	2025_PAVED	1.711E-04	8.77E-08	5.26E-08	8.77E-08	5.61E-08	1.75E-06	1.61E-07	9.82E-09	3.79E-06	1.75E-07	1.33E-07	4.98E-04
Rock Pile Area 2026	2026_CHAN_RCK	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Paved road	2026_PAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Channel Widening 2027	2027_CHAN_RCK	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Paved road	2027_PAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Material Removal 2028	2028_MATRMVL	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Paved road	2028_PAVED	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Unpaved road	2028_UNPAVED	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Material Removal 2029	2029_MATRMVL	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Paved road	2029_PAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Unpaved road	2029_UNPAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

N/A = not including PM10 on-site dust in HRA calculation; it is only for speciating metals.

Chronic REL

TAC	UOM	
DPM	µg/m^3	5
Arsenic	µg/m^3	0.015
Beryllium	µg/m^3	0.007
Cadmium	µg/m^3	0.02
Copper	µg/m^3	100
Mercury	µg/m^3	0.032
Nickel	µg/m^3	0.014
Selenium	µg/m^3	20
Chromium VI	µg/m^3	0.2
Crystalline Silica	µg/m^3	3

	Max
CT House	0.001
Res	0.008

Chronic Calculation, $\sum C_{TAC}$ /REL

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} (µg/m^3)										Total HI	Receptor Type
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Copper	Mercury	Nickel	Selenium	Chromium VI	Crystalline Silica		
			5	0.015	0.007	0.02	100	0.032	0.014	20	0.2	3		
581336.22_4131207.48	581336.22	4131207.48	2.00E-04	1.01E-07	6.05E-08	1.01E-07	2.01E-06	1.13E-08	4.35E-06	2.02E-07	1.53E-07	5.72E-04	0.000562861	CT House
581554.22_4130688.06	581554.22	4130688.06	1.37E-04	6.70E-08	4.02E-08	6.70E-08	1.34E-06	7.52E-09	2.88E-06	1.34E-07	1.01E-07	3.79E-04	0.000374111	Res
579793.36_4131503.29	579793.36	4131503.29	1.25E-05	3.69E-09	2.21E-09	3.69E-09	7.10E-08	4.28E-10	1.51E-07	7.38E-09	5.15E-09	2.01E-05	2.07994E-05	Acute
580488.37_4131517.71	580488.37	4131517.71	1.58E-05	6.54E-09	3.92E-09	6.54E-09	1.29E-07	7.41E-10	2.78E-07	1.31E-08	9.68E-09	3.66E-05	3.66295E-05	Acute
581678.43_4131040.03	581678.43	4131040.03	6.34E-04	3.23E-07	1.94E-07	3.23E-07	6.46E-06	3.62E-08	1.39E-05	6.46E-07	4.91E-07	1.83E-03	0.001803105	Res
581635.43_4130978.54	581635.43	4130978.54	1.28E-03	6.55E-07	3.93E-07	6.55E-07	1.31E-05	7.34E-08	2.83E-05	1.31E-06	9.95E-07	3.72E-03	0.003655914	Res
581830.06_4131027.55	581830.06	4131027.55	5.84E-04	2.97E-07	1.78E-07	2.97E-07	5.95E-06	3.33E-08	1.28E-05	5.95E-07	4.52E-07	1.69E-03	0.00166085	Res
581727.48_4130976.54	581727.48	4130976.54	1.55E-03	7.93E-07	4.76E-07	7.93E-07	1.59E-05	8.88E-08	3.43E-05	1.59E-06	1.21E-06	4.50E-03	0.004427427	Res
581789.11_4130419.65	581789.11	4130419.65	1.07E-04	5.04E-08	3.02E-08	5.04E-08	1.00E-06	5.67E-09	2.16E-06	1.01E-07	7.59E-08	2.85E-04	0.000281652	Res
581700.32_4130781.89	581700.32	4130781.89	3.09E-04	1.56E-07	9.37E-08	1.56E-07	3.12E-06	1.75E-08	6.74E-06	3.12E-07	2.37E-07	8.86E-04	0.000872258	Res
581426.07_4131299.01	581426.07	4131299.01	7.29E-05	3.59E-08	2.15E-08	3.59E-08	7.16E-07	4.03E-09	1.55E-06	7.18E-08	5.43E-08	2.03E-04	0.000200416	Acute
582301.42_4129474.56	582301.42	4129474.56	3.79E-05	1.55E-08	9.29E-09	1.55E-08	3.06E-07	1.76E-09	6.57E-07	3.10E-08	2.29E-08	8.67E-05	8.67539E-05	Res
582357.99_4129474.56	582357.99	4129474.56	3.55E-05	1.45E-08	8.67E-09	1.45E-08	2.85E-07	1.64E-09	6.14E-07	2.89E-08	2.13E-08	8.09E-05	8.09969E-05	Res
582414.56_4129474.56	582414.56	4129474.56	3.33E-05	1.35E-08	8.11E-09	1.35E-08	2.67E-07	1.53E-09	5.74E-07	2.70E-08	2.00E-08	7.57E-05	7.57839E-05	Res
582471.13_4129474.56	582471.13	4129474.56	3.14E-05	1.27E-08	7.61E-09	1.27E-08	2.50E-07	1.44E-09	5.38E-07	2.54E-08	1.87E-08	7.10E-05	7.10824E-05	Res
582527.7_4129474.56	582527.7	4129474.56	2.96E-05	1.20E-08	7.18E-09	1.20E-08	2.36E-07	1.36E-09	5.08E-07	2.39E-08	1.76E-08	6.69E-05	6.70479E-05	Res
582584.27_4129474.56	582584.27	4129474.56	2.79E-05	1.12E-08	6.74E-09	1.12E-08	2.22E-07	1.28E-09	4.77E-07	2.25E-08	1.66E-08	6.28E-05	6.29665E-05	Res
582640.84_4129474.56	582640.84	4129474.56	2.61E-05	1.05E-08	6.27E-09	1.05E-08	2.06E-07	1.19E-09	4.43E-07	2.09E-08	1.54E-08	5.85E-05	5.8606E-05	Res
582244.85_4129558.47	582244.85	4129558.47	3.95E-05	1.57E-08	9.41E-09	1.57E-08	3.09E-07	1.78E-09	6.64E-07	3.14E-08	2.31E-08	8.76E-05	8.78876E-05	Res
582301.42_4129558.47	582301.42	4129558.47	3.84E-05	1.56E-08	9.34E-09	1.56E-08	3.07E-07	1.77E-09	6.60E-07	3.11E-08	2.30E-08	8.71E-05	8.71879E-05	Res
582357.99_4129558.47	582357.99	4129558.47	3.63E-05	1.48E-08	8.85E-09	1.48E-08	2.91E-07	1.67E-09	6.26E-07	2.95E-08	2.18E-08	8.26E-05	8.26903E-05	Res
582414.56_4129558.47	582414.56	4129558.47	3.41E-05	1.38E-08	8.30E-09	1.38E-08	2.73E-07	1.57E-09	5.87E-07	2.77E-08	2.04E-08	7.74E-05	7.75121E-05	Res
582471.13_4129558.47	582471.13	4129558.47	3.19E-05	1.29E-08	7.76E-09	1.29E-08	2.55E-07	1.47E-09	5.49E-07	2.59E-08	1.91E-08	7.24E-05	7.24555E-05	Res
582527.7_4129558.47	582527.7	4129558.47	2.99E-05	1.21E-08	7.25E-09	1.21E-08	2.38E-07	1.37E-09	5.13E-07	2.42E-08	1.78E-08	6.76E-05	6.77076E-05	Res
582584.27_4129558.47	582584.27	4129558.47	2.80E-05	1.13E-08	6.77E-09	1.13E-08	2.22E-07	1.28E-09	4.78E-07	2.26E-08	1.66E-08	6.31E-05	6.32098E-05	Res
582640.84_4129558.47	582640.84	4129558.47	2.64E-05	1.06E-08	6.36E-09	1.06E-08	2.09E-07	1.20E-09	4.50E-07	2.12E-08	1.56E-08	5.93E-05	5.9436E-05	Res
582697.41_4129558.47	582697.41	4129558.47	2.49E-05	9.96E-09	5.98E-09	9.96E-09	1.96E-07	1.13E-09	4.22E-07	1.99E-08	1.47E-08	5.57E-05	5.5819E-05	Res
582244.85_4129642.38	582244.85	4129642.38	3.62E-05	1.37E-08	8.24E-09	1.37E-08	2.70E-07	1.56E-09	5.79E-07	2.75E-08	2.01E-08	7.64E-05	7.70155E-05	Res
582301.42_4129642.38	582301.42	4129642.38	3.80E-05	1.52E-08	9.10E-09	1.52E-08	2.99E-07	1.72E-09	6.42E-07	3.03E-08	2.23E-08	8.47E-05	8.49699E-05	Res
582357.99_4129642.38	582357.99	4129642.38	3.68E-05	1.50E-08	9.00E-09	1.50E-08	2.96E-07	1.70E-09	6.37E-07	3.00E-08	2.22E-08	8.40E-05	8.40786E-05	Res
582414.56_4129642.38	582414.56	4129642.38	3.47E-05	1.42E-08	8.50E-09	1.42E-08	2.80E-07	1.61E-09	6.01E-07	2.83E-08	2.09E-08	7.93E-05	7.93599E-05	Res
582471.13_4129642.38	582471.13	4129642.38	3.26E-05	1.33E-08	7.97E-09	1.33E-08	2.62E-07	1.51E-09	5.64E-07	2.66E-08	1.96E-08	7.43E-05	7.44057E-05	Res
582527.7_4129642.38	582527.7	4129642.38	3.06E-05	1.25E-08	7.48E-09	1.25E-08	2.46E-07	1.41E-09	5.29E-07	2.49E-08	1.84E-08	6.98E-05	6.98425E-05	Res
582584.27_4129642.38	582584.27	4129642.38	2.86E-05	1.16E-08	6.95E-09	1.16E-08	2.28E-07	1.31E-09	4.91E-07	2.32E-08	1.71E-08	6.48E-05	6.48679E-05	Res

Chronic Calculation, $\sum C_{TAC}$ /REL

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)										Total HI	Receptor Type
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Copper	Mercury	Nickel	Selenium	Chromium VI	Crystalline Silica		
582640.84_4129642.38	582640.84	4129642.38	2.68E-05	1.08E-08	6.48E-09	1.08E-08	2.13E-07	1.23E-09	4.58E-07	2.16E-08	1.59E-08	6.05E-05	6.0564E-05	Res
582697.41_4129642.38	582697.41	4129642.38	2.52E-05	1.01E-08	6.06E-09	1.01E-08	1.99E-07	1.15E-09	4.28E-07	2.02E-08	1.49E-08	5.65E-05	5.66283E-05	Res
582753.98_4129642.38	582753.98	4129642.38	2.36E-05	9.42E-09	5.65E-09	9.42E-09	1.86E-07	1.07E-09	3.99E-07	1.88E-08	1.39E-08	5.27E-05	5.28044E-05	Res
582810.55_4129642.38	582810.55	4129642.38	2.22E-05	8.81E-09	5.28E-09	8.81E-09	1.74E-07	1.00E-09	3.73E-07	1.76E-08	1.30E-08	4.92E-05	4.9372E-05	Res
582867.12_4129642.38	582867.12	4129642.38	2.07E-05	8.14E-09	4.88E-09	8.14E-09	1.60E-07	9.26E-10	3.45E-07	1.63E-08	1.20E-08	4.55E-05	4.5641E-05	Res
582244.85_4129726.29	582244.85	4129726.29	3.86E-05	1.51E-08	9.08E-09	1.51E-08	2.98E-07	1.72E-09	6.40E-07	3.03E-08	2.22E-08	8.44E-05	8.48269E-05	Res
582301.42_4129726.29	582301.42	4129726.29	3.72E-05	1.48E-08	8.85E-09	1.48E-08	2.91E-07	1.68E-09	6.25E-07	2.95E-08	2.17E-08	8.24E-05	8.2707E-05	Res
582357.99_4129726.29	582357.99	4129726.29	3.70E-05	1.51E-08	9.07E-09	1.51E-08	2.98E-07	1.71E-09	6.42E-07	3.02E-08	2.23E-08	8.46E-05	8.4673E-05	Res
582414.56_4129726.29	582414.56	4129726.29	3.52E-05	1.44E-08	8.67E-09	1.44E-08	2.85E-07	1.64E-09	6.14E-07	2.89E-08	2.13E-08	8.09E-05	8.09141E-05	Res
582471.13_4129726.29	582471.13	4129726.29	3.32E-05	1.36E-08	8.17E-09	1.36E-08	2.69E-07	1.54E-09	5.78E-07	2.72E-08	2.01E-08	7.63E-05	7.62938E-05	Res
582527.7_4129726.29	582527.7	4129726.29	3.12E-05	1.28E-08	7.68E-09	1.28E-08	2.53E-07	1.45E-09	5.44E-07	2.56E-08	1.89E-08	7.17E-05	7.16882E-05	Res
582584.27_4129726.29	582584.27	4129726.29	2.93E-05	1.20E-08	7.18E-09	1.20E-08	2.36E-07	1.36E-09	5.08E-07	2.39E-08	1.77E-08	6.70E-05	6.70531E-05	Res
582640.84_4129726.29	582640.84	4129726.29	2.74E-05	1.12E-08	6.69E-09	1.12E-08	2.20E-07	1.27E-09	4.73E-07	2.23E-08	1.65E-08	6.24E-05	6.2486E-05	Res
582697.41_4129726.29	582697.41	4129726.29	2.55E-05	1.03E-08	6.18E-09	1.03E-08	2.03E-07	1.17E-09	4.37E-07	2.06E-08	1.52E-08	5.76E-05	5.7687E-05	Res
582753.98_4129726.29	582753.98	4129726.29	2.36E-05	9.45E-09	5.67E-09	9.45E-09	1.86E-07	1.07E-09	4.00E-07	1.89E-08	1.39E-08	5.28E-05	5.29482E-05	Res
582810.55_4129726.29	582810.55	4129726.29	2.17E-05	8.57E-09	5.14E-09	8.57E-09	1.69E-07	9.74E-10	3.63E-07	1.71E-08	1.26E-08	4.79E-05	4.80575E-05	Res
582244.85_4129810.2	582244.85	4129810.2	3.78E-05	1.47E-08	8.82E-09	1.47E-08	2.89E-07	1.67E-09	6.22E-07	2.94E-08	2.16E-08	8.21E-05	8.24756E-05	Res
582301.42_4129810.2	582301.42	4129810.2	3.74E-05	1.50E-08	8.98E-09	1.50E-08	2.95E-07	1.70E-09	6.35E-07	2.99E-08	2.21E-08	8.37E-05	8.39175E-05	Res
582357.99_4129810.2	582357.99	4129810.2	3.66E-05	1.49E-08	8.95E-09	1.49E-08	2.94E-07	1.69E-09	6.33E-07	2.98E-08	2.20E-08	8.35E-05	8.35447E-05	Res
582414.56_4129810.2	582414.56	4129810.2	3.53E-05	1.46E-08	8.73E-09	1.46E-08	2.87E-07	1.65E-09	6.18E-07	2.91E-08	2.15E-08	8.15E-05	8.15297E-05	Res
582471.13_4129810.2	582471.13	4129810.2	3.36E-05	1.39E-08	8.34E-09	1.39E-08	2.74E-07	1.57E-09	5.91E-07	2.78E-08	2.06E-08	7.79E-05	7.78289E-05	Res
582527.7_4129810.2	582527.7	4129810.2	3.15E-05	1.30E-08	7.81E-09	1.30E-08	2.57E-07	1.47E-09	5.53E-07	2.60E-08	1.92E-08	7.29E-05	7.28852E-05	Res
582584.27_4129810.2	582584.27	4129810.2	2.94E-05	1.21E-08	7.26E-09	1.21E-08	2.39E-07	1.37E-09	5.14E-07	2.42E-08	1.79E-08	6.78E-05	6.77606E-05	Res
582640.84_4129810.2	582640.84	4129810.2	2.71E-05	1.10E-08	6.62E-09	1.10E-08	2.18E-07	1.25E-09	4.68E-07	2.21E-08	1.63E-08	6.18E-05	6.18123E-05	Res
582697.41_4129810.2	582697.41	4129810.2	2.49E-05	1.01E-08	6.04E-09	1.01E-08	1.99E-07	1.14E-09	4.27E-07	2.01E-08	1.49E-08	5.63E-05	5.64412E-05	Res
581905.43_4129894.11	581905.43	4129894.11	4.55E-05	1.93E-08	1.16E-08	1.93E-08	3.81E-07	2.18E-09	8.21E-07	3.85E-08	2.86E-08	1.08E-04	0.000107918	Res
581962_4129894.11	581962	4129894.11	4.85E-05	1.95E-08	1.17E-08	1.95E-08	3.84E-07	2.21E-09	8.25E-07	3.89E-08	2.87E-08	1.09E-04	0.000109108	Res
582131.71_4129894.11	582131.71	4129894.11	4.31E-05	1.69E-08	1.02E-08	1.69E-08	3.34E-07	1.93E-09	7.17E-07	3.39E-08	2.49E-08	9.46E-05	9.49771E-05	Res
582188.28_4129894.11	582188.28	4129894.11	4.11E-05	1.63E-08	9.79E-09	1.63E-08	3.21E-07	1.85E-09	6.91E-07	3.26E-08	2.40E-08	9.11E-05	9.14318E-05	Res
582244.85_4129894.11	582244.85	4129894.11	3.97E-05	1.60E-08	9.60E-09	1.60E-08	3.16E-07	1.82E-09	6.79E-07	3.20E-08	2.36E-08	8.95E-05	8.9677E-05	Res
582301.42_4129894.11	582301.42	4129894.11	3.80E-05	1.55E-08	9.28E-09	1.55E-08	3.05E-07	1.76E-09	6.57E-07	3.09E-08	2.28E-08	8.66E-05	8.66775E-05	Res
582357.99_4129894.11	582357.99	4129894.11	3.61E-05	1.48E-08	8.86E-09	1.48E-08	2.92E-07	1.68E-09	6.27E-07	2.95E-08	2.18E-08	8.27E-05	8.27653E-05	Res
582414.56_4129894.11	582414.56	4129894.11	3.60E-05	1.51E-08	9.03E-09	1.51E-08	2.98E-07	1.70E-09	6.40E-07	3.01E-08	2.23E-08	8.44E-05	8.4289E-05	Res
582471.13_4129894.11	582471.13	4129894.11	3.37E-05	1.41E-08	8.45E-09	1.41E-08	2.78E-07	1.60E-09	5.99E-07	2.82E-08	2.09E-08	7.90E-05	7.88859E-05	Res
582527.7_4129894.11	582527.7	4129894.11	3.12E-05	1.29E-08	7.77E-09	1.29E-08	2.56E-07	1.47E-09	5.51E-07	2.59E-08	1.92E-08	7.26E-05	7.25093E-05	Res
582584.27_4129894.11	582584.27	4129894.11	2.87E-05	1.18E-08	7.09E-09	1.18E-08	2.33E-07	1.34E-09	5.02E-07	2.36E-08	1.75E-08	6.62E-05	6.62045E-05	Res
582640.84_4129894.11	582640.84	4129894.11	2.63E-05	1.07E-08	6.45E-09	1.07E-08	2.12E-07	1.22E-09	4.56E-07	2.15E-08	1.59E-08	6.02E-05	6.02105E-05	Res
582697.41_4129894.11	582697.41	4129894.11	2.41E-05	9.75E-09	5.85E-09	9.75E-09	1.92E-07	1.11E-09	4.14E-07	1.95E-08	1.44E-08	5.45E-05	5.46395E-05	Res
581962_4129978.02	581962	4129978.02	5.00E-05	2.03E-08	1.22E-08	2.03E-08	4.01E-07	2.31E-09	8.62E-07	4.06E-08	3.00E-08	1.14E-04	0.000113835	Res
582018.57_4129978.02	582018.57	4129978.02	4.79E-05	1.91E-08	1.15E-08	1.91E-08	3.77E-07	2.17E-09	8.10E-07	3.82E-08	2.82E-08	1.07E-04	0.000107159	Res
582075.14_4129978.02	582075.14	4129978.02	4.86E-05	1.98E-08	1.19E-08	1.98E-08	3.91E-07	2.25E-09	8.40E-07	3.96E-08	2.92E-08	1.11E-04	0.000110907	Res
582131.71_4129978.02	582131.71	4129978.02	4.77E-05	1.98E-08	1.19E-08	1.98E-08	3.91E-07	2.24E-09	8.42E-07	3.96E-08	2.93E-08	1.11E-04	0.00011092	Res
582188.28_4129978.02	582188.28	4129978.02	4.69E-05	1.98E-08	1.19E-08	1.98E-08	3.92E-07	2.24E-09	8.44E-07	3.97E-08	2.94E-08	1.11E-04	0.000111024	Res
582244.85_4129978.02	582244.85	4129978.02	4.26E-05	1.79E-08	1.07E-08	1.79E-08	3.53E-07	2.02E-09	7.61E-07	3.57E-08	2.65E-08	1.00E-04	0.000100098	Res
582301.42_4129978.02	582301.42	4129978.02	4.16E-05	1.77E-08	1.06E-08	1.77E-08	3.50E-07	2.00E-09	7.53E-07	3.54E-08	2.63E-08	9.93E-05	9.90007E-05	Res
582357.99_4129978.02	582357.99	4129978.02	3.92E-05	1.67E-08	1.00E-08	1.67E-08	3.31E-07	1.89E-09	7.12E-07	3.34E-08	2.48E-08	9.39E-05	9.35852E-05	Res
582414.56_4129978.02	582414.56	4129978.02	3.63E-05	1.54E-08	9.26E-09	1.54E-08	3.05E-07	1.75E-09	6.57E-07	3.09E-08	2.29E-08	8.66E-05	8.64067E-05	Res

Chronic Calculation, $\sum C_{TAC}$ /REL

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)										Total HI	Receptor Type
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Copper	Mercury	Nickel	Selenium	Chromium VI	Crystalline Silica		
582471.13_4129978.02	582471.13	4129978.02	3.34E-05	1.41E-08	8.46E-09	1.41E-08	2.79E-07	1.60E-09	6.00E-07	2.82E-08	2.09E-08	7.91E-05	7.89552E-05	Res
582527.7_4129978.02	582527.7	4129978.02	3.06E-05	1.28E-08	7.68E-09	1.28E-08	2.53E-07	1.45E-09	5.44E-07	2.56E-08	1.90E-08	7.18E-05	7.16507E-05	Res
582584.27_4129978.02	582584.27	4129978.02	2.80E-05	1.16E-08	6.95E-09	1.16E-08	2.29E-07	1.31E-09	4.92E-07	2.32E-08	1.71E-08	6.49E-05	6.48741E-05	Res
582640.84_4129978.02	582640.84	4129978.02	2.56E-05	1.05E-08	6.30E-09	1.05E-08	2.07E-07	1.19E-09	4.46E-07	2.10E-08	1.55E-08	5.88E-05	5.87864E-05	Res
582697.41_4129978.02	582697.41	4129978.02	2.34E-05	9.49E-09	5.70E-09	9.49E-09	1.87E-07	1.08E-09	4.03E-07	1.90E-08	1.40E-08	5.31E-05	5.31934E-05	Res
582753.98_4129978.02	582753.98	4129978.02	2.13E-05	8.51E-09	5.11E-09	8.51E-09	1.68E-07	9.67E-10	3.61E-07	1.70E-08	1.25E-08	4.76E-05	4.7719E-05	Res
582810.55_4129978.02	582810.55	4129978.02	1.90E-05	7.46E-09	4.47E-09	7.46E-09	1.47E-07	8.48E-10	3.15E-07	1.49E-08	1.09E-08	4.16E-05	4.18032E-05	Res
581905.43_4130061.93	581905.43	4130061.93	6.85E-05	2.97E-08	1.78E-08	2.97E-08	5.87E-07	3.35E-09	1.27E-06	5.93E-08	4.42E-08	1.67E-04	0.000165961	Res
581962_4130061.93	581962	4130061.93	6.44E-05	2.80E-08	1.68E-08	2.80E-08	5.54E-07	3.16E-09	1.19E-06	5.59E-08	4.16E-08	1.57E-04	0.00015644	Res
582018.57_4130061.93	582018.57	4130061.93	5.58E-05	2.37E-08	1.42E-08	2.37E-08	4.68E-07	2.68E-09	1.01E-06	4.73E-08	3.52E-08	1.33E-04	0.000132518	Res
582075.14_4130061.93	582075.14	4130061.93	5.01E-05	2.11E-08	1.26E-08	2.11E-08	4.16E-07	2.38E-09	8.96E-07	4.21E-08	3.12E-08	1.18E-04	0.0001179	Res
582131.71_4130061.93	582131.71	4130061.93	4.86E-05	2.07E-08	1.24E-08	2.07E-08	4.10E-07	2.34E-09	8.82E-07	4.14E-08	3.07E-08	1.16E-04	0.000115862	Res
582188.28_4130061.93	582188.28	4130061.93	4.70E-05	2.02E-08	1.21E-08	2.02E-08	4.01E-07	2.29E-09	8.63E-07	4.05E-08	3.01E-08	1.14E-04	0.000113302	Res
582244.85_4130061.93	582244.85	4130061.93	4.56E-05	1.99E-08	1.19E-08	1.99E-08	3.93E-07	2.24E-09	8.47E-07	3.97E-08	2.96E-08	1.12E-04	0.000111111	Res
582301.42_4130061.93	582301.42	4130061.93	4.24E-05	1.84E-08	1.10E-08	1.84E-08	3.65E-07	2.08E-09	7.86E-07	3.68E-08	2.74E-08	1.04E-04	0.000103041	Res
582357.99_4130061.93	582357.99	4130061.93	3.94E-05	1.70E-08	1.02E-08	1.70E-08	3.38E-07	1.93E-09	7.27E-07	3.41E-08	2.54E-08	9.58E-05	9.54113E-05	Res
582414.56_4130061.93	582414.56	4130061.93	3.62E-05	1.56E-08	9.35E-09	1.56E-08	3.09E-07	1.76E-09	6.65E-07	3.12E-08	2.32E-08	8.76E-05	8.72524E-05	Res
582471.13_4130061.93	582471.13	4130061.93	3.30E-05	1.41E-08	8.46E-09	1.41E-08	2.79E-07	1.59E-09	6.01E-07	2.82E-08	2.10E-08	7.92E-05	7.8917E-05	Res
582527.7_4130061.93	582527.7	4130061.93	3.00E-05	1.27E-08	7.60E-09	1.27E-08	2.51E-07	1.43E-09	5.40E-07	2.53E-08	1.88E-08	7.11E-05	7.09428E-05	Res
582584.27_4130061.93	582584.27	4130061.93	2.73E-05	1.14E-08	6.84E-09	1.14E-08	2.25E-07	1.29E-09	4.85E-07	2.28E-08	1.69E-08	6.39E-05	6.3824E-05	Res
582640.84_4130061.93	582640.84	4130061.93	2.48E-05	1.02E-08	6.13E-09	1.02E-08	2.02E-07	1.16E-09	4.34E-07	2.04E-08	1.51E-08	5.73E-05	5.72384E-05	Res
582697.41_4130061.93	582697.41	4130061.93	2.26E-05	9.19E-09	5.52E-09	9.19E-09	1.81E-07	1.04E-09	3.90E-07	1.84E-08	1.36E-08	5.15E-05	5.15119E-05	Res
582753.98_4130061.93	582753.98	4130061.93	2.06E-05	8.30E-09	4.98E-09	8.30E-09	1.64E-07	9.42E-10	3.52E-07	1.66E-08	1.22E-08	4.64E-05	4.65101E-05	Res
582810.55_4130061.93	582810.55	4130061.93	1.89E-05	7.49E-09	4.49E-09	7.49E-09	1.48E-07	8.51E-10	3.17E-07	1.50E-08	1.10E-08	4.18E-05	4.19794E-05	Res
581962_4130145.84	581962	4130145.84	7.24E-05	3.28E-08	1.97E-08	3.28E-08	6.51E-07	3.70E-09	1.40E-06	6.56E-08	4.91E-08	1.85E-04	0.000183347	Res
582018.57_4130145.84	582018.57	4130145.84	6.71E-05	3.03E-08	1.82E-08	3.03E-08	6.03E-07	3.42E-09	1.30E-06	6.07E-08	4.54E-08	1.71E-04	0.000169708	Res
582075.14_4130145.84	582075.14	4130145.84	5.78E-05	2.57E-08	1.54E-08	2.57E-08	5.10E-07	2.90E-09	1.10E-06	5.14E-08	3.84E-08	1.45E-04	0.000143811	Res
582131.71_4130145.84	582131.71	4130145.84	5.36E-05	2.38E-08	1.43E-08	2.38E-08	4.72E-07	2.68E-09	1.02E-06	4.76E-08	3.55E-08	1.34E-04	0.000133092	Res
582188.28_4130145.84	582188.28	4130145.84	5.14E-05	2.30E-08	1.38E-08	2.30E-08	4.56E-07	2.59E-09	9.84E-07	4.60E-08	3.44E-08	1.30E-04	0.00012864	Res
582244.85_4130145.84	582244.85	4130145.84	4.70E-05	2.09E-08	1.26E-08	2.09E-08	4.15E-07	2.36E-09	8.95E-07	4.19E-08	3.13E-08	1.18E-04	0.000117132	Res
582301.42_4130145.84	582301.42	4130145.84	4.28E-05	1.89E-08	1.14E-08	1.89E-08	3.76E-07	2.14E-09	8.10E-07	3.79E-08	2.83E-08	1.07E-04	0.000105973	Res
582357.99_4130145.84	582357.99	4130145.84	3.91E-05	1.72E-08	1.03E-08	1.72E-08	3.41E-07	1.94E-09	7.35E-07	3.44E-08	2.57E-08	9.68E-05	9.62608E-05	Res
582414.56_4130145.84	582414.56	4130145.84	3.57E-05	1.56E-08	9.34E-09	1.56E-08	3.08E-07	1.76E-09	6.65E-07	3.11E-08	2.32E-08	8.75E-05	8.71055E-05	Res
582471.13_4130145.84	582471.13	4130145.84	3.23E-05	1.40E-08	8.37E-09	1.40E-08	2.76E-07	1.58E-09	5.95E-07	2.79E-08	2.08E-08	7.84E-05	7.81252E-05	Res
582527.7_4130145.84	582527.7	4130145.84	2.90E-05	1.24E-08	7.44E-09	1.24E-08	2.45E-07	1.40E-09	5.29E-07	2.48E-08	1.84E-08	6.97E-05	6.94313E-05	Res
582584.27_4130145.84	582584.27	4130145.84	2.61E-05	1.10E-08	6.60E-09	1.10E-08	2.17E-07	1.24E-09	4.68E-07	2.20E-08	1.63E-08	6.17E-05	6.15612E-05	Res
582640.84_4130145.84	582640.84	4130145.84	2.35E-05	9.78E-09	5.87E-09	9.78E-09	1.93E-07	1.11E-09	4.16E-07	1.96E-08	1.45E-08	5.48E-05	5.47926E-05	Res
582697.41_4130145.84	582697.41	4130145.84	2.14E-05	8.76E-09	5.25E-09	8.76E-09	1.73E-07	9.93E-10	3.72E-07	1.75E-08	1.29E-08	4.90E-05	4.90631E-05	Res
582753.98_4130145.84	582753.98	4130145.84	1.95E-05	7.91E-09	4.74E-09	7.91E-09	1.56E-07	8.97E-10	3.36E-07	1.58E-08	1.17E-08	4.42E-05	4.43086E-05	Res
582810.55_4130145.84	582810.55	4130145.84	1.80E-05	7.19E-09	4.32E-09	7.19E-09	1.42E-07	8.17E-10	3.05E-07	1.44E-08	1.06E-08	4.02E-05	4.03211E-05	Res
582867.12_4130145.84	582867.12	4130145.84	1.60E-05	6.29E-09	3.77E-09	6.29E-09	1.24E-07	7.15E-10	2.66E-07	1.26E-08	9.24E-09	3.51E-05	3.52756E-05	Res
581962_4130229.75	581962	4130229.75	7.35E-05	3.35E-08	2.01E-08	3.35E-08	6.67E-07	3.78E-09	1.44E-06	6.71E-08	5.03E-08	1.89E-04	0.00018759	Res
582018.57_4130229.75	582018.57	4130229.75	6.98E-05	3.20E-08	1.92E-08	3.20E-08	6.36E-07	3.60E-09	1.37E-06	6.40E-08	4.80E-08	1.81E-04	0.000178914	Res
582075.14_4130229.75	582075.14	4130229.75	6.48E-05	2.97E-08	1.78E-08	2.97E-08	5.91E-07	3.35E-09	1.27E-06	5.94E-08	4.46E-08	1.68E-04	0.000166218	Res
582131.71_4130229.75	582131.71	4130229.75	5.85E-05	2.67E-08	1.60E-08	2.67E-08	5.31E-07	3.01E-09	1.14E-06	5.34E-08	4.00E-08	1.51E-04	0.000149325	Res
582188.28_4130229.75	582188.28	4130229.75	5.24E-05	2.37E-08	1.42E-08	2.37E-08	4.72E-07	2.68E-09	1.02E-06	4.75E-08	3.56E-08	1.34E-04	0.000132813	Res
582244.85_4130229.75	582244.85	4130229.75	4.70E-05	2.12E-08	1.27E-08	2.12E-08	4.21E-07	2.39E-09	9.06E-07	4.24E-08	3.17E-08	1.19E-04	0.000118457	Res

Chronic Calculation, $\sum C_{TAC}$ /REL

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)										Total HI	Receptor Type
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Copper	Mercury	Nickel	Selenium	Chromium VI	Crystalline Silica		
582301.42_4130229.75	582301.42	4130229.75	4.25E-05	1.90E-08	1.14E-08	1.90E-08	3.77E-07	2.14E-09	8.13E-07	3.80E-08	2.84E-08	1.07E-04	0.000106296	Res
582357.99_4130229.75	582357.99	4130229.75	3.85E-05	1.71E-08	1.03E-08	1.71E-08	3.39E-07	1.93E-09	7.31E-07	3.42E-08	2.55E-08	9.62E-05	9.56221E-05	Res
582414.56_4130229.75	582414.56	4130229.75	3.46E-05	1.52E-08	9.12E-09	1.52E-08	3.01E-07	1.72E-09	6.49E-07	3.04E-08	2.27E-08	8.55E-05	8.50552E-05	Res
582471.13_4130229.75	582471.13	4130229.75	3.08E-05	1.34E-08	8.02E-09	1.34E-08	2.65E-07	1.51E-09	5.70E-07	2.67E-08	1.99E-08	7.51E-05	7.47802E-05	Res
582527.7_4130229.75	582527.7	4130229.75	2.74E-05	1.17E-08	7.04E-09	1.17E-08	2.32E-07	1.33E-09	5.01E-07	2.35E-08	1.75E-08	6.60E-05	6.57254E-05	Res
582584.27_4130229.75	582584.27	4130229.75	2.45E-05	1.04E-08	6.22E-09	1.04E-08	2.05E-07	1.17E-09	4.41E-07	2.07E-08	1.54E-08	5.82E-05	5.80372E-05	Res
582640.84_4130229.75	582640.84	4130229.75	2.21E-05	9.22E-09	5.53E-09	9.22E-09	1.82E-07	1.04E-09	3.92E-07	1.84E-08	1.37E-08	5.17E-05	5.16169E-05	Res
582697.41_4130229.75	582697.41	4130229.75	2.01E-05	8.30E-09	4.98E-09	8.30E-09	1.64E-07	9.41E-10	3.53E-07	1.66E-08	1.23E-08	4.65E-05	4.64915E-05	Res
582753.98_4130229.75	582753.98	4130229.75	1.85E-05	7.52E-09	4.51E-09	7.52E-09	1.48E-07	8.53E-10	3.19E-07	1.50E-08	1.11E-08	4.21E-05	4.21265E-05	Res
582810.55_4130229.75	582810.55	4130229.75	1.71E-05	6.88E-09	4.13E-09	6.88E-09	1.36E-07	7.81E-10	2.92E-07	1.38E-08	1.01E-08	3.85E-05	3.85737E-05	Res
582867.12_4130229.75	582867.12	4130229.75	1.59E-05	6.35E-09	3.81E-09	6.35E-09	1.25E-07	7.21E-10	2.69E-07	1.27E-08	9.35E-09	3.55E-05	3.55988E-05	Res
582018.57_4130313.66	582018.57	4130313.66	7.45E-05	3.46E-08	2.07E-08	3.46E-08	6.88E-07	3.89E-09	1.48E-06	6.91E-08	5.19E-08	1.95E-04	0.000193276	Res
582075.14_4130313.66	582075.14	4130313.66	6.89E-05	3.20E-08	1.92E-08	3.20E-08	6.37E-07	3.60E-09	1.37E-06	6.40E-08	4.81E-08	1.81E-04	0.000178897	Res
582131.71_4130313.66	582131.71	4130313.66	6.06E-05	2.79E-08	1.68E-08	2.79E-08	5.55E-07	3.15E-09	1.20E-06	5.59E-08	4.19E-08	1.58E-04	0.000156176	Res
582188.28_4130313.66	582188.28	4130313.66	5.33E-05	2.43E-08	1.46E-08	2.43E-08	4.84E-07	2.74E-09	1.04E-06	4.87E-08	3.65E-08	1.37E-04	0.000136122	Res
582244.85_4130313.66	582244.85	4130313.66	4.73E-05	2.14E-08	1.28E-08	2.14E-08	4.25E-07	2.41E-09	9.17E-07	4.28E-08	3.21E-08	1.21E-04	0.000119775	Res
582301.42_4130313.66	582301.42	4130313.66	4.22E-05	1.90E-08	1.14E-08	1.90E-08	3.76E-07	2.14E-09	8.11E-07	3.79E-08	2.84E-08	1.07E-04	0.000106031	Res
582357.99_4130313.66	582357.99	4130313.66	3.73E-05	1.66E-08	9.96E-09	1.66E-08	3.29E-07	1.87E-09	7.10E-07	3.32E-08	2.48E-08	9.35E-05	9.28527E-05	Res
582414.56_4130313.66	582414.56	4130313.66	3.28E-05	1.44E-08	8.64E-09	1.44E-08	2.86E-07	1.63E-09	6.15E-07	2.88E-08	2.15E-08	8.10E-05	8.05694E-05	Res
582471.13_4130313.66	582471.13	4130313.66	2.89E-05	1.25E-08	7.51E-09	1.25E-08	2.48E-07	1.41E-09	5.34E-07	2.50E-08	1.86E-08	7.03E-05	7.00355E-05	Res
582527.7_4130313.66	582527.7	4130313.66	2.57E-05	1.10E-08	6.58E-09	1.10E-08	2.17E-07	1.24E-09	4.68E-07	2.19E-08	1.63E-08	6.16E-05	6.14268E-05	Res
582584.27_4130313.66	582584.27	4130313.66	2.30E-05	9.70E-09	5.82E-09	9.70E-09	1.92E-07	1.10E-09	4.13E-07	1.94E-08	1.44E-08	5.44E-05	5.43319E-05	Res
582640.84_4130313.66	582640.84	4130313.66	2.08E-05	8.69E-09	5.21E-09	8.69E-09	1.72E-07	9.84E-10	3.70E-07	1.74E-08	1.29E-08	4.87E-05	4.86575E-05	Res
582697.41_4130313.66	582697.41	4130313.66	1.90E-05	7.84E-09	4.71E-09	7.84E-09	1.55E-07	8.89E-10	3.33E-07	1.57E-08	1.16E-08	4.40E-05	4.39464E-05	Res
582753.98_4130313.66	582753.98	4130313.66	1.75E-05	7.13E-09	4.28E-09	7.13E-09	1.41E-07	8.09E-10	3.03E-07	1.43E-08	1.05E-08	3.99E-05	3.99606E-05	Res
582810.55_4130313.66	582810.55	4130313.66	1.61E-05	6.50E-09	3.90E-09	6.50E-09	1.28E-07	7.38E-10	2.76E-07	1.30E-08	9.59E-09	3.64E-05	3.64438E-05	Res
582867.12_4130313.66	582867.12	4130313.66	1.49E-05	5.96E-09	3.57E-09	5.96E-09	1.17E-07	6.76E-10	2.52E-07	1.19E-08	8.77E-09	3.33E-05	3.33813E-05	Res
581848.86_4130397.57	581848.86	4130397.57	1.01E-04	4.76E-08	2.86E-08	4.76E-08	9.49E-07	5.36E-09	2.05E-06	9.53E-08	7.17E-08	2.69E-04	0.000266299	Res
581905.43_4130397.57	581905.43	4130397.57	9.77E-05	4.62E-08	2.77E-08	4.62E-08	9.20E-07	5.20E-09	1.98E-06	9.24E-08	6.96E-08	2.61E-04	0.000258242	Res
581962_4130397.57	581962	4130397.57	9.23E-05	4.37E-08	2.62E-08	4.37E-08	8.70E-07	4.91E-09	1.88E-06	8.73E-08	6.58E-08	2.47E-04	0.000244079	Res
582018.57_4130397.57	582018.57	4130397.57	8.29E-05	3.91E-08	2.35E-08	3.91E-08	7.78E-07	4.40E-09	1.68E-06	7.82E-08	5.88E-08	2.21E-04	0.000218484	Res
582075.14_4130397.57	582075.14	4130397.57	7.29E-05	3.41E-08	2.05E-08	3.41E-08	6.80E-07	3.84E-09	1.47E-06	6.83E-08	5.14E-08	1.93E-04	0.000190901	Res
582131.71_4130397.57	582131.71	4130397.57	6.27E-05	2.91E-08	1.75E-08	2.91E-08	5.79E-07	3.28E-09	1.25E-06	5.82E-08	4.37E-08	1.64E-04	0.000162688	Res
582188.28_4130397.57	582188.28	4130397.57	5.47E-05	2.52E-08	1.51E-08	2.52E-08	5.00E-07	2.83E-09	1.08E-06	5.03E-08	3.78E-08	1.42E-04	0.000140693	Res
582244.85_4130397.57	582244.85	4130397.57	4.75E-05	2.16E-08	1.30E-08	2.16E-08	4.29E-07	2.43E-09	9.25E-07	4.32E-08	3.24E-08	1.22E-04	0.000120754	Res
582301.42_4130397.57	582301.42	4130397.57	4.12E-05	1.85E-08	1.11E-08	1.85E-08	3.67E-07	2.09E-09	7.91E-07	3.70E-08	2.77E-08	1.04E-04	0.000103443	Res
582357.99_4130397.57	582357.99	4130397.57	3.55E-05	1.57E-08	9.43E-09	1.57E-08	3.12E-07	1.77E-09	6.72E-07	3.14E-08	2.35E-08	8.85E-05	8.79541E-05	Res
582414.56_4130397.57	582414.56	4130397.57	3.09E-05	1.35E-08	8.10E-09	1.35E-08	2.68E-07	1.53E-09	5.77E-07	2.70E-08	2.01E-08	7.60E-05	7.55875E-05	Res
582471.13_4130397.57	582471.13	4130397.57	2.73E-05	1.18E-08	7.05E-09	1.18E-08	2.33E-07	1.33E-09	5.01E-07	2.35E-08	1.75E-08	6.60E-05	6.57798E-05	Res
582527.7_4130397.57	582527.7	4130397.57	2.43E-05	1.03E-08	6.20E-09	1.03E-08	2.04E-07	1.17E-09	4.40E-07	2.07E-08	1.53E-08	5.80E-05	5.78374E-05	Res
582584.27_4130397.57	582584.27	4130397.57	2.19E-05	9.17E-09	5.50E-09	9.17E-09	1.81E-07	1.04E-09	3.90E-07	1.83E-08	1.36E-08	5.14E-05	5.13435E-05	Res
582640.84_4130397.57	582640.84	4130397.57	1.98E-05	8.21E-09	4.92E-09	8.21E-09	1.62E-07	9.30E-10	3.49E-07	1.64E-08	1.21E-08	4.60E-05	4.59627E-05	Res
582697.41_4130397.57	582697.41	4130397.57	1.80E-05	7.35E-09	4.41E-09	7.35E-09	1.45E-07	8.34E-10	3.12E-07	1.47E-08	1.09E-08	4.12E-05	4.12016E-05	Res
582753.98_4130397.57	582753.98	4130397.57	1.64E-05	6.64E-09	3.99E-09	6.64E-09	1.31E-07	7.54E-10	2.82E-07	1.33E-08	9.80E-09	3.72E-05	3.72342E-05	Res
582810.55_4130397.57	582810.55	4130397.57	1.51E-05	6.04E-09	3.62E-09	6.04E-09	1.19E-07	6.86E-10	2.56E-07	1.21E-08	8.89E-09	3.37E-05	3.38392E-05	Res
582867.12_4130397.57	582867.12	4130397.57	1.40E-05	5.51E-09	3.31E-09	5.51E-09	1.09E-07	6.26E-10	2.33E-07	1.10E-08	8.10E-09	3.08E-05	3.08876E-05	Res
581848.86_4130481.48	581848.86	4130481.48	1.28E-04	6.20E-08	3.72E-08	6.20E-08	1.24E-06	6.96E-09	2.67E-06	1.24E-07	9.36E-08	3.51E-04	0.000346365	Res
581905.43_4130481.48	581905.43	4130481.48	1.19E-04	5.74E-08	3.44E-08	5.74E-08	1.14E-06	6.45E-09	2.47E-06	1.15E-07	8.67E-08	3.25E-04	0.000320727	Res
581962_4130481.48	581962	4130481.48	1.02E-04	4.88E-08	2.93E-08	4.88E-08	9.72E-07	5.48E-09	2.10E-06	9.75E-08	7.36E-08	2.76E-04	0.000272468	Res

Chronic Calculation, $\sum C_{TAC}$ /REL

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)										Total HI	Receptor Type
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Copper	Mercury	Nickel	Selenium	Chromium VI	Crystalline Silica		
582018.57_4130481.48	582018.57	4130481.48	8.96E-05	4.28E-08	2.57E-08	4.28E-08	8.53E-07	4.81E-09	1.84E-06	8.56E-08	6.46E-08	2.42E-04	0.000239299	Res
582075.14_4130481.48	582075.14	4130481.48	7.61E-05	3.60E-08	2.16E-08	3.60E-08	7.17E-07	4.05E-09	1.55E-06	7.21E-08	5.43E-08	2.04E-04	0.000201375	Res
582131.71_4130481.48	582131.71	4130481.48	6.50E-05	3.04E-08	1.82E-08	3.04E-08	6.05E-07	3.42E-09	1.31E-06	6.08E-08	4.58E-08	1.72E-04	0.000170032	Res
582188.28_4130481.48	582188.28	4130481.48	5.52E-05	2.55E-08	1.53E-08	2.55E-08	5.08E-07	2.88E-09	1.10E-06	5.11E-08	3.84E-08	1.44E-04	0.000142815	Res
582244.85_4130481.48	582244.85	4130481.48	4.64E-05	2.11E-08	1.27E-08	2.11E-08	4.20E-07	2.38E-09	9.04E-07	4.22E-08	3.16E-08	1.19E-04	0.000118082	Res
582301.42_4130481.48	582301.42	4130481.48	3.92E-05	1.75E-08	1.05E-08	1.75E-08	3.48E-07	1.98E-09	7.51E-07	3.51E-08	2.62E-08	9.89E-05	9.81609E-05	Res
582357.99_4130481.48	582357.99	4130481.48	3.36E-05	1.48E-08	8.89E-09	1.48E-08	2.94E-07	1.67E-09	6.33E-07	2.96E-08	2.21E-08	8.34E-05	8.28779E-05	Res
582414.56_4130481.48	582414.56	4130481.48	2.94E-05	1.27E-08	7.65E-09	1.27E-08	2.53E-07	1.44E-09	5.44E-07	2.55E-08	1.90E-08	7.16E-05	7.13315E-05	Res
582471.13_4130481.48	582471.13	4130481.48	2.60E-05	1.11E-08	6.65E-09	1.11E-08	2.19E-07	1.25E-09	4.72E-07	2.22E-08	1.65E-08	6.23E-05	6.20621E-05	Res
582527.7_4130481.48	582527.7	4130481.48	2.31E-05	9.71E-09	5.82E-09	9.71E-09	1.92E-07	1.10E-09	4.13E-07	1.94E-08	1.44E-08	5.45E-05	5.43505E-05	Res
582584.27_4130481.48	582584.27	4130481.48	2.07E-05	8.58E-09	5.15E-09	8.58E-09	1.69E-07	9.72E-10	3.65E-07	1.72E-08	1.27E-08	4.81E-05	4.80478E-05	Res
582640.84_4130481.48	582640.84	4130481.48	1.86E-05	7.61E-09	4.57E-09	7.61E-09	1.50E-07	8.63E-10	3.23E-07	1.52E-08	1.12E-08	4.26E-05	4.26529E-05	Res
582697.41_4130481.48	582697.41	4130481.48	1.69E-05	6.81E-09	4.09E-09	6.81E-09	1.34E-07	7.73E-10	2.89E-07	1.36E-08	1.00E-08	3.81E-05	3.81578E-05	Res
582753.98_4130481.48	582753.98	4130481.48	1.55E-05	6.15E-09	3.69E-09	6.15E-09	1.21E-07	6.99E-10	2.61E-07	1.23E-08	9.05E-09	3.44E-05	3.44852E-05	Res
582810.55_4130481.48	582810.55	4130481.48	1.43E-05	5.60E-09	3.36E-09	5.60E-09	1.10E-07	6.37E-10	2.37E-07	1.12E-08	8.22E-09	3.13E-05	3.13932E-05	Res
582867.12_4130481.48	582867.12	4130481.48	1.32E-05	5.13E-09	3.08E-09	5.13E-09	1.01E-07	5.83E-10	2.17E-07	1.03E-08	7.52E-09	2.86E-05	2.87445E-05	Res
581735.72_4130565.39	581735.72	4130565.39	1.54E-04	7.57E-08	4.54E-08	7.57E-08	1.51E-06	8.49E-09	3.26E-06	1.51E-07	1.14E-07	4.29E-04	0.00042266	Res
581792.29_4130565.39	581792.29	4130565.39	1.51E-04	7.45E-08	4.47E-08	7.45E-08	1.49E-06	8.37E-09	3.21E-06	1.49E-07	1.13E-07	4.22E-04	0.000416397	Res
581848.86_4130565.39	581848.86	4130565.39	1.44E-04	7.09E-08	4.25E-08	7.09E-08	1.41E-06	7.96E-09	3.05E-06	1.42E-07	1.07E-07	4.02E-04	0.000395975	Res
581905.43_4130565.39	581905.43	4130565.39	1.38E-04	6.77E-08	4.06E-08	6.77E-08	1.35E-06	7.60E-09	2.92E-06	1.35E-07	1.02E-07	3.84E-04	0.000378139	Res
581962_4130565.39	581962	4130565.39	1.19E-04	5.83E-08	3.50E-08	5.83E-08	1.16E-06	6.54E-09	2.51E-06	1.17E-07	8.81E-08	3.30E-04	0.000325486	Res
582018.57_4130565.39	582018.57	4130565.39	9.68E-05	4.69E-08	2.81E-08	4.69E-08	9.36E-07	5.27E-09	2.02E-06	9.38E-08	7.09E-08	2.66E-04	0.000262133	Res
582075.14_4130565.39	582075.14	4130565.39	7.91E-05	3.79E-08	2.27E-08	3.79E-08	7.55E-07	4.26E-09	1.63E-06	7.58E-08	5.71E-08	2.14E-04	0.000211729	Res
582131.71_4130565.39	582131.71	4130565.39	6.53E-05	3.09E-08	1.85E-08	3.09E-08	6.15E-07	3.47E-09	1.33E-06	6.18E-08	4.65E-08	1.75E-04	0.00017261	Res
582188.28_4130565.39	582188.28	4130565.39	5.29E-05	2.46E-08	1.48E-08	2.46E-08	4.90E-07	2.77E-09	1.06E-06	4.92E-08	3.70E-08	1.39E-04	0.000137624	Res
582244.85_4130565.39	582244.85	4130565.39	4.34E-05	1.98E-08	1.19E-08	1.98E-08	3.94E-07	2.23E-09	8.49E-07	3.96E-08	2.97E-08	1.12E-04	0.000110848	Res
582301.42_4130565.39	582301.42	4130565.39	3.69E-05	1.65E-08	9.93E-09	1.65E-08	3.29E-07	1.87E-09	7.08E-07	3.31E-08	2.48E-08	9.32E-05	9.25748E-05	Res
582357.99_4130565.39	582357.99	4130565.39	3.16E-05	1.39E-08	8.33E-09	1.39E-08	2.75E-07	1.57E-09	5.93E-07	2.78E-08	2.07E-08	7.81E-05	7.77095E-05	Res
582414.56_4130565.39	582414.56	4130565.39	2.74E-05	1.18E-08	7.10E-09	1.18E-08	2.34E-07	1.34E-09	5.05E-07	2.37E-08	1.76E-08	6.65E-05	6.62299E-05	Res
582471.13_4130565.39	582471.13	4130565.39	2.41E-05	1.02E-08	6.13E-09	1.02E-08	2.02E-07	1.16E-09	4.35E-07	2.04E-08	1.52E-08	5.74E-05	5.72076E-05	Res
582527.7_4130565.39	582527.7	4130565.39	2.14E-05	8.92E-09	5.35E-09	8.92E-09	1.76E-07	1.01E-09	3.79E-07	1.78E-08	1.32E-08	5.00E-05	4.99617E-05	Res
582584.27_4130565.39	582584.27	4130565.39	1.93E-05	7.89E-09	4.73E-09	7.89E-09	1.56E-07	8.95E-10	3.35E-07	1.58E-08	1.17E-08	4.42E-05	4.41969E-05	Res
582640.84_4130565.39	582640.84	4130565.39	1.74E-05	6.99E-09	4.20E-09	6.99E-09	1.38E-07	7.94E-10	2.97E-07	1.40E-08	1.03E-08	3.91E-05	3.91984E-05	Res
582697.41_4130565.39	582697.41	4130565.39	1.59E-05	6.29E-09	3.77E-09	6.29E-09	1.24E-07	7.15E-10	2.66E-07	1.26E-08	9.25E-09	3.51E-05	3.52606E-05	Res
582753.98_4130565.39	582753.98	4130565.39	1.46E-05	5.71E-09	3.43E-09	5.71E-09	1.12E-07	6.49E-10	2.41E-07	1.14E-08	8.38E-09	3.19E-05	3.20098E-05	Res
582810.55_4130565.39	582810.55	4130565.39	1.36E-05	5.23E-09	3.14E-09	5.23E-09	1.03E-07	5.96E-10	2.21E-07	1.05E-08	7.67E-09	2.92E-05	2.93487E-05	Res
582867.12_4130565.39	582867.12	4130565.39	1.27E-05	4.83E-09	2.90E-09	4.83E-09	9.50E-08	5.51E-10	2.04E-07	9.67E-09	7.07E-09	2.69E-05	2.71195E-05	Res
581735.72_4130649.3	581735.72	4130649.3	1.66E-04	8.22E-08	4.93E-08	8.22E-08	1.64E-06	9.22E-09	3.54E-06	1.64E-07	1.24E-07	4.66E-04	0.000458922	Res
581792.29_4130649.3	581792.29	4130649.3	1.60E-04	7.95E-08	4.77E-08	7.95E-08	1.59E-06	8.92E-09	3.43E-06	1.59E-07	1.20E-07	4.51E-04	0.000444188	Res
581905.43_4130649.3	581905.43	4130649.3	1.60E-04	7.97E-08	4.78E-08	7.97E-08	1.59E-06	8.93E-09	3.43E-06	1.59E-07	1.21E-07	4.52E-04	0.0004449	Res
581962_4130649.3	581962	4130649.3	1.33E-04	6.59E-08	3.96E-08	6.59E-08	1.32E-06	7.40E-09	2.84E-06	1.32E-07	9.98E-08	3.74E-04	0.000368326	Res
582018.57_4130649.3	582018.57	4130649.3	1.02E-04	4.98E-08	2.99E-08	4.98E-08	9.94E-07	5.59E-09	2.15E-06	9.96E-08	7.53E-08	2.82E-04	0.000278227	Res
582075.14_4130649.3	582075.14	4130649.3	7.93E-05	3.84E-08	2.31E-08	3.84E-08	7.66E-07	4.32E-09	1.65E-06	7.69E-08	5.80E-08	2.18E-04	0.000214709	Res
582131.71_4130649.3	582131.71	4130649.3	6.21E-05	2.96E-08	1.78E-08	2.96E-08	5.90E-07	3.33E-09	1.27E-06	5.92E-08	4.47E-08	1.68E-04	0.000165532	Res
582188.28_4130649.3	582188.28	4130649.3	4.93E-05	2.31E-08	1.39E-08	2.31E-08	4.60E-07	2.60E-09	9.91E-07	4.62E-08	3.47E-08	1.30E-04	0.000129062	Res
582244.85_4130649.3	582244.85	4130649.3	4.00E-05	1.84E-08	1.10E-08	1.84E-08	3.65E-07	2.07E-09	7.88E-07	3.68E-08	2.76E-08	1.04E-04	0.000102765	Res
582301.42_4130649.3	582301.42	4130649.3	3.34E-05	1.50E-08	9.01E-09	1.50E-08	2.98E-07	1.69E-09	6.43E-07	3.00E-08	2.25E-08	8.46E-05	8.4011E-05	Res
582357.99_4130649.3	582357.99	4130649.3	2.85E-05	1.26E-08	7.55E-09	1.26E-08	2.49E-07	1.42E-09	5.37E-07	2.52E-08	1.88E-08	7.08E-05	7.03674E-05	Res
582414.56_4130649.3	582414.56	4130649.3	2.49E-05	1.08E-08	6.45E-09	1.08E-08	2.13E-07	1.22E-09	4.59E-07	2.15E-08	1.60E-08	6.04E-05	6.01785E-05	Res

Chronic Calculation, $\sum C_{TAC}$ /REL

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)										Total HI	Receptor Type
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Copper	Mercury	Nickel	Selenium	Chromium VI	Crystalline Silica		
582471.13_4130649.3	582471.13	4130649.3	2.20E-05	9.28E-09	5.57E-09	9.28E-09	1.84E-07	1.05E-09	3.95E-07	1.86E-08	1.38E-08	5.21E-05	5.19762E-05	Res
582527.7_4130649.3	582527.7	4130649.3	1.96E-05	8.13E-09	4.88E-09	8.13E-09	1.61E-07	9.22E-10	3.46E-07	1.63E-08	1.20E-08	4.56E-05	4.5565E-05	Res
582584.27_4130649.3	582584.27	4130649.3	1.78E-05	7.23E-09	4.34E-09	7.23E-09	1.43E-07	8.21E-10	3.07E-07	1.45E-08	1.07E-08	4.05E-05	4.05331E-05	Res
582640.84_4130649.3	582640.84	4130649.3	1.63E-05	6.52E-09	3.91E-09	6.52E-09	1.29E-07	7.40E-10	2.76E-07	1.30E-08	9.60E-09	3.64E-05	3.65378E-05	Res
582697.41_4130649.3	582697.41	4130649.3	1.51E-05	5.94E-09	3.56E-09	5.94E-09	1.17E-07	6.75E-10	2.51E-07	1.19E-08	8.72E-09	3.32E-05	3.32799E-05	Res
582753.98_4130649.3	582753.98	4130649.3	1.40E-05	5.47E-09	3.28E-09	5.47E-09	1.08E-07	6.22E-10	2.31E-07	1.09E-08	8.02E-09	3.05E-05	3.06731E-05	Res
582810.55_4130649.3	582810.55	4130649.3	1.32E-05	5.09E-09	3.05E-09	5.09E-09	1.00E-07	5.79E-10	2.15E-07	1.02E-08	7.45E-09	2.84E-05	2.85422E-05	Res
582867.12_4130649.3	582867.12	4130649.3	1.25E-05	4.75E-09	2.85E-09	4.75E-09	9.34E-08	5.42E-10	2.01E-07	9.51E-09	6.95E-09	2.65E-05	2.66691E-05	Res
581848.86_4130733.21	581848.86	4130733.21	2.37E-04	1.19E-07	7.14E-08	1.19E-07	2.38E-06	1.33E-08	5.14E-06	2.38E-07	1.81E-07	6.76E-04	0.000664939	Res
581905.43_4130733.21	581905.43	4130733.21	2.02E-04	1.01E-07	6.09E-08	1.01E-07	2.03E-06	1.14E-08	4.38E-06	2.03E-07	1.54E-07	5.76E-04	0.000566779	Res
581962_4130733.21	581962	4130733.21	1.49E-04	7.43E-08	4.46E-08	7.43E-08	1.48E-06	8.34E-09	3.21E-06	1.49E-07	1.13E-07	4.22E-04	0.000415108	Res
582018.57_4130733.21	582018.57	4130733.21	1.05E-04	5.18E-08	3.11E-08	5.18E-08	1.03E-06	5.81E-09	2.23E-06	1.04E-07	7.84E-08	2.94E-04	0.000289451	Res
582075.14_4130733.21	582075.14	4130733.21	7.45E-05	3.63E-08	2.18E-08	3.63E-08	7.25E-07	4.08E-09	1.56E-06	7.26E-08	5.49E-08	2.06E-04	0.00020292	Res
582131.71_4130733.21	582131.71	4130733.21	5.49E-05	2.63E-08	1.58E-08	2.63E-08	5.24E-07	2.95E-09	1.13E-06	5.26E-08	3.97E-08	1.49E-04	0.000146905	Res
582188.28_4130733.21	582188.28	4130733.21	4.28E-05	2.01E-08	1.21E-08	2.01E-08	4.01E-07	2.27E-09	8.65E-07	4.03E-08	3.03E-08	1.14E-04	0.000112629	Res
582244.85_4130733.21	582244.85	4130733.21	3.47E-05	1.60E-08	9.61E-09	1.60E-08	3.18E-07	1.80E-09	6.86E-07	3.20E-08	2.40E-08	9.04E-05	8.9522E-05	Res
582301.42_4130733.21	582301.42	4130733.21	2.91E-05	1.32E-08	7.89E-09	1.32E-08	2.61E-07	1.48E-09	5.63E-07	2.63E-08	1.97E-08	7.41E-05	7.35783E-05	Res
582357.99_4130733.21	582357.99	4130733.21	2.51E-05	1.11E-08	6.66E-09	1.11E-08	2.20E-07	1.25E-09	4.75E-07	2.22E-08	1.66E-08	6.25E-05	6.21386E-05	Res
582414.56_4130733.21	582414.56	4130733.21	2.21E-05	9.59E-09	5.75E-09	9.59E-09	1.90E-07	1.08E-09	4.09E-07	1.92E-08	1.43E-08	5.39E-05	5.36795E-05	Res
582471.13_4130733.21	582471.13	4130733.21	1.99E-05	8.46E-09	5.08E-09	8.46E-09	1.67E-07	9.57E-10	3.60E-07	1.69E-08	1.26E-08	4.75E-05	4.73676E-05	Res
582527.7_4130733.21	582527.7	4130733.21	1.82E-05	7.59E-09	4.55E-09	7.59E-09	1.50E-07	8.60E-10	3.23E-07	1.52E-08	1.12E-08	4.26E-05	4.25029E-05	Res
582584.27_4130733.21	582584.27	4130733.21	1.68E-05	6.90E-09	4.14E-09	6.90E-09	1.36E-07	7.83E-10	2.93E-07	1.38E-08	1.02E-08	3.87E-05	3.86792E-05	Res
582640.84_4130733.21	582640.84	4130733.21	1.56E-05	6.35E-09	3.81E-09	6.35E-09	1.25E-07	7.20E-10	2.69E-07	1.27E-08	9.37E-09	3.55E-05	3.55642E-05	Res
582697.41_4130733.21	582697.41	4130733.21	1.47E-05	5.88E-09	3.53E-09	5.88E-09	1.16E-07	6.68E-10	2.49E-07	1.18E-08	8.66E-09	3.29E-05	3.29658E-05	Res
582753.98_4130733.21	582753.98	4130733.21	1.38E-05	5.48E-09	3.29E-09	5.48E-09	1.08E-07	6.23E-10	2.32E-07	1.10E-08	8.06E-09	3.06E-05	3.07181E-05	Res
582810.55_4130733.21	582810.55	4130733.21	1.31E-05	5.15E-09	3.09E-09	5.15E-09	1.01E-07	5.85E-10	2.18E-07	1.03E-08	7.56E-09	2.87E-05	2.88669E-05	Res
582867.12_4130733.21	582867.12	4130733.21	1.25E-05	4.84E-09	2.90E-09	4.84E-09	9.51E-08	5.50E-10	2.04E-07	9.67E-09	7.09E-09	2.70E-05	2.7126E-05	Res
581735.72_4130817.12	581735.72	4130817.12	3.47E-04	1.76E-07	1.05E-07	1.76E-07	3.51E-06	1.97E-08	7.58E-06	3.51E-07	2.66E-07	9.96E-04	0.000980109	Res
581792.29_4130817.12	581792.29	4130817.12	3.91E-04	1.98E-07	1.19E-07	1.98E-07	3.96E-06	2.22E-08	8.56E-06	3.97E-07	3.01E-07	1.13E-03	0.001107168	Res
581848.86_4130817.12	581848.86	4130817.12	3.51E-04	1.78E-07	1.07E-07	1.78E-07	3.55E-06	1.99E-08	7.68E-06	3.56E-07	2.70E-07	1.01E-03	0.000992822	Res
581905.43_4130817.12	581905.43	4130817.12	2.66E-04	1.34E-07	8.05E-08	1.34E-07	2.68E-06	1.50E-08	5.79E-06	2.68E-07	2.04E-07	7.62E-04	0.00074953	Res
581962_4130817.12	581962	4130817.12	1.62E-04	8.10E-08	4.86E-08	8.10E-08	1.62E-06	9.09E-09	3.50E-06	1.62E-07	1.23E-07	4.60E-04	0.000452577	Res
582018.57_4130817.12	582018.57	4130817.12	9.73E-05	4.82E-08	2.89E-08	4.82E-08	9.62E-07	5.40E-09	2.08E-06	9.63E-08	7.29E-08	2.73E-04	0.000269082	Res
582075.14_4130817.12	582075.14	4130817.12	6.34E-05	3.09E-08	1.85E-08	3.09E-08	6.16E-07	3.47E-09	1.33E-06	6.18E-08	4.67E-08	1.75E-04	0.00017254	Res
582131.71_4130817.12	582131.71	4130817.12	4.61E-05	2.20E-08	1.32E-08	2.20E-08	4.39E-07	2.47E-09	9.47E-07	4.40E-08	3.32E-08	1.25E-04	0.000123047	Res
582188.28_4130817.12	582188.28	4130817.12	3.60E-05	1.69E-08	1.02E-08	1.69E-08	3.37E-07	1.90E-09	7.27E-07	3.38E-08	2.55E-08	9.56E-05	9.45918E-05	Res
582244.85_4130817.12	582244.85	4130817.12	2.97E-05	1.37E-08	8.23E-09	1.37E-08	2.73E-07	1.55E-09	5.88E-07	2.74E-08	2.06E-08	7.75E-05	7.67348E-05	Res
582301.42_4130817.12	582301.42	4130817.12	2.56E-05	1.16E-08	6.97E-09	1.16E-08	2.31E-07	1.31E-09	4.97E-07	2.32E-08	1.74E-08	6.55E-05	6.49344E-05	Res
582357.99_4130817.12	582357.99	4130817.12	2.27E-05	1.01E-08	6.07E-09	1.01E-08	2.01E-07	1.14E-09	4.33E-07	2.02E-08	1.51E-08	5.70E-05	5.66086E-05	Res
582414.56_4130817.12	582414.56	4130817.12	2.04E-05	8.99E-09	5.40E-09	8.99E-09	1.78E-07	1.02E-09	3.84E-07	1.80E-08	1.34E-08	5.06E-05	5.0322E-05	Res
582471.13_4130817.12	582471.13	4130817.12	1.88E-05	8.13E-09	4.88E-09	8.13E-09	1.61E-07	9.19E-10	3.47E-07	1.63E-08	1.21E-08	4.57E-05	4.55214E-05	Res
582527.7_4130817.12	582527.7	4130817.12	1.73E-05	7.41E-09	4.45E-09	7.41E-09	1.47E-07	8.38E-10	3.16E-07	1.48E-08	1.10E-08	4.16E-05	4.14888E-05	Res
582584.27_4130817.12	582584.27	4130817.12	1.62E-05	6.82E-09	4.09E-09	6.82E-09	1.35E-07	7.72E-10	2.90E-07	1.36E-08	1.01E-08	3.83E-05	3.82013E-05	Res
582640.84_4130817.12	582640.84	4130817.12	1.52E-05	6.32E-09	3.79E-09	6.32E-09	1.25E-07	7.16E-10	2.69E-07	1.26E-08	9.36E-09	3.54E-05	3.53979E-05	Res
582697.41_4130817.12	582697.41	4130817.12	1.43E-05	5.88E-09	3.53E-09	5.88E-09	1.16E-07	6.67E-10	2.50E-07	1.18E-08	8.69E-09	3.29E-05	3.29459E-05	Res
582753.98_4130817.12	582753.98	4130817.12	1.35E-05	5.48E-09	3.29E-09	5.48E-09	1.08E-07	6.22E-10	2.33E-07	1.10E-08	8.09E-09	3.07E-05	3.0702E-05	Res
582810.55_4130817.12	582810.55	4130817.12	1.28E-05	5.13E-09	3.08E-09	5.13E-09	1.01E-07	5.83E-10	2.17E-07	1.03E-08	7.56E-09	2.87E-05	2.87556E-05	Res
582867.12_4130817.12	582867.12	4130817.12	1.22E-05	4.82E-09	2.89E-09	4.82E-09	9.50E-08	5.48E-10	2.04E-07	9.64E-09	7.09E-09	2.69E-05	2.70332E-05	Res
581735.72_4130901.03	581735.72	4130901.03	6.87E-04	3.50E-07	2.10E-07	3.50E-07	7.00E-06	3.92E-08	1.51E-05	7.00E-07	5.32E-07	1.99E-03	0.00195483	Res

Chronic Calculation, $\sum C_{TAC}$ /REL

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)										Total HI	Receptor Type
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Copper	Mercury	Nickel	Selenium	Chromium VI	Crystalline Silica		
581792.29_4130901.03	581792.29	4130901.03	7.34E-04	3.74E-07	2.24E-07	3.74E-07	7.48E-06	4.19E-08	1.62E-05	7.48E-07	5.68E-07	2.12E-03	0.002088157	Res
581848.86_4130901.03	581848.86	4130901.03	6.54E-04	3.33E-07	2.00E-07	3.33E-07	6.66E-06	3.73E-08	1.44E-05	6.67E-07	5.06E-07	1.89E-03	0.001860672	Res
581905.43_4130901.03	581905.43	4130901.03	3.44E-04	1.75E-07	1.05E-07	1.75E-07	3.49E-06	1.96E-08	7.54E-06	3.49E-07	2.65E-07	9.91E-04	0.000974608	Res
581962_4130901.03	581962	4130901.03	1.40E-04	7.03E-08	4.22E-08	7.03E-08	1.40E-06	7.88E-09	3.03E-06	1.41E-07	1.07E-07	3.99E-04	0.000392601	Res
582018.57_4130901.03	582018.57	4130901.03	7.59E-05	3.73E-08	2.24E-08	3.73E-08	7.45E-07	4.19E-09	1.61E-06	7.46E-08	5.65E-08	2.11E-04	0.000208465	Res
582075.14_4130901.03	582075.14	4130901.03	5.13E-05	2.48E-08	1.49E-08	2.48E-08	4.94E-07	2.78E-09	1.07E-06	4.95E-08	3.74E-08	1.40E-04	0.000138435	Res
582131.71_4130901.03	582131.71	4130901.03	3.95E-05	1.88E-08	1.13E-08	1.88E-08	3.74E-07	2.11E-09	8.08E-07	3.76E-08	2.83E-08	1.06E-04	0.000105038	Res
582188.28_4130901.03	582188.28	4130901.03	3.25E-05	1.53E-08	9.17E-09	1.53E-08	3.04E-07	1.72E-09	6.56E-07	3.06E-08	2.30E-08	8.63E-05	8.53947E-05	Res
582244.85_4130901.03	582244.85	4130901.03	2.78E-05	1.29E-08	7.74E-09	1.29E-08	2.56E-07	1.45E-09	5.53E-07	2.58E-08	1.94E-08	7.28E-05	7.20874E-05	Res
582301.42_4130901.03	582301.42	4130901.03	2.43E-05	1.11E-08	6.68E-09	1.11E-08	2.21E-07	1.25E-09	4.77E-07	2.23E-08	1.67E-08	6.28E-05	6.22625E-05	Res
582357.99_4130901.03	582357.99	4130901.03	2.16E-05	9.79E-09	5.88E-09	9.79E-09	1.95E-07	1.10E-09	4.19E-07	1.96E-08	1.47E-08	5.52E-05	5.47837E-05	Res
582414.56_4130901.03	582414.56	4130901.03	1.95E-05	8.72E-09	5.23E-09	8.72E-09	1.73E-07	9.84E-10	3.73E-07	1.74E-08	1.30E-08	4.91E-05	4.87834E-05	Res
582471.13_4130901.03	582471.13	4130901.03	1.78E-05	7.86E-09	4.72E-09	7.86E-09	1.56E-07	8.87E-10	3.36E-07	1.57E-08	1.17E-08	4.42E-05	4.39826E-05	Res
582527.7_4130901.03	582527.7	4130901.03	1.64E-05	7.14E-09	4.28E-09	7.14E-09	1.42E-07	8.07E-10	3.05E-07	1.43E-08	1.06E-08	4.02E-05	3.99684E-05	Res
582584.27_4130901.03	582584.27	4130901.03	1.52E-05	6.56E-09	3.93E-09	6.56E-09	1.30E-07	7.41E-10	2.80E-07	1.31E-08	9.76E-09	3.68E-05	3.67017E-05	Res
582640.84_4130901.03	582640.84	4130901.03	1.43E-05	6.06E-09	3.64E-09	6.06E-09	1.20E-07	6.86E-10	2.58E-07	1.21E-08	9.01E-09	3.40E-05	3.39555E-05	Res
582697.41_4130901.03	582697.41	4130901.03	1.34E-05	5.64E-09	3.38E-09	5.64E-09	1.12E-07	6.39E-10	2.40E-07	1.13E-08	8.36E-09	3.16E-05	3.1582E-05	Res
582753.98_4130901.03	582753.98	4130901.03	1.27E-05	5.27E-09	3.16E-09	5.27E-09	1.04E-07	5.97E-10	2.24E-07	1.05E-08	7.79E-09	2.95E-05	2.94978E-05	Res
582810.55_4130901.03	582810.55	4130901.03	1.21E-05	4.93E-09	2.96E-09	4.93E-09	9.73E-08	5.59E-10	2.09E-07	9.86E-09	7.28E-09	2.76E-05	2.76089E-05	Res
582867.12_4130901.03	582867.12	4130901.03	1.15E-05	4.64E-09	2.78E-09	4.64E-09	9.15E-08	5.26E-10	1.97E-07	9.27E-09	6.84E-09	2.59E-05	2.59837E-05	Res
581735.72_4130984.94	581735.72	4130984.94	1.83E-03	9.35E-07	5.61E-07	9.35E-07	1.87E-05	1.05E-07	4.04E-05	1.87E-06	1.42E-06	5.31E-03	0.005220444	Res
581792.29_4130984.94	581792.29	4130984.94	2.40E-03	1.23E-06	7.37E-07	1.23E-06	2.46E-05	1.38E-07	5.30E-05	2.46E-06	1.87E-06	6.97E-03	0.006855536	Res
581848.86_4130984.94	581848.86	4130984.94	2.79E-03	1.43E-06	8.57E-07	1.43E-06	2.86E-05	1.60E-07	6.17E-05	2.86E-06	2.17E-06	8.11E-03	0.007976618	Res
581905.43_4130984.94	581905.43	4130984.94	2.24E-04	1.13E-07	6.77E-08	1.13E-07	2.26E-06	1.27E-08	4.87E-06	2.26E-07	1.71E-07	6.41E-04	0.000630394	Res
581962_4130984.94	581962	4130984.94	9.68E-05	4.80E-08	2.88E-08	4.80E-08	9.58E-07	5.38E-09	2.07E-06	9.59E-08	7.26E-08	2.72E-04	0.000267904	Res
582018.57_4130984.94	582018.57	4130984.94	6.27E-05	3.06E-08	1.84E-08	3.06E-08	6.10E-07	3.43E-09	1.32E-06	6.12E-08	4.62E-08	1.73E-04	0.000170917	Res
582075.14_4130984.94	582075.14	4130984.94	4.64E-05	2.23E-08	1.34E-08	2.23E-08	4.45E-07	2.51E-09	9.61E-07	4.47E-08	3.37E-08	1.26E-04	0.000124859	Res
582131.71_4130984.94	582131.71	4130984.94	3.69E-05	1.75E-08	1.05E-08	1.75E-08	3.49E-07	1.97E-09	7.52E-07	3.50E-08	2.64E-08	9.90E-05	9.78568E-05	Res
582188.28_4130984.94	582188.28	4130984.94	3.05E-05	1.43E-08	8.58E-09	1.43E-08	2.85E-07	1.61E-09	6.14E-07	2.86E-08	2.15E-08	8.08E-05	7.99383E-05	Res
582244.85_4130984.94	582244.85	4130984.94	2.59E-05	1.20E-08	7.22E-09	1.20E-08	2.39E-07	1.35E-09	5.16E-07	2.41E-08	1.81E-08	6.79E-05	6.72485E-05	Res
582301.42_4130984.94	582301.42	4130984.94	2.26E-05	1.03E-08	6.21E-09	1.03E-08	2.06E-07	1.17E-09	4.44E-07	2.07E-08	1.55E-08	5.84E-05	5.78773E-05	Res
582357.99_4130984.94	582357.99	4130984.94	2.00E-05	9.07E-09	5.44E-09	9.07E-09	1.80E-07	1.02E-09	3.88E-07	1.81E-08	1.36E-08	5.11E-05	5.07347E-05	Res
582414.56_4130984.94	582414.56	4130984.94	1.80E-05	8.06E-09	4.84E-09	8.06E-09	1.60E-07	9.09E-10	3.45E-07	1.61E-08	1.21E-08	4.54E-05	4.51005E-05	Res
582471.13_4130984.94	582471.13	4130984.94	1.63E-05	7.25E-09	4.35E-09	7.25E-09	1.44E-07	8.18E-10	3.10E-07	1.45E-08	1.08E-08	4.08E-05	4.05581E-05	Res
582527.7_4130984.94	582527.7	4130984.94	1.50E-05	6.58E-09	3.95E-09	6.58E-09	1.30E-07	7.43E-10	2.81E-07	1.32E-08	9.82E-09	3.70E-05	3.68139E-05	Res
582584.27_4130984.94	582584.27	4130984.94	1.39E-05	6.04E-09	3.62E-09	6.04E-09	1.20E-07	6.82E-10	2.58E-07	1.21E-08	9.00E-09	3.40E-05	3.38041E-05	Res
582640.84_4130984.94	582640.84	4130984.94	1.30E-05	5.60E-09	3.36E-09	5.60E-09	1.11E-07	6.34E-10	2.39E-07	1.12E-08	8.34E-09	3.15E-05	3.13662E-05	Res
582697.41_4130984.94	582697.41	4130984.94	1.23E-05	5.21E-09	3.12E-09	5.21E-09	1.03E-07	5.89E-10	2.22E-07	1.04E-08	7.74E-09	2.92E-05	2.91611E-05	Res
582753.98_4130984.94	582753.98	4130984.94	1.16E-05	4.89E-09	2.93E-09	4.89E-09	9.66E-08	5.53E-10	2.08E-07	9.77E-09	7.25E-09	2.74E-05	2.73603E-05	Res
582810.55_4130984.94	582810.55	4130984.94	1.11E-05	4.59E-09	2.76E-09	4.59E-09	9.07E-08	5.20E-10	1.95E-07	9.18E-09	6.80E-09	2.57E-05	2.57216E-05	Res
582867.12_4130984.94	582867.12	4130984.94	1.05E-05	4.33E-09	2.60E-09	4.33E-09	8.55E-08	4.91E-10	1.84E-07	8.66E-09	6.40E-09	2.42E-05	2.42553E-05	Res
581735.72_4131068.85	581735.72	4131068.85	3.00E-04	1.52E-07	9.12E-08	1.52E-07	3.04E-06	1.70E-08	6.56E-06	3.04E-07	2.31E-07	8.63E-04	0.000848614	Res
581792.29_4131068.85	581792.29	4131068.85	2.40E-04	1.21E-07	7.26E-08	1.21E-07	2.42E-06	1.36E-08	5.22E-06	2.42E-07	1.84E-07	6.87E-04	0.000676005	Res
581848.86_4131068.85	581848.86	4131068.85	1.30E-04	6.48E-08	3.89E-08	6.48E-08	1.29E-06	7.26E-09	2.79E-06	1.30E-07	9.81E-08	3.67E-04	0.000361674	Res
581905.43_4131068.85	581905.43	4131068.85	8.31E-05	4.09E-08	2.46E-08	4.09E-08	8.17E-07	4.60E-09	1.76E-06	8.19E-08	6.20E-08	2.32E-04	0.000228737	Res
581962_4131068.85	581962	4131068.85	6.05E-05	2.94E-08	1.77E-08	2.94E-08	5.87E-07	3.31E-09	1.27E-06	5.89E-08	4.45E-08	1.67E-04	0.000164491	Res
582018.57_4131068.85	582018.57	4131068.85	4.61E-05	2.21E-08	1.33E-08	2.21E-08	4.41E-07	2.49E-09	9.52E-07	4.43E-08	3.34E-08	1.25E-04	0.000123663	Res
582075.14_4131068.85	582075.14	4131068.85	3.67E-05	1.74E-08	1.04E-08	1.74E-08	3.47E-07	1.96E-09	7.48E-07	3.48E-08	2.62E-08	9.84E-05	9.72529E-05	Res
582131.71_4131068.85	582131.71	4131068.85	3.04E-05	1.42E-08	8.53E-09	1.42E-08	2.83E-07	1.60E-09	6.10E-07	2.84E-08	2.14E-08	8.03E-05	7.94758E-05	Res

Chronic Calculation, $\sum C_{TAC}$ /REL

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)										Total HI	Receptor Type
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Copper	Mercury	Nickel	Selenium	Chromium VI	Crystalline Silica		
582188.28_4131068.85	582188.28	4131068.85	2.57E-05	1.19E-08	7.14E-09	1.19E-08	2.37E-07	1.34E-09	5.11E-07	2.38E-08	1.79E-08	6.72E-05	6.65754E-05	Res
582244.85_4131068.85	582244.85	4131068.85	2.23E-05	1.02E-08	6.12E-09	1.02E-08	2.03E-07	1.15E-09	4.37E-07	2.04E-08	1.53E-08	5.76E-05	5.70755E-05	Res
582301.42_4131068.85	582301.42	4131068.85	1.97E-05	8.90E-09	5.34E-09	8.90E-09	1.77E-07	1.00E-09	3.81E-07	1.78E-08	1.33E-08	5.02E-05	4.97562E-05	Res
582357.99_4131068.85	582357.99	4131068.85	1.75E-05	7.86E-09	4.72E-09	7.86E-09	1.56E-07	8.87E-10	3.36E-07	1.57E-08	1.18E-08	4.43E-05	4.39774E-05	Res
582414.56_4131068.85	582414.56	4131068.85	1.58E-05	7.04E-09	4.22E-09	7.04E-09	1.40E-07	7.95E-10	3.01E-07	1.41E-08	1.05E-08	3.97E-05	3.93969E-05	Res
582471.13_4131068.85	582471.13	4131068.85	1.45E-05	6.37E-09	3.82E-09	6.37E-09	1.26E-07	7.19E-10	2.72E-07	1.27E-08	9.51E-09	3.58E-05	3.56428E-05	Res
582527.7_4131068.85	582527.7	4131068.85	1.33E-05	5.81E-09	3.49E-09	5.81E-09	1.15E-07	6.56E-10	2.48E-07	1.16E-08	8.66E-09	3.27E-05	3.25149E-05	Res
582584.27_4131068.85	582584.27	4131068.85	1.23E-05	5.33E-09	3.20E-09	5.33E-09	1.06E-07	6.02E-10	2.27E-07	1.07E-08	7.93E-09	3.00E-05	2.98223E-05	Res
582640.84_4131068.85	582640.84	4131068.85	1.16E-05	4.98E-09	2.99E-09	4.98E-09	9.86E-08	5.63E-10	2.12E-07	9.95E-09	7.40E-09	2.80E-05	2.78599E-05	Res
582697.41_4131068.85	582697.41	4131068.85	1.09E-05	4.66E-09	2.79E-09	4.66E-09	9.22E-08	5.27E-10	1.98E-07	9.31E-09	6.92E-09	2.62E-05	2.60728E-05	Res
582753.98_4131068.85	582753.98	4131068.85	1.04E-05	4.40E-09	2.64E-09	4.40E-09	8.70E-08	4.98E-10	1.87E-07	8.80E-09	6.53E-09	2.47E-05	2.46328E-05	Res
582810.55_4131068.85	582810.55	4131068.85	9.96E-06	4.17E-09	2.50E-09	4.17E-09	8.24E-08	4.72E-10	1.77E-07	8.34E-09	6.18E-09	2.34E-05	2.33524E-05	Res
582867.12_4131068.85	582867.12	4131068.85	9.48E-06	3.93E-09	2.36E-09	3.93E-09	7.76E-08	4.45E-10	1.67E-07	7.86E-09	5.82E-09	2.20E-05	2.20083E-05	Res
582018.57_4131152.76	582018.57	4131152.76	3.12E-05	1.45E-08	8.72E-09	1.45E-08	2.89E-07	1.64E-09	6.24E-07	2.91E-08	2.19E-08	8.21E-05	8.12939E-05	Res
582244.85_4131152.76	582244.85	4131152.76	1.90E-05	8.51E-09	5.11E-09	8.51E-09	1.69E-07	9.60E-10	3.64E-07	1.70E-08	1.27E-08	4.80E-05	4.76317E-05	Res
582301.42_4131152.76	582301.42	4131152.76	1.71E-05	7.61E-09	4.57E-09	7.61E-09	1.51E-07	8.59E-10	3.25E-07	1.52E-08	1.14E-08	4.29E-05	4.25713E-05	Res
582357.99_4131152.76	582357.99	4131152.76	1.55E-05	6.82E-09	4.09E-09	6.82E-09	1.35E-07	7.70E-10	2.91E-07	1.36E-08	1.02E-08	3.84E-05	3.81435E-05	Res
582414.56_4131152.76	582414.56	4131152.76	1.41E-05	6.16E-09	3.70E-09	6.16E-09	1.22E-07	6.96E-10	2.63E-07	1.23E-08	9.19E-09	3.47E-05	3.44914E-05	Res
582471.13_4131152.76	582471.13	4131152.76	1.28E-05	5.55E-09	3.33E-09	5.55E-09	1.10E-07	6.27E-10	2.37E-07	1.11E-08	8.27E-09	3.12E-05	3.10651E-05	Res
582527.7_4131152.76	582527.7	4131152.76	1.18E-05	5.07E-09	3.04E-09	5.07E-09	1.00E-07	5.73E-10	2.16E-07	1.01E-08	7.54E-09	2.85E-05	2.83568E-05	Res
582584.27_4131152.76	582584.27	4131152.76	1.09E-05	4.65E-09	2.79E-09	4.65E-09	9.21E-08	5.26E-10	1.98E-07	9.31E-09	6.92E-09	2.61E-05	2.60479E-05	Res
582640.84_4131152.76	582640.84	4131152.76	1.02E-05	4.32E-09	2.59E-09	4.32E-09	8.55E-08	4.89E-10	1.84E-07	8.64E-09	6.42E-09	2.43E-05	2.41993E-05	Res
582697.41_4131152.76	582697.41	4131152.76	9.59E-06	4.04E-09	2.43E-09	4.04E-09	7.99E-08	4.58E-10	1.72E-07	8.08E-09	6.00E-09	2.27E-05	2.26332E-05	Res
582753.98_4131152.76	582753.98	4131152.76	9.15E-06	3.84E-09	2.30E-09	3.84E-09	7.58E-08	4.34E-10	1.63E-07	7.67E-09	5.69E-09	2.15E-05	2.14784E-05	Res
582810.55_4131152.76	582810.55	4131152.76	8.75E-06	3.64E-09	2.19E-09	3.64E-09	7.20E-08	4.13E-10	1.55E-07	7.29E-09	5.40E-09	2.04E-05	2.0406E-05	Res
582867.12_4131152.76	582867.12	4131152.76	8.32E-06	3.44E-09	2.06E-09	3.44E-09	6.79E-08	3.90E-10	1.46E-07	6.88E-09	5.09E-09	1.93E-05	1.9265E-05	Res

HRA Permanente Creek Restoration Project

Construction Year 2026

Emissions Inputs

Construction Activity	Construction Year & Source	DPM Exhaust (tons/year)	PM10 Dust for speciation (tons/year)	Arsenic (tons/year)	Beryllium (tons/year)	Cadmium (tons/year)	Cobalt (tons/year)	Copper (tons/year)	Lead (tons/year)	Mercury (tons/year)	Nickel (tons/year)	Selenium (tons/year)	Chromium VI (tons/year)	Crystalline Silica (tons/year)
Concrete Channel 2024	2024_CONCRTE	0.000	0.00	2.91E-12	1.74E-12	2.91E-12	1.49E-11	3.26E-11	2.91E-12	4.65E-13	5.35E-11	5.81E-12	2.33E-13	8.63E-09
Paved road	2024_PAVED	2.07E-04	0.08	1.04E-07	6.26E-08	1.04E-07	6.68E-08	2.09E-06	1.92E-07	1.17E-08	4.51E-06	2.09E-07	1.59E-07	5.93E-04
Unpaved road	2024_CCP_UNPV	6.27E-05	0.20	2.56E-07	1.54E-07	2.56E-07	1.64E-07	5.12E-06	4.71E-07	2.87E-08	1.11E-05	5.12E-07	3.89E-07	1.46E-03
Channel Widening 2024	2024_CHAN_RCK	0.002	0.16	2.05E-07	1.23E-07	2.05E-07	1.05E-06	2.29E-06	2.05E-07	3.28E-08	3.77E-06	4.09E-07	1.64E-08	6.08E-04
Paved road	2024_PAVED	1.80E-03	2.39	2.99E-06	1.79E-06	2.99E-06	1.91E-06	5.98E-05	5.50E-06	3.35E-07	1.29E-04	5.98E-06	4.54E-06	1.70E-02
Rock Pile Area 2025	2025_CHAN_RCK	0.006	0.25	3.16E-07	1.89E-07	3.16E-07	1.62E-06	3.54E-06	3.16E-07	5.05E-08	5.81E-06	6.31E-07	2.53E-08	9.37E-04
Paved road	2025_PAVED	5.95E-03	2.44	3.05E-06	1.83E-06	3.05E-06	1.95E-06	6.10E-05	5.61E-06	3.41E-07	1.32E-04	6.10E-06	4.63E-06	1.73E-02
Rock Pile Area 2026	2026_CHAN_RCK	0.006	0.25	3.16E-07	1.89E-07	3.16E-07	1.62E-06	3.54E-06	3.16E-07	5.05E-08	5.81E-06	6.31E-07	2.53E-08	9.37E-04
Paved road	2026_PAVED	5.84E-03	2.44	3.05E-06	1.83E-06	3.05E-06	1.95E-06	6.10E-05	5.61E-06	3.41E-07	1.32E-04	6.10E-06	4.63E-06	1.73E-02
Channel Widening 2027	2027_CHAN_RCK	0.002	0.98	1.23E-06	7.36E-07	1.23E-06	6.28E-06	1.37E-05	1.23E-06	1.96E-07	2.26E-05	2.45E-06	9.82E-08	3.64E-03
Paved road	2027_PAVED	5.61E-03	2.39	2.99E-06	1.79E-06	2.99E-06	1.91E-06	5.98E-05	5.50E-06	3.35E-07	1.29E-04	5.98E-06	4.54E-06	1.70E-02
Material Removal 2028	2028_MATRMVL	0.001	0.25	3.15E-07	1.89E-07	3.15E-07	1.62E-06	3.53E-06	3.15E-07	5.05E-08	5.80E-06	6.31E-07	2.52E-08	9.37E-04
Paved road	2028_PAVED	5.57E-03	2.39	2.99E-06	1.80E-06	2.99E-06	1.92E-06	5.98E-05	5.51E-06	3.35E-07	1.29E-04	5.98E-06	4.55E-06	1.70E-02
Unpaved road	2028_UNPAVED	3.40E-03	11.84	1.48E-05	8.88E-06	1.48E-05	9.47E-06	2.96E-04	2.72E-05	1.66E-06	6.40E-04	2.96E-05	2.25E-05	8.41E-02
Material Removal 2029	2029_MATRMVL	0.001	0.25	3.15E-07	1.89E-07	3.15E-07	1.62E-06	3.53E-06	3.15E-07	5.05E-08	5.80E-06	6.31E-07	2.52E-08	9.37E-04
Paved road	2029_PAVED	5.56E-03	2.41	3.01E-06	1.81E-06	3.01E-06	1.93E-06	6.03E-05	5.55E-06	3.38E-07	1.30E-04	6.03E-06	4.58E-06	1.71E-02
Unpaved road	2029_UNPAVED	3.39E-03	11.93	1.49E-05	8.95E-06	1.49E-05	9.55E-06	2.98E-04	2.74E-05	1.67E-06	6.44E-04	2.98E-05	2.27E-05	8.47E-02

Construction Activity	Construction Year	DPM (g/s)	Arsenic (g/s)	Beryllium (g/s)	Cadmium (g/s)	Cobalt (g/s)	Copper (g/s)	Lead (g/s)	Mercury (g/s)	Nickel (g/s)	Selenium (g/s)	Chromium VI (g/s)	Crystalline Silica (g/s)
Concrete Channel 2024	2024_CONCRTE	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Paved road	2024_PAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Unpaved road	2024_CCP_UNPV	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Channel Widening 2024	2024_CHAN_RCK	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Paved road	2024_PAVED	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Rock Pile Area 2025	2025_CHAN_RCK	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Paved road	2025_PAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Rock Pile Area 2026	2026_CHAN_RCK	1.698E-04	9.08E-09	5.45E-09	9.08E-09	4.65E-08	1.02E-07	9.08E-09	1.45E-09	1.67E-07	1.82E-08	7.26E-10	2.70E-05
Paved road	2026_PAVED	1.681E-04	8.77E-08	5.26E-08	8.77E-08	5.61E-08	1.75E-06	1.61E-07	9.82E-09	3.79E-06	1.75E-07	1.33E-07	4.98E-04
Channel Widening 2027	2027_CHAN_RCK	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Paved road	2027_PAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Material Removal 2028	2028_MATRMVL	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Paved road	2028_PAVED	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Unpaved road	2028_UNPAVED	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Material Removal 2029	2029_MATRMVL	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Paved road	2029_PAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Unpaved road	2029_UNPAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

N/A = not including PM10 on-site dust in HRA calculation; it is only for speciating metals.

Chronic REL

TAC	UOM	
DPM	µg/m^3	5
Arsenic	µg/m^3	0.015
Beryllium	µg/m^3	0.007
Cadmium	µg/m^3	0.02
Copper	µg/m^3	100
Mercury	µg/m^3	0.032
Nickel	µg/m^3	0.014
Selenium	µg/m^3	20
Chromium VI	µg/m^3	0.2
Crystalline Silica	µg/m^3	3

	Max
CT House	0.001
Res	0.008

Chronic Calculation, $\sum C_{TAC}$ /REL

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} (µg/m^3)										Total HI	Receptor Type
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Copper	Mercury	Nickel	Selenium	Chromium VI	Crystalline Silica		
			5	0.015	0.007	0.02	100	0.032	0.014	20	0.2	3		
581336.22_4131207.48	581336.22	4131207.48	1.96E-04	1.01E-07	6.05E-08	1.01E-07	2.01E-06	1.13E-08	4.35E-06	2.02E-07	1.53E-07	5.72E-04	0.000562168	CT House
581554.22_4130688.06	581554.22	4130688.06	1.35E-04	6.70E-08	4.02E-08	6.70E-08	1.34E-06	7.52E-09	2.88E-06	1.34E-07	1.01E-07	3.79E-04	0.000373653	Res
579793.36_4131503.29	579793.36	4131503.29	1.24E-05	3.69E-09	2.21E-09	3.69E-09	7.10E-08	4.28E-10	1.51E-07	7.38E-09	5.15E-09	2.01E-05	2.07762E-05	Acute
580488.37_4131517.71	580488.37	4131517.71	1.56E-05	6.54E-09	3.92E-09	6.54E-09	1.29E-07	7.41E-10	2.78E-07	1.31E-08	9.68E-09	3.66E-05	3.65857E-05	Acute
581678.43_4131040.03	581678.43	4131040.03	6.23E-04	3.23E-07	1.94E-07	3.23E-07	6.46E-06	3.62E-08	1.39E-05	6.46E-07	4.91E-07	1.83E-03	0.001800882	Res
581635.43_4130978.54	581635.43	4130978.54	1.26E-03	6.55E-07	3.93E-07	6.55E-07	1.31E-05	7.34E-08	2.83E-05	1.31E-06	9.95E-07	3.72E-03	0.003651404	Res
581830.06_4131027.55	581830.06	4131027.55	5.74E-04	2.97E-07	1.78E-07	2.97E-07	5.95E-06	3.33E-08	1.28E-05	5.95E-07	4.52E-07	1.69E-03	0.001658802	Res
581727.48_4130976.54	581727.48	4130976.54	1.52E-03	7.93E-07	4.76E-07	7.93E-07	1.59E-05	8.88E-08	3.43E-05	1.59E-06	1.21E-06	4.50E-03	0.004421965	Res
581789.11_4130419.65	581789.11	4130419.65	1.05E-04	5.04E-08	3.02E-08	5.04E-08	1.00E-06	5.67E-09	2.16E-06	1.01E-07	7.59E-08	2.85E-04	0.000281308	Res
581700.32_4130781.89	581700.32	4130781.89	3.04E-04	1.56E-07	9.37E-08	1.56E-07	3.12E-06	1.75E-08	6.74E-06	3.12E-07	2.37E-07	8.86E-04	0.000871184	Res
581426.07_4131299.01	581426.07	4131299.01	7.16E-05	3.59E-08	2.15E-08	3.59E-08	7.16E-07	4.03E-09	1.55E-06	7.18E-08	5.43E-08	2.03E-04	0.00020017	Acute
582301.42_4129474.56	582301.42	4129474.56	3.74E-05	1.55E-08	9.29E-09	1.55E-08	3.06E-07	1.76E-09	6.57E-07	3.10E-08	2.29E-08	8.67E-05	8.66504E-05	Res
582357.99_4129474.56	582357.99	4129474.56	3.50E-05	1.45E-08	8.67E-09	1.45E-08	2.85E-07	1.64E-09	6.14E-07	2.89E-08	2.13E-08	8.09E-05	8.09003E-05	Res
582414.56_4129474.56	582414.56	4129474.56	3.29E-05	1.35E-08	8.11E-09	1.35E-08	2.67E-07	1.53E-09	5.74E-07	2.70E-08	2.00E-08	7.57E-05	7.56935E-05	Res
582471.13_4129474.56	582471.13	4129474.56	3.09E-05	1.27E-08	7.61E-09	1.27E-08	2.50E-07	1.44E-09	5.38E-07	2.54E-08	1.87E-08	7.10E-05	7.09977E-05	Res
582527.7_4129474.56	582527.7	4129474.56	2.92E-05	1.20E-08	7.18E-09	1.20E-08	2.36E-07	1.36E-09	5.08E-07	2.39E-08	1.76E-08	6.69E-05	6.69681E-05	Res
582584.27_4129474.56	582584.27	4129474.56	2.75E-05	1.12E-08	6.74E-09	1.12E-08	2.22E-07	1.28E-09	4.77E-07	2.25E-08	1.66E-08	6.28E-05	6.28916E-05	Res
582640.84_4129474.56	582640.84	4129474.56	2.58E-05	1.05E-08	6.27E-09	1.05E-08	2.06E-07	1.19E-09	4.43E-07	2.09E-08	1.54E-08	5.85E-05	5.85363E-05	Res
582244.85_4129558.47	582244.85	4129558.47	3.90E-05	1.57E-08	9.41E-09	1.57E-08	3.09E-07	1.78E-09	6.64E-07	3.14E-08	2.31E-08	8.76E-05	8.77832E-05	Res
582301.42_4129558.47	582301.42	4129558.47	3.79E-05	1.56E-08	9.34E-09	1.56E-08	3.07E-07	1.77E-09	6.60E-07	3.11E-08	2.30E-08	8.71E-05	8.70841E-05	Res
582357.99_4129558.47	582357.99	4129558.47	3.58E-05	1.48E-08	8.85E-09	1.48E-08	2.91E-07	1.67E-09	6.26E-07	2.95E-08	2.18E-08	8.26E-05	8.25917E-05	Res
582414.56_4129558.47	582414.56	4129558.47	3.36E-05	1.38E-08	8.30E-09	1.38E-08	2.73E-07	1.57E-09	5.87E-07	2.77E-08	2.04E-08	7.74E-05	7.74196E-05	Res
582471.13_4129558.47	582471.13	4129558.47	3.14E-05	1.29E-08	7.76E-09	1.29E-08	2.55E-07	1.47E-09	5.49E-07	2.59E-08	1.91E-08	7.24E-05	7.23692E-05	Res
582527.7_4129558.47	582527.7	4129558.47	2.95E-05	1.21E-08	7.25E-09	1.21E-08	2.38E-07	1.37E-09	5.13E-07	2.42E-08	1.78E-08	6.76E-05	6.7627E-05	Res
582584.27_4129558.47	582584.27	4129558.47	2.76E-05	1.13E-08	6.77E-09	1.13E-08	2.22E-07	1.28E-09	4.78E-07	2.26E-08	1.66E-08	6.31E-05	6.31346E-05	Res
582640.84_4129558.47	582640.84	4129558.47	2.61E-05	1.06E-08	6.36E-09	1.06E-08	2.09E-07	1.20E-09	4.50E-07	2.12E-08	1.56E-08	5.93E-05	5.93652E-05	Res
582697.41_4129558.47	582697.41	4129558.47	2.46E-05	9.96E-09	5.98E-09	9.96E-09	1.96E-07	1.13E-09	4.22E-07	1.99E-08	1.47E-08	5.57E-05	5.57526E-05	Res
582244.85_4129642.38	582244.85	4129642.38	3.57E-05	1.37E-08	8.24E-09	1.37E-08	2.70E-07	1.56E-09	5.79E-07	2.75E-08	2.01E-08	7.64E-05	7.69247E-05	Res
582301.42_4129642.38	582301.42	4129642.38	3.75E-05	1.52E-08	9.10E-09	1.52E-08	2.99E-07	1.72E-09	6.42E-07	3.03E-08	2.23E-08	8.47E-05	8.48689E-05	Res
582357.99_4129642.38	582357.99	4129642.38	3.63E-05	1.50E-08	9.00E-09	1.50E-08	2.96E-07	1.70E-09	6.37E-07	3.00E-08	2.22E-08	8.40E-05	8.39783E-05	Res
582414.56_4129642.38	582414.56	4129642.38	3.42E-05	1.42E-08	8.50E-09	1.42E-08	2.80E-07	1.61E-09	6.01E-07	2.83E-08	2.09E-08	7.93E-05	7.92652E-05	Res
582471.13_4129642.38	582471.13	4129642.38	3.21E-05	1.33E-08	7.97E-09	1.33E-08	2.62E-07	1.51E-09	5.64E-07	2.66E-08	1.96E-08	7.43E-05	7.43169E-05	Res
582527.7_4129642.38	582527.7	4129642.38	3.02E-05	1.25E-08	7.48E-09	1.25E-08	2.46E-07	1.41E-09	5.29E-07	2.49E-08	1.84E-08	6.98E-05	6.97592E-05	Res
582584.27_4129642.38	582584.27	4129642.38	2.82E-05	1.16E-08	6.95E-09	1.16E-08	2.28E-07	1.31E-09	4.91E-07	2.32E-08	1.71E-08	6.48E-05	6.47906E-05	Res

Chronic Calculation, $\sum C_{TAC}$ /REL

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)										Total HI	Receptor Type
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Copper	Mercury	Nickel	Selenium	Chromium VI	Crystalline Silica		
582640.84_4129642.38	582640.84	4129642.38	2.64E-05	1.08E-08	6.48E-09	1.08E-08	2.13E-07	1.23E-09	4.58E-07	2.16E-08	1.59E-08	6.05E-05	6.04919E-05	Res
582697.41_4129642.38	582697.41	4129642.38	2.48E-05	1.01E-08	6.06E-09	1.01E-08	1.99E-07	1.15E-09	4.28E-07	2.02E-08	1.49E-08	5.65E-05	5.65609E-05	Res
582753.98_4129642.38	582753.98	4129642.38	2.33E-05	9.42E-09	5.65E-09	9.42E-09	1.86E-07	1.07E-09	3.99E-07	1.88E-08	1.39E-08	5.27E-05	5.27417E-05	Res
582810.55_4129642.38	582810.55	4129642.38	2.19E-05	8.81E-09	5.28E-09	8.81E-09	1.74E-07	1.00E-09	3.73E-07	1.76E-08	1.30E-08	4.92E-05	4.93134E-05	Res
582867.12_4129642.38	582867.12	4129642.38	2.04E-05	8.14E-09	4.88E-09	8.14E-09	1.60E-07	9.26E-10	3.45E-07	1.63E-08	1.20E-08	4.55E-05	4.55869E-05	Res
582244.85_4129726.29	582244.85	4129726.29	3.81E-05	1.51E-08	9.08E-09	1.51E-08	2.98E-07	1.72E-09	6.40E-07	3.03E-08	2.22E-08	8.44E-05	8.47264E-05	Res
582301.42_4129726.29	582301.42	4129726.29	3.67E-05	1.48E-08	8.85E-09	1.48E-08	2.91E-07	1.68E-09	6.25E-07	2.95E-08	2.17E-08	8.24E-05	8.26088E-05	Res
582357.99_4129726.29	582357.99	4129726.29	3.65E-05	1.51E-08	9.07E-09	1.51E-08	2.98E-07	1.71E-09	6.42E-07	3.02E-08	2.23E-08	8.46E-05	8.45719E-05	Res
582414.56_4129726.29	582414.56	4129726.29	3.47E-05	1.44E-08	8.67E-09	1.44E-08	2.85E-07	1.64E-09	6.14E-07	2.89E-08	2.13E-08	8.09E-05	8.08174E-05	Res
582471.13_4129726.29	582471.13	4129726.29	3.27E-05	1.36E-08	8.17E-09	1.36E-08	2.69E-07	1.54E-09	5.78E-07	2.72E-08	2.01E-08	7.63E-05	7.62027E-05	Res
582527.7_4129726.29	582527.7	4129726.29	3.08E-05	1.28E-08	7.68E-09	1.28E-08	2.53E-07	1.45E-09	5.44E-07	2.56E-08	1.89E-08	7.17E-05	7.16026E-05	Res
582584.27_4129726.29	582584.27	4129726.29	2.89E-05	1.20E-08	7.18E-09	1.20E-08	2.36E-07	1.36E-09	5.08E-07	2.39E-08	1.77E-08	6.70E-05	6.69731E-05	Res
582640.84_4129726.29	582640.84	4129726.29	2.70E-05	1.12E-08	6.69E-09	1.12E-08	2.20E-07	1.27E-09	4.73E-07	2.23E-08	1.65E-08	6.24E-05	6.24115E-05	Res
582697.41_4129726.29	582697.41	4129726.29	2.51E-05	1.03E-08	6.18E-09	1.03E-08	2.03E-07	1.17E-09	4.37E-07	2.06E-08	1.52E-08	5.76E-05	5.76183E-05	Res
582753.98_4129726.29	582753.98	4129726.29	2.33E-05	9.45E-09	5.67E-09	9.45E-09	1.86E-07	1.07E-09	4.00E-07	1.89E-08	1.39E-08	5.28E-05	5.28852E-05	Res
582810.55_4129726.29	582810.55	4129726.29	2.14E-05	8.57E-09	5.14E-09	8.57E-09	1.69E-07	9.74E-10	3.63E-07	1.71E-08	1.26E-08	4.79E-05	4.80005E-05	Res
582244.85_4129810.2	582244.85	4129810.2	3.73E-05	1.47E-08	8.82E-09	1.47E-08	2.89E-07	1.67E-09	6.22E-07	2.94E-08	2.16E-08	8.21E-05	8.2378E-05	Res
582301.42_4129810.2	582301.42	4129810.2	3.69E-05	1.50E-08	8.98E-09	1.50E-08	2.95E-07	1.70E-09	6.35E-07	2.99E-08	2.21E-08	8.37E-05	8.38178E-05	Res
582357.99_4129810.2	582357.99	4129810.2	3.61E-05	1.49E-08	8.95E-09	1.49E-08	2.94E-07	1.69E-09	6.33E-07	2.98E-08	2.20E-08	8.35E-05	8.34451E-05	Res
582414.56_4129810.2	582414.56	4129810.2	3.48E-05	1.46E-08	8.73E-09	1.46E-08	2.87E-07	1.65E-09	6.18E-07	2.91E-08	2.15E-08	8.15E-05	8.14323E-05	Res
582471.13_4129810.2	582471.13	4129810.2	3.31E-05	1.39E-08	8.34E-09	1.39E-08	2.74E-07	1.57E-09	5.91E-07	2.78E-08	2.06E-08	7.79E-05	7.77358E-05	Res
582527.7_4129810.2	582527.7	4129810.2	3.11E-05	1.30E-08	7.81E-09	1.30E-08	2.57E-07	1.47E-09	5.53E-07	2.60E-08	1.92E-08	7.29E-05	7.27981E-05	Res
582584.27_4129810.2	582584.27	4129810.2	2.90E-05	1.21E-08	7.26E-09	1.21E-08	2.39E-07	1.37E-09	5.14E-07	2.42E-08	1.79E-08	6.78E-05	6.76796E-05	Res
582640.84_4129810.2	582640.84	4129810.2	2.67E-05	1.10E-08	6.62E-09	1.10E-08	2.18E-07	1.25E-09	4.68E-07	2.21E-08	1.63E-08	6.18E-05	6.17386E-05	Res
582697.41_4129810.2	582697.41	4129810.2	2.46E-05	1.01E-08	6.04E-09	1.01E-08	1.99E-07	1.14E-09	4.27E-07	2.01E-08	1.49E-08	5.63E-05	5.6374E-05	Res
581905.43_4129894.11	581905.43	4129894.11	4.48E-05	1.93E-08	1.16E-08	1.93E-08	3.81E-07	2.18E-09	8.21E-07	3.85E-08	2.86E-08	1.08E-04	0.000107789	Res
581962_4129894.11	581962	4129894.11	4.78E-05	1.95E-08	1.17E-08	1.95E-08	3.84E-07	2.21E-09	8.25E-07	3.89E-08	2.87E-08	1.09E-04	0.000108979	Res
582131.71_4129894.11	582131.71	4129894.11	4.25E-05	1.69E-08	1.02E-08	1.69E-08	3.34E-07	1.93E-09	7.17E-07	3.39E-08	2.49E-08	9.46E-05	9.48645E-05	Res
582188.28_4129894.11	582188.28	4129894.11	4.06E-05	1.63E-08	9.79E-09	1.63E-08	3.21E-07	1.85E-09	6.91E-07	3.26E-08	2.40E-08	9.11E-05	9.13232E-05	Res
582244.85_4129894.11	582244.85	4129894.11	3.92E-05	1.60E-08	9.60E-09	1.60E-08	3.16E-07	1.82E-09	6.79E-07	3.20E-08	2.36E-08	8.95E-05	8.95702E-05	Res
582301.42_4129894.11	582301.42	4129894.11	3.75E-05	1.55E-08	9.28E-09	1.55E-08	3.05E-07	1.76E-09	6.57E-07	3.09E-08	2.28E-08	8.66E-05	8.65741E-05	Res
582357.99_4129894.11	582357.99	4129894.11	3.56E-05	1.48E-08	8.86E-09	1.48E-08	2.92E-07	1.68E-09	6.27E-07	2.95E-08	2.18E-08	8.27E-05	8.26665E-05	Res
582414.56_4129894.11	582414.56	4129894.11	3.55E-05	1.51E-08	9.03E-09	1.51E-08	2.98E-07	1.70E-09	6.40E-07	3.01E-08	2.23E-08	8.44E-05	8.4188E-05	Res
582471.13_4129894.11	582471.13	4129894.11	3.32E-05	1.41E-08	8.45E-09	1.41E-08	2.78E-07	1.60E-09	5.99E-07	2.82E-08	2.09E-08	7.90E-05	7.87914E-05	Res
582527.7_4129894.11	582527.7	4129894.11	3.07E-05	1.29E-08	7.77E-09	1.29E-08	2.56E-07	1.47E-09	5.51E-07	2.59E-08	1.92E-08	7.26E-05	7.24225E-05	Res
582584.27_4129894.11	582584.27	4129894.11	2.83E-05	1.18E-08	7.09E-09	1.18E-08	2.33E-07	1.34E-09	5.02E-07	2.36E-08	1.75E-08	6.62E-05	6.61254E-05	Res
582640.84_4129894.11	582640.84	4129894.11	2.60E-05	1.07E-08	6.45E-09	1.07E-08	2.12E-07	1.22E-09	4.56E-07	2.15E-08	1.59E-08	6.02E-05	6.01387E-05	Res
582697.41_4129894.11	582697.41	4129894.11	2.38E-05	9.75E-09	5.85E-09	9.75E-09	1.92E-07	1.11E-09	4.14E-07	1.95E-08	1.44E-08	5.45E-05	5.45744E-05	Res
581962_4129978.02	581962	4129978.02	4.94E-05	2.03E-08	1.22E-08	2.03E-08	4.01E-07	2.31E-09	8.62E-07	4.06E-08	3.00E-08	1.14E-04	0.000113699	Res
582018.57_4129978.02	582018.57	4129978.02	4.72E-05	1.91E-08	1.15E-08	1.91E-08	3.77E-07	2.17E-09	8.10E-07	3.82E-08	2.82E-08	1.07E-04	0.000107032	Res
582075.14_4129978.02	582075.14	4129978.02	4.79E-05	1.98E-08	1.19E-08	1.98E-08	3.91E-07	2.25E-09	8.40E-07	3.96E-08	2.92E-08	1.11E-04	0.000110774	Res
582131.71_4129978.02	582131.71	4129978.02	4.70E-05	1.98E-08	1.19E-08	1.98E-08	3.91E-07	2.24E-09	8.42E-07	3.96E-08	2.93E-08	1.11E-04	0.000110788	Res
582188.28_4129978.02	582188.28	4129978.02	4.62E-05	1.98E-08	1.19E-08	1.98E-08	3.92E-07	2.24E-09	8.44E-07	3.97E-08	2.94E-08	1.11E-04	0.00011089	Res
582244.85_4129978.02	582244.85	4129978.02	4.20E-05	1.79E-08	1.07E-08	1.79E-08	3.53E-07	2.02E-09	7.61E-07	3.57E-08	2.65E-08	1.00E-04	9.99781E-05	Res
582301.42_4129978.02	582301.42	4129978.02	4.10E-05	1.77E-08	1.06E-08	1.77E-08	3.50E-07	2.00E-09	7.53E-07	3.54E-08	2.63E-08	9.93E-05	9.88817E-05	Res
582357.99_4129978.02	582357.99	4129978.02	3.86E-05	1.67E-08	1.00E-08	1.67E-08	3.31E-07	1.89E-09	7.12E-07	3.34E-08	2.48E-08	9.39E-05	9.34728E-05	Res
582414.56_4129978.02	582414.56	4129978.02	3.58E-05	1.54E-08	9.26E-09	1.54E-08	3.05E-07	1.75E-09	6.57E-07	3.09E-08	2.29E-08	8.66E-05	8.63029E-05	Res

Chronic Calculation, $\sum C_{TAC}$ /REL

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)										Total HI	Receptor Type
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Copper	Mercury	Nickel	Selenium	Chromium VI	Crystalline Silica		
582471.13_4129978.02	582471.13	4129978.02	3.29E-05	1.41E-08	8.46E-09	1.41E-08	2.79E-07	1.60E-09	6.00E-07	2.82E-08	2.09E-08	7.91E-05	7.88605E-05	Res
582527.7_4129978.02	582527.7	4129978.02	3.02E-05	1.28E-08	7.68E-09	1.28E-08	2.53E-07	1.45E-09	5.44E-07	2.56E-08	1.90E-08	7.18E-05	7.15648E-05	Res
582584.27_4129978.02	582584.27	4129978.02	2.76E-05	1.16E-08	6.95E-09	1.16E-08	2.29E-07	1.31E-09	4.92E-07	2.32E-08	1.71E-08	6.49E-05	6.47965E-05	Res
582640.84_4129978.02	582640.84	4129978.02	2.53E-05	1.05E-08	6.30E-09	1.05E-08	2.07E-07	1.19E-09	4.46E-07	2.10E-08	1.55E-08	5.88E-05	5.87162E-05	Res
582697.41_4129978.02	582697.41	4129978.02	2.31E-05	9.49E-09	5.70E-09	9.49E-09	1.87E-07	1.08E-09	4.03E-07	1.90E-08	1.40E-08	5.31E-05	5.313E-05	Res
582753.98_4129978.02	582753.98	4129978.02	2.10E-05	8.51E-09	5.11E-09	8.51E-09	1.68E-07	9.67E-10	3.61E-07	1.70E-08	1.25E-08	4.76E-05	4.76622E-05	Res
582810.55_4129978.02	582810.55	4129978.02	1.88E-05	7.46E-09	4.47E-09	7.46E-09	1.47E-07	8.48E-10	3.15E-07	1.49E-08	1.09E-08	4.16E-05	4.17537E-05	Res
581905.43_4130061.93	581905.43	4130061.93	6.75E-05	2.97E-08	1.78E-08	2.97E-08	5.87E-07	3.35E-09	1.27E-06	5.93E-08	4.42E-08	1.67E-04	0.000165761	Res
581962_4130061.93	581962	4130061.93	6.35E-05	2.80E-08	1.68E-08	2.80E-08	5.54E-07	3.16E-09	1.19E-06	5.59E-08	4.16E-08	1.57E-04	0.000156252	Res
582018.57_4130061.93	582018.57	4130061.93	5.50E-05	2.37E-08	1.42E-08	2.37E-08	4.68E-07	2.68E-09	1.01E-06	4.73E-08	3.52E-08	1.33E-04	0.000132358	Res
582075.14_4130061.93	582075.14	4130061.93	4.94E-05	2.11E-08	1.26E-08	2.11E-08	4.16E-07	2.38E-09	8.96E-07	4.21E-08	3.12E-08	1.18E-04	0.000117759	Res
582131.71_4130061.93	582131.71	4130061.93	4.79E-05	2.07E-08	1.24E-08	2.07E-08	4.10E-07	2.34E-09	8.82E-07	4.14E-08	3.07E-08	1.16E-04	0.000115723	Res
582188.28_4130061.93	582188.28	4130061.93	4.64E-05	2.02E-08	1.21E-08	2.02E-08	4.01E-07	2.29E-09	8.63E-07	4.05E-08	3.01E-08	1.14E-04	0.000113165	Res
582244.85_4130061.93	582244.85	4130061.93	4.50E-05	1.99E-08	1.19E-08	1.99E-08	3.93E-07	2.24E-09	8.47E-07	3.97E-08	2.96E-08	1.12E-04	0.000110977	Res
582301.42_4130061.93	582301.42	4130061.93	4.18E-05	1.84E-08	1.10E-08	1.84E-08	3.65E-07	2.08E-09	7.86E-07	3.68E-08	2.74E-08	1.04E-04	0.000102917	Res
582357.99_4130061.93	582357.99	4130061.93	3.88E-05	1.70E-08	1.02E-08	1.70E-08	3.38E-07	1.93E-09	7.27E-07	3.41E-08	2.54E-08	9.58E-05	9.52964E-05	Res
582414.56_4130061.93	582414.56	4130061.93	3.57E-05	1.56E-08	9.35E-09	1.56E-08	3.09E-07	1.76E-09	6.65E-07	3.12E-08	2.32E-08	8.76E-05	8.71473E-05	Res
582471.13_4130061.93	582471.13	4130061.93	3.25E-05	1.41E-08	8.46E-09	1.41E-08	2.79E-07	1.59E-09	6.01E-07	2.82E-08	2.10E-08	7.92E-05	7.88221E-05	Res
582527.7_4130061.93	582527.7	4130061.93	2.96E-05	1.27E-08	7.60E-09	1.27E-08	2.51E-07	1.43E-09	5.40E-07	2.53E-08	1.88E-08	7.11E-05	7.08577E-05	Res
582584.27_4130061.93	582584.27	4130061.93	2.69E-05	1.14E-08	6.84E-09	1.14E-08	2.25E-07	1.29E-09	4.85E-07	2.28E-08	1.69E-08	6.39E-05	6.37476E-05	Res
582640.84_4130061.93	582640.84	4130061.93	2.44E-05	1.02E-08	6.13E-09	1.02E-08	2.02E-07	1.16E-09	4.34E-07	2.04E-08	1.51E-08	5.73E-05	5.717E-05	Res
582697.41_4130061.93	582697.41	4130061.93	2.23E-05	9.19E-09	5.52E-09	9.19E-09	1.81E-07	1.04E-09	3.90E-07	1.84E-08	1.36E-08	5.15E-05	5.14505E-05	Res
582753.98_4130061.93	582753.98	4130061.93	2.04E-05	8.30E-09	4.98E-09	8.30E-09	1.64E-07	9.42E-10	3.52E-07	1.66E-08	1.22E-08	4.64E-05	4.64548E-05	Res
582810.55_4130061.93	582810.55	4130061.93	1.86E-05	7.49E-09	4.49E-09	7.49E-09	1.48E-07	8.51E-10	3.17E-07	1.50E-08	1.10E-08	4.18E-05	4.19296E-05	Res
581962_4130145.84	581962	4130145.84	7.13E-05	3.28E-08	1.97E-08	3.28E-08	6.51E-07	3.70E-09	1.40E-06	6.56E-08	4.91E-08	1.85E-04	0.000183125	Res
582018.57_4130145.84	582018.57	4130145.84	6.61E-05	3.03E-08	1.82E-08	3.03E-08	6.03E-07	3.42E-09	1.30E-06	6.07E-08	4.54E-08	1.71E-04	0.000169502	Res
582075.14_4130145.84	582075.14	4130145.84	5.70E-05	2.57E-08	1.54E-08	2.57E-08	5.10E-07	2.90E-09	1.10E-06	5.14E-08	3.84E-08	1.45E-04	0.000143637	Res
582131.71_4130145.84	582131.71	4130145.84	5.28E-05	2.38E-08	1.43E-08	2.38E-08	4.72E-07	2.68E-09	1.02E-06	4.76E-08	3.55E-08	1.34E-04	0.000132931	Res
582188.28_4130145.84	582188.28	4130145.84	5.06E-05	2.30E-08	1.38E-08	2.30E-08	4.56E-07	2.59E-09	9.84E-07	4.60E-08	3.44E-08	1.30E-04	0.000128484	Res
582244.85_4130145.84	582244.85	4130145.84	4.63E-05	2.09E-08	1.26E-08	2.09E-08	4.15E-07	2.36E-09	8.95E-07	4.19E-08	3.13E-08	1.18E-04	0.000116991	Res
582301.42_4130145.84	582301.42	4130145.84	4.22E-05	1.89E-08	1.14E-08	1.89E-08	3.76E-07	2.14E-09	8.10E-07	3.79E-08	2.83E-08	1.07E-04	0.000105845	Res
582357.99_4130145.84	582357.99	4130145.84	3.86E-05	1.72E-08	1.03E-08	1.72E-08	3.41E-07	1.94E-09	7.35E-07	3.44E-08	2.57E-08	9.68E-05	9.61445E-05	Res
582414.56_4130145.84	582414.56	4130145.84	3.52E-05	1.56E-08	9.34E-09	1.56E-08	3.08E-07	1.76E-09	6.65E-07	3.11E-08	2.32E-08	8.75E-05	8.70005E-05	Res
582471.13_4130145.84	582471.13	4130145.84	3.18E-05	1.40E-08	8.37E-09	1.40E-08	2.76E-07	1.58E-09	5.95E-07	2.79E-08	2.08E-08	7.84E-05	7.80312E-05	Res
582527.7_4130145.84	582527.7	4130145.84	2.86E-05	1.24E-08	7.44E-09	1.24E-08	2.45E-07	1.40E-09	5.29E-07	2.48E-08	1.84E-08	6.97E-05	6.93479E-05	Res
582584.27_4130145.84	582584.27	4130145.84	2.57E-05	1.10E-08	6.60E-09	1.10E-08	2.17E-07	1.24E-09	4.68E-07	2.20E-08	1.63E-08	6.17E-05	6.14873E-05	Res
582640.84_4130145.84	582640.84	4130145.84	2.32E-05	9.78E-09	5.87E-09	9.78E-09	1.93E-07	1.11E-09	4.16E-07	1.96E-08	1.45E-08	5.48E-05	5.4727E-05	Res
582697.41_4130145.84	582697.41	4130145.84	2.11E-05	8.76E-09	5.25E-09	8.76E-09	1.73E-07	9.93E-10	3.72E-07	1.75E-08	1.29E-08	4.90E-05	4.90046E-05	Res
582753.98_4130145.84	582753.98	4130145.84	1.93E-05	7.91E-09	4.74E-09	7.91E-09	1.56E-07	8.97E-10	3.36E-07	1.58E-08	1.17E-08	4.42E-05	4.42558E-05	Res
582810.55_4130145.84	582810.55	4130145.84	1.77E-05	7.19E-09	4.32E-09	7.19E-09	1.42E-07	8.17E-10	3.05E-07	1.44E-08	1.06E-08	4.02E-05	4.02731E-05	Res
582867.12_4130145.84	582867.12	4130145.84	1.58E-05	6.29E-09	3.77E-09	6.29E-09	1.24E-07	7.15E-10	2.66E-07	1.26E-08	9.24E-09	3.51E-05	3.52338E-05	Res
581962_4130229.75	581962	4130229.75	7.23E-05	3.35E-08	2.01E-08	3.35E-08	6.67E-07	3.78E-09	1.44E-06	6.71E-08	5.03E-08	1.89E-04	0.000187363	Res
582018.57_4130229.75	582018.57	4130229.75	6.87E-05	3.20E-08	1.92E-08	3.20E-08	6.36E-07	3.60E-09	1.37E-06	6.40E-08	4.80E-08	1.81E-04	0.000178697	Res
582075.14_4130229.75	582075.14	4130229.75	6.38E-05	2.97E-08	1.78E-08	2.97E-08	5.91E-07	3.35E-09	1.27E-06	5.94E-08	4.46E-08	1.68E-04	0.000166016	Res
582131.71_4130229.75	582131.71	4130229.75	5.76E-05	2.67E-08	1.60E-08	2.67E-08	5.31E-07	3.01E-09	1.14E-06	5.34E-08	4.00E-08	1.51E-04	0.000149144	Res
582188.28_4130229.75	582188.28	4130229.75	5.16E-05	2.37E-08	1.42E-08	2.37E-08	4.72E-07	2.68E-09	1.02E-06	4.75E-08	3.56E-08	1.34E-04	0.000132652	Res
582244.85_4130229.75	582244.85	4130229.75	4.63E-05	2.12E-08	1.27E-08	2.12E-08	4.21E-07	2.39E-09	9.06E-07	4.24E-08	3.17E-08	1.19E-04	0.000118314	Res

Chronic Calculation, $\sum C_{TAC}$ /REL

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)										Total HI	Receptor Type
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Copper	Mercury	Nickel	Selenium	Chromium VI	Crystalline Silica		
582301.42_4130229.75	582301.42	4130229.75	4.19E-05	1.90E-08	1.14E-08	1.90E-08	3.77E-07	2.14E-09	8.13E-07	3.80E-08	2.84E-08	1.07E-04	0.000106167	Res
582357.99_4130229.75	582357.99	4130229.75	3.79E-05	1.71E-08	1.03E-08	1.71E-08	3.39E-07	1.93E-09	7.31E-07	3.42E-08	2.55E-08	9.62E-05	9.55065E-05	Res
582414.56_4130229.75	582414.56	4130229.75	3.41E-05	1.52E-08	9.12E-09	1.52E-08	3.01E-07	1.72E-09	6.49E-07	3.04E-08	2.27E-08	8.55E-05	8.49525E-05	Res
582471.13_4130229.75	582471.13	4130229.75	3.03E-05	1.34E-08	8.02E-09	1.34E-08	2.65E-07	1.51E-09	5.70E-07	2.67E-08	1.99E-08	7.51E-05	7.46901E-05	Res
582527.7_4130229.75	582527.7	4130229.75	2.70E-05	1.17E-08	7.04E-09	1.17E-08	2.32E-07	1.33E-09	5.01E-07	2.35E-08	1.75E-08	6.60E-05	6.56464E-05	Res
582584.27_4130229.75	582584.27	4130229.75	2.42E-05	1.04E-08	6.22E-09	1.04E-08	2.05E-07	1.17E-09	4.41E-07	2.07E-08	1.54E-08	5.82E-05	5.79675E-05	Res
582640.84_4130229.75	582640.84	4130229.75	2.18E-05	9.22E-09	5.53E-09	9.22E-09	1.82E-07	1.04E-09	3.92E-07	1.84E-08	1.37E-08	5.17E-05	5.15551E-05	Res
582697.41_4130229.75	582697.41	4130229.75	1.99E-05	8.30E-09	4.98E-09	8.30E-09	1.64E-07	9.41E-10	3.53E-07	1.66E-08	1.23E-08	4.65E-05	4.64359E-05	Res
582753.98_4130229.75	582753.98	4130229.75	1.82E-05	7.52E-09	4.51E-09	7.52E-09	1.48E-07	8.53E-10	3.19E-07	1.50E-08	1.11E-08	4.21E-05	4.20762E-05	Res
582810.55_4130229.75	582810.55	4130229.75	1.69E-05	6.88E-09	4.13E-09	6.88E-09	1.36E-07	7.81E-10	2.92E-07	1.38E-08	1.01E-08	3.85E-05	3.85278E-05	Res
582867.12_4130229.75	582867.12	4130229.75	1.57E-05	6.35E-09	3.81E-09	6.35E-09	1.25E-07	7.21E-10	2.69E-07	1.27E-08	9.35E-09	3.55E-05	3.55565E-05	Res
582018.57_4130313.66	582018.57	4130313.66	7.33E-05	3.46E-08	2.07E-08	3.46E-08	6.88E-07	3.89E-09	1.48E-06	6.91E-08	5.19E-08	1.95E-04	0.000193041	Res
582075.14_4130313.66	582075.14	4130313.66	6.78E-05	3.20E-08	1.92E-08	3.20E-08	6.37E-07	3.60E-09	1.37E-06	6.40E-08	4.81E-08	1.81E-04	0.00017868	Res
582131.71_4130313.66	582131.71	4130313.66	5.97E-05	2.79E-08	1.68E-08	2.79E-08	5.55E-07	3.15E-09	1.20E-06	5.59E-08	4.19E-08	1.58E-04	0.000155986	Res
582188.28_4130313.66	582188.28	4130313.66	5.24E-05	2.43E-08	1.46E-08	2.43E-08	4.84E-07	2.74E-09	1.04E-06	4.87E-08	3.65E-08	1.37E-04	0.000135957	Res
582244.85_4130313.66	582244.85	4130313.66	4.65E-05	2.14E-08	1.28E-08	2.14E-08	4.25E-07	2.41E-09	9.17E-07	4.28E-08	3.21E-08	1.21E-04	0.00011963	Res
582301.42_4130313.66	582301.42	4130313.66	4.15E-05	1.90E-08	1.14E-08	1.90E-08	3.76E-07	2.14E-09	8.11E-07	3.79E-08	2.84E-08	1.07E-04	0.000105902	Res
582357.99_4130313.66	582357.99	4130313.66	3.67E-05	1.66E-08	9.96E-09	1.66E-08	3.29E-07	1.87E-09	7.10E-07	3.32E-08	2.48E-08	9.35E-05	9.27404E-05	Res
582414.56_4130313.66	582414.56	4130313.66	3.23E-05	1.44E-08	8.64E-09	1.44E-08	2.86E-07	1.63E-09	6.15E-07	2.88E-08	2.15E-08	8.10E-05	8.04721E-05	Res
582471.13_4130313.66	582471.13	4130313.66	2.84E-05	1.25E-08	7.51E-09	1.25E-08	2.48E-07	1.41E-09	5.34E-07	2.50E-08	1.86E-08	7.03E-05	6.99511E-05	Res
582527.7_4130313.66	582527.7	4130313.66	2.53E-05	1.10E-08	6.58E-09	1.10E-08	2.17E-07	1.24E-09	4.68E-07	2.19E-08	1.63E-08	6.16E-05	6.13529E-05	Res
582584.27_4130313.66	582584.27	4130313.66	2.27E-05	9.70E-09	5.82E-09	9.70E-09	1.92E-07	1.10E-09	4.13E-07	1.94E-08	1.44E-08	5.44E-05	5.42668E-05	Res
582640.84_4130313.66	582640.84	4130313.66	2.05E-05	8.69E-09	5.21E-09	8.69E-09	1.72E-07	9.84E-10	3.70E-07	1.74E-08	1.29E-08	4.87E-05	4.85992E-05	Res
582697.41_4130313.66	582697.41	4130313.66	1.88E-05	7.84E-09	4.71E-09	7.84E-09	1.55E-07	8.89E-10	3.33E-07	1.57E-08	1.16E-08	4.40E-05	4.38939E-05	Res
582753.98_4130313.66	582753.98	4130313.66	1.73E-05	7.13E-09	4.28E-09	7.13E-09	1.41E-07	8.09E-10	3.03E-07	1.43E-08	1.05E-08	3.99E-05	3.99129E-05	Res
582810.55_4130313.66	582810.55	4130313.66	1.59E-05	6.50E-09	3.90E-09	6.50E-09	1.28E-07	7.38E-10	2.76E-07	1.30E-08	9.59E-09	3.64E-05	3.64004E-05	Res
582867.12_4130313.66	582867.12	4130313.66	1.47E-05	5.96E-09	3.57E-09	5.96E-09	1.17E-07	6.76E-10	2.52E-07	1.19E-08	8.77E-09	3.33E-05	3.33416E-05	Res
581848.86_4130397.57	581848.86	4130397.57	9.95E-05	4.76E-08	2.86E-08	4.76E-08	9.49E-07	5.36E-09	2.05E-06	9.53E-08	7.17E-08	2.69E-04	0.000265974	Res
581905.43_4130397.57	581905.43	4130397.57	9.62E-05	4.62E-08	2.77E-08	4.62E-08	9.20E-07	5.20E-09	1.98E-06	9.24E-08	6.96E-08	2.61E-04	0.000257927	Res
581962_4130397.57	581962	4130397.57	9.08E-05	4.37E-08	2.62E-08	4.37E-08	8.70E-07	4.91E-09	1.88E-06	8.73E-08	6.58E-08	2.47E-04	0.000243781	Res
582018.57_4130397.57	582018.57	4130397.57	8.16E-05	3.91E-08	2.35E-08	3.91E-08	7.78E-07	4.40E-09	1.68E-06	7.82E-08	5.88E-08	2.21E-04	0.000218217	Res
582075.14_4130397.57	582075.14	4130397.57	7.17E-05	3.41E-08	2.05E-08	3.41E-08	6.80E-07	3.84E-09	1.47E-06	6.83E-08	5.14E-08	1.93E-04	0.000190668	Res
582131.71_4130397.57	582131.71	4130397.57	6.17E-05	2.91E-08	1.75E-08	2.91E-08	5.79E-07	3.28E-09	1.25E-06	5.82E-08	4.37E-08	1.64E-04	0.00016249	Res
582188.28_4130397.57	582188.28	4130397.57	5.39E-05	2.52E-08	1.51E-08	2.52E-08	5.00E-07	2.83E-09	1.08E-06	5.03E-08	3.78E-08	1.42E-04	0.000140522	Res
582244.85_4130397.57	582244.85	4130397.57	4.67E-05	2.16E-08	1.30E-08	2.16E-08	4.29E-07	2.43E-09	9.25E-07	4.32E-08	3.24E-08	1.22E-04	0.000120607	Res
582301.42_4130397.57	582301.42	4130397.57	4.05E-05	1.85E-08	1.11E-08	1.85E-08	3.67E-07	2.09E-09	7.91E-07	3.70E-08	2.77E-08	1.04E-04	0.000103317	Res
582357.99_4130397.57	582357.99	4130397.57	3.50E-05	1.57E-08	9.43E-09	1.57E-08	3.12E-07	1.77E-09	6.72E-07	3.14E-08	2.35E-08	8.85E-05	8.78478E-05	Res
582414.56_4130397.57	582414.56	4130397.57	3.05E-05	1.35E-08	8.10E-09	1.35E-08	2.68E-07	1.53E-09	5.77E-07	2.70E-08	2.01E-08	7.60E-05	7.54964E-05	Res
582471.13_4130397.57	582471.13	4130397.57	2.69E-05	1.18E-08	7.05E-09	1.18E-08	2.33E-07	1.33E-09	5.01E-07	2.35E-08	1.75E-08	6.60E-05	6.57007E-05	Res
582527.7_4130397.57	582527.7	4130397.57	2.40E-05	1.03E-08	6.20E-09	1.03E-08	2.04E-07	1.17E-09	4.40E-07	2.07E-08	1.53E-08	5.80E-05	5.77679E-05	Res
582584.27_4130397.57	582584.27	4130397.57	2.16E-05	9.17E-09	5.50E-09	9.17E-09	1.81E-07	1.04E-09	3.90E-07	1.83E-08	1.36E-08	5.14E-05	5.1282E-05	Res
582640.84_4130397.57	582640.84	4130397.57	1.95E-05	8.21E-09	4.92E-09	8.21E-09	1.62E-07	9.30E-10	3.49E-07	1.64E-08	1.21E-08	4.60E-05	4.59078E-05	Res
582697.41_4130397.57	582697.41	4130397.57	1.77E-05	7.35E-09	4.41E-09	7.35E-09	1.45E-07	8.34E-10	3.12E-07	1.47E-08	1.09E-08	4.12E-05	4.11524E-05	Res
582753.98_4130397.57	582753.98	4130397.57	1.62E-05	6.64E-09	3.99E-09	6.64E-09	1.31E-07	7.54E-10	2.82E-07	1.33E-08	9.80E-09	3.72E-05	3.71899E-05	Res
582810.55_4130397.57	582810.55	4130397.57	1.49E-05	6.04E-09	3.62E-09	6.04E-09	1.19E-07	6.86E-10	2.56E-07	1.21E-08	8.89E-09	3.37E-05	3.3799E-05	Res
582867.12_4130397.57	582867.12	4130397.57	1.38E-05	5.51E-09	3.31E-09	5.51E-09	1.09E-07	6.26E-10	2.33E-07	1.10E-08	8.10E-09	3.08E-05	3.0851E-05	Res
581848.86_4130481.48	581848.86	4130481.48	1.26E-04	6.20E-08	3.72E-08	6.20E-08	1.24E-06	6.96E-09	2.67E-06	1.24E-07	9.36E-08	3.51E-04	0.000345941	Res
581905.43_4130481.48	581905.43	4130481.48	1.17E-04	5.74E-08	3.44E-08	5.74E-08	1.14E-06	6.45E-09	2.47E-06	1.15E-07	8.67E-08	3.25E-04	0.000320334	Res
581962_4130481.48	581962	4130481.48	9.99E-05	4.88E-08	2.93E-08	4.88E-08	9.72E-07	5.48E-09	2.10E-06	9.75E-08	7.36E-08	2.76E-04	0.000272135	Res

Chronic Calculation, $\sum C_{TAC}$ /REL

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)										Total HI	Receptor Type
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Copper	Mercury	Nickel	Selenium	Chromium VI	Crystalline Silica		
582018.57_4130481.48	582018.57	4130481.48	8.82E-05	4.28E-08	2.57E-08	4.28E-08	8.53E-07	4.81E-09	1.84E-06	8.56E-08	6.46E-08	2.42E-04	0.000239007	Res
582075.14_4130481.48	582075.14	4130481.48	7.49E-05	3.60E-08	2.16E-08	3.60E-08	7.17E-07	4.05E-09	1.55E-06	7.21E-08	5.43E-08	2.04E-04	0.000201129	Res
582131.71_4130481.48	582131.71	4130481.48	6.39E-05	3.04E-08	1.82E-08	3.04E-08	6.05E-07	3.42E-09	1.31E-06	6.08E-08	4.58E-08	1.72E-04	0.000169824	Res
582188.28_4130481.48	582188.28	4130481.48	5.43E-05	2.55E-08	1.53E-08	2.55E-08	5.08E-07	2.88E-09	1.10E-06	5.11E-08	3.84E-08	1.44E-04	0.000142641	Res
582244.85_4130481.48	582244.85	4130481.48	4.56E-05	2.11E-08	1.27E-08	2.11E-08	4.20E-07	2.38E-09	9.04E-07	4.22E-08	3.16E-08	1.19E-04	0.000117939	Res
582301.42_4130481.48	582301.42	4130481.48	3.86E-05	1.75E-08	1.05E-08	1.75E-08	3.48E-07	1.98E-09	7.51E-07	3.51E-08	2.62E-08	9.89E-05	9.8042E-05	Res
582357.99_4130481.48	582357.99	4130481.48	3.31E-05	1.48E-08	8.89E-09	1.48E-08	2.94E-07	1.67E-09	6.33E-07	2.96E-08	2.21E-08	8.34E-05	8.27778E-05	Res
582414.56_4130481.48	582414.56	4130481.48	2.90E-05	1.27E-08	7.65E-09	1.27E-08	2.53E-07	1.44E-09	5.44E-07	2.55E-08	1.90E-08	7.16E-05	7.12456E-05	Res
582471.13_4130481.48	582471.13	4130481.48	2.56E-05	1.11E-08	6.65E-09	1.11E-08	2.19E-07	1.25E-09	4.72E-07	2.22E-08	1.65E-08	6.23E-05	6.19875E-05	Res
582527.7_4130481.48	582527.7	4130481.48	2.27E-05	9.71E-09	5.82E-09	9.71E-09	1.92E-07	1.10E-09	4.13E-07	1.94E-08	1.44E-08	5.45E-05	5.42854E-05	Res
582584.27_4130481.48	582584.27	4130481.48	2.04E-05	8.58E-09	5.15E-09	8.58E-09	1.69E-07	9.72E-10	3.65E-07	1.72E-08	1.27E-08	4.81E-05	4.79903E-05	Res
582640.84_4130481.48	582640.84	4130481.48	1.84E-05	7.61E-09	4.57E-09	7.61E-09	1.50E-07	8.63E-10	3.23E-07	1.52E-08	1.12E-08	4.26E-05	4.2602E-05	Res
582697.41_4130481.48	582697.41	4130481.48	1.67E-05	6.81E-09	4.09E-09	6.81E-09	1.34E-07	7.73E-10	2.89E-07	1.36E-08	1.00E-08	3.81E-05	3.81123E-05	Res
582753.98_4130481.48	582753.98	4130481.48	1.53E-05	6.15E-09	3.69E-09	6.15E-09	1.21E-07	6.99E-10	2.61E-07	1.23E-08	9.05E-09	3.44E-05	3.44443E-05	Res
582810.55_4130481.48	582810.55	4130481.48	1.41E-05	5.60E-09	3.36E-09	5.60E-09	1.10E-07	6.37E-10	2.37E-07	1.12E-08	8.22E-09	3.13E-05	3.1356E-05	Res
582867.12_4130481.48	582867.12	4130481.48	1.30E-05	5.13E-09	3.08E-09	5.13E-09	1.01E-07	5.83E-10	2.17E-07	1.03E-08	7.52E-09	2.86E-05	2.87105E-05	Res
581735.72_4130565.39	581735.72	4130565.39	1.51E-04	7.57E-08	4.54E-08	7.57E-08	1.51E-06	8.49E-09	3.26E-06	1.51E-07	1.14E-07	4.29E-04	0.000422142	Res
581792.29_4130565.39	581792.29	4130565.39	1.49E-04	7.45E-08	4.47E-08	7.45E-08	1.49E-06	8.37E-09	3.21E-06	1.49E-07	1.13E-07	4.22E-04	0.000415886	Res
581848.86_4130565.39	581848.86	4130565.39	1.42E-04	7.09E-08	4.25E-08	7.09E-08	1.41E-06	7.96E-09	3.05E-06	1.42E-07	1.07E-07	4.02E-04	0.000395489	Res
581905.43_4130565.39	581905.43	4130565.39	1.35E-04	6.77E-08	4.06E-08	6.77E-08	1.35E-06	7.60E-09	2.92E-06	1.35E-07	1.02E-07	3.84E-04	0.000377675	Res
581962_4130565.39	581962	4130565.39	1.17E-04	5.83E-08	3.50E-08	5.83E-08	1.16E-06	6.54E-09	2.51E-06	1.17E-07	8.81E-08	3.30E-04	0.000325086	Res
582018.57_4130565.39	582018.57	4130565.39	9.52E-05	4.69E-08	2.81E-08	4.69E-08	9.36E-07	5.27E-09	2.02E-06	9.38E-08	7.09E-08	2.66E-04	0.000261812	Res
582075.14_4130565.39	582075.14	4130565.39	7.78E-05	3.79E-08	2.27E-08	3.79E-08	7.55E-07	4.26E-09	1.63E-06	7.58E-08	5.71E-08	2.14E-04	0.00021147	Res
582131.71_4130565.39	582131.71	4130565.39	6.42E-05	3.09E-08	1.85E-08	3.09E-08	6.15E-07	3.47E-09	1.33E-06	6.18E-08	4.65E-08	1.75E-04	0.000172399	Res
582188.28_4130565.39	582188.28	4130565.39	5.21E-05	2.46E-08	1.48E-08	2.46E-08	4.90E-07	2.77E-09	1.06E-06	4.92E-08	3.70E-08	1.39E-04	0.000137456	Res
582244.85_4130565.39	582244.85	4130565.39	4.28E-05	1.98E-08	1.19E-08	1.98E-08	3.94E-07	2.23E-09	8.49E-07	3.96E-08	2.97E-08	1.12E-04	0.000110714	Res
582301.42_4130565.39	582301.42	4130565.39	3.63E-05	1.65E-08	9.93E-09	1.65E-08	3.29E-07	1.87E-09	7.08E-07	3.31E-08	2.48E-08	9.32E-05	9.24627E-05	Res
582357.99_4130565.39	582357.99	4130565.39	3.11E-05	1.39E-08	8.33E-09	1.39E-08	2.75E-07	1.57E-09	5.93E-07	2.78E-08	2.07E-08	7.81E-05	7.76157E-05	Res
582414.56_4130565.39	582414.56	4130565.39	2.70E-05	1.18E-08	7.10E-09	1.18E-08	2.34E-07	1.34E-09	5.05E-07	2.37E-08	1.76E-08	6.65E-05	6.61502E-05	Res
582471.13_4130565.39	582471.13	4130565.39	2.38E-05	1.02E-08	6.13E-09	1.02E-08	2.02E-07	1.16E-09	4.35E-07	2.04E-08	1.52E-08	5.74E-05	5.71389E-05	Res
582527.7_4130565.39	582527.7	4130565.39	2.11E-05	8.92E-09	5.35E-09	8.92E-09	1.76E-07	1.01E-09	3.79E-07	1.78E-08	1.32E-08	5.00E-05	4.99019E-05	Res
582584.27_4130565.39	582584.27	4130565.39	1.90E-05	7.89E-09	4.73E-09	7.89E-09	1.56E-07	8.95E-10	3.35E-07	1.58E-08	1.17E-08	4.42E-05	4.41441E-05	Res
582640.84_4130565.39	582640.84	4130565.39	1.72E-05	6.99E-09	4.20E-09	6.99E-09	1.38E-07	7.94E-10	2.97E-07	1.40E-08	1.03E-08	3.91E-05	3.91517E-05	Res
582697.41_4130565.39	582697.41	4130565.39	1.57E-05	6.29E-09	3.77E-09	6.29E-09	1.24E-07	7.15E-10	2.66E-07	1.26E-08	9.25E-09	3.51E-05	3.52187E-05	Res
582753.98_4130565.39	582753.98	4130565.39	1.44E-05	5.71E-09	3.43E-09	5.71E-09	1.12E-07	6.49E-10	2.41E-07	1.14E-08	8.38E-09	3.19E-05	3.19719E-05	Res
582810.55_4130565.39	582810.55	4130565.39	1.34E-05	5.23E-09	3.14E-09	5.23E-09	1.03E-07	5.96E-10	2.21E-07	1.05E-08	7.67E-09	2.92E-05	2.9314E-05	Res
582867.12_4130565.39	582867.12	4130565.39	1.25E-05	4.83E-09	2.90E-09	4.83E-09	9.50E-08	5.51E-10	2.04E-07	9.67E-09	7.07E-09	2.69E-05	2.70876E-05	Res
581735.72_4130649.3	581735.72	4130649.3	1.63E-04	8.22E-08	4.93E-08	8.22E-08	1.64E-06	9.22E-09	3.54E-06	1.64E-07	1.24E-07	4.66E-04	0.000458359	Res
581792.29_4130649.3	581792.29	4130649.3	1.58E-04	7.95E-08	4.77E-08	7.95E-08	1.59E-06	8.92E-09	3.43E-06	1.59E-07	1.20E-07	4.51E-04	0.000443642	Res
581905.43_4130649.3	581905.43	4130649.3	1.57E-04	7.97E-08	4.78E-08	7.97E-08	1.59E-06	8.93E-09	3.43E-06	1.59E-07	1.21E-07	4.52E-04	0.000444353	Res
581962_4130649.3	581962	4130649.3	1.31E-04	6.59E-08	3.96E-08	6.59E-08	1.32E-06	7.40E-09	2.84E-06	1.32E-07	9.98E-08	3.74E-04	0.000367874	Res
582018.57_4130649.3	582018.57	4130649.3	9.99E-05	4.98E-08	2.99E-08	4.98E-08	9.94E-07	5.59E-09	2.15E-06	9.96E-08	7.53E-08	2.82E-04	0.000277886	Res
582075.14_4130649.3	582075.14	4130649.3	7.80E-05	3.84E-08	2.31E-08	3.84E-08	7.66E-07	4.32E-09	1.65E-06	7.69E-08	5.80E-08	2.18E-04	0.000214446	Res
582131.71_4130649.3	582131.71	4130649.3	6.10E-05	2.96E-08	1.78E-08	2.96E-08	5.90E-07	3.33E-09	1.27E-06	5.92E-08	4.47E-08	1.68E-04	0.00016533	Res
582188.28_4130649.3	582188.28	4130649.3	4.85E-05	2.31E-08	1.39E-08	2.31E-08	4.60E-07	2.60E-09	9.91E-07	4.62E-08	3.47E-08	1.30E-04	0.000128904	Res
582244.85_4130649.3	582244.85	4130649.3	3.94E-05	1.84E-08	1.10E-08	1.84E-08	3.65E-07	2.07E-09	7.88E-07	3.68E-08	2.76E-08	1.04E-04	0.00010264	Res
582301.42_4130649.3	582301.42	4130649.3	3.29E-05	1.50E-08	9.01E-09	1.50E-08	2.98E-07	1.69E-09	6.43E-07	3.00E-08	2.25E-08	8.46E-05	8.39092E-05	Res
582357.99_4130649.3	582357.99	4130649.3	2.81E-05	1.26E-08	7.55E-09	1.26E-08	2.49E-07	1.42E-09	5.37E-07	2.52E-08	1.88E-08	7.08E-05	7.02824E-05	Res
582414.56_4130649.3	582414.56	4130649.3	2.46E-05	1.08E-08	6.45E-09	1.08E-08	2.13E-07	1.22E-09	4.59E-07	2.15E-08	1.60E-08	6.04E-05	6.0106E-05	Res

Chronic Calculation, $\sum C_{TAC}$ /REL

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)										Total HI	Receptor Type
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Copper	Mercury	Nickel	Selenium	Chromium VI	Crystalline Silica		
582471.13_4130649.3	582471.13	4130649.3	2.16E-05	9.28E-09	5.57E-09	9.28E-09	1.84E-07	1.05E-09	3.95E-07	1.86E-08	1.38E-08	5.21E-05	5.19139E-05	Res
582527.7_4130649.3	582527.7	4130649.3	1.94E-05	8.13E-09	4.88E-09	8.13E-09	1.61E-07	9.22E-10	3.46E-07	1.63E-08	1.20E-08	4.56E-05	4.55105E-05	Res
582584.27_4130649.3	582584.27	4130649.3	1.75E-05	7.23E-09	4.34E-09	7.23E-09	1.43E-07	8.21E-10	3.07E-07	1.45E-08	1.07E-08	4.05E-05	4.04848E-05	Res
582640.84_4130649.3	582640.84	4130649.3	1.61E-05	6.52E-09	3.91E-09	6.52E-09	1.29E-07	7.40E-10	2.76E-07	1.30E-08	9.60E-09	3.64E-05	3.64943E-05	Res
582697.41_4130649.3	582697.41	4130649.3	1.49E-05	5.94E-09	3.56E-09	5.94E-09	1.17E-07	6.75E-10	2.51E-07	1.19E-08	8.72E-09	3.32E-05	3.32404E-05	Res
582753.98_4130649.3	582753.98	4130649.3	1.39E-05	5.47E-09	3.28E-09	5.47E-09	1.08E-07	6.22E-10	2.31E-07	1.09E-08	8.02E-09	3.05E-05	3.06368E-05	Res
582810.55_4130649.3	582810.55	4130649.3	1.30E-05	5.09E-09	3.05E-09	5.09E-09	1.00E-07	5.79E-10	2.15E-07	1.02E-08	7.45E-09	2.84E-05	2.85085E-05	Res
582867.12_4130649.3	582867.12	4130649.3	1.23E-05	4.75E-09	2.85E-09	4.75E-09	9.34E-08	5.42E-10	2.01E-07	9.51E-09	6.95E-09	2.65E-05	2.66377E-05	Res
581848.86_4130733.21	581848.86	4130733.21	2.32E-04	1.19E-07	7.14E-08	1.19E-07	2.38E-06	1.33E-08	5.14E-06	2.38E-07	1.81E-07	6.76E-04	0.00066412	Res
581905.43_4130733.21	581905.43	4130733.21	1.99E-04	1.01E-07	6.09E-08	1.01E-07	2.03E-06	1.14E-08	4.38E-06	2.03E-07	1.54E-07	5.76E-04	0.000566082	Res
581962_4130733.21	581962	4130733.21	1.46E-04	7.43E-08	4.46E-08	7.43E-08	1.48E-06	8.34E-09	3.21E-06	1.49E-07	1.13E-07	4.22E-04	0.000414598	Res
582018.57_4130733.21	582018.57	4130733.21	1.03E-04	5.18E-08	3.11E-08	5.18E-08	1.03E-06	5.81E-09	2.23E-06	1.04E-07	7.84E-08	2.94E-04	0.000289096	Res
582075.14_4130733.21	582075.14	4130733.21	7.33E-05	3.63E-08	2.18E-08	3.63E-08	7.25E-07	4.08E-09	1.56E-06	7.26E-08	5.49E-08	2.06E-04	0.000202671	Res
582131.71_4130733.21	582131.71	4130733.21	5.40E-05	2.63E-08	1.58E-08	2.63E-08	5.24E-07	2.95E-09	1.13E-06	5.26E-08	3.97E-08	1.49E-04	0.000146725	Res
582188.28_4130733.21	582188.28	4130733.21	4.22E-05	2.01E-08	1.21E-08	2.01E-08	4.01E-07	2.27E-09	8.65E-07	4.03E-08	3.03E-08	1.14E-04	0.000112492	Res
582244.85_4130733.21	582244.85	4130733.21	3.42E-05	1.60E-08	9.61E-09	1.60E-08	3.18E-07	1.80E-09	6.86E-07	3.20E-08	2.40E-08	9.04E-05	8.94131E-05	Res
582301.42_4130733.21	582301.42	4130733.21	2.87E-05	1.32E-08	7.89E-09	1.32E-08	2.61E-07	1.48E-09	5.63E-07	2.63E-08	1.97E-08	7.41E-05	7.34891E-05	Res
582357.99_4130733.21	582357.99	4130733.21	2.47E-05	1.11E-08	6.66E-09	1.11E-08	2.20E-07	1.25E-09	4.75E-07	2.22E-08	1.66E-08	6.25E-05	6.20635E-05	Res
582414.56_4130733.21	582414.56	4130733.21	2.18E-05	9.59E-09	5.75E-09	9.59E-09	1.90E-07	1.08E-09	4.09E-07	1.92E-08	1.43E-08	5.39E-05	5.36148E-05	Res
582471.13_4130733.21	582471.13	4130733.21	1.96E-05	8.46E-09	5.08E-09	8.46E-09	1.67E-07	9.57E-10	3.60E-07	1.69E-08	1.26E-08	4.75E-05	4.73107E-05	Res
582527.7_4130733.21	582527.7	4130733.21	1.79E-05	7.59E-09	4.55E-09	7.59E-09	1.50E-07	8.60E-10	3.23E-07	1.52E-08	1.12E-08	4.26E-05	4.2452E-05	Res
582584.27_4130733.21	582584.27	4130733.21	1.65E-05	6.90E-09	4.14E-09	6.90E-09	1.36E-07	7.83E-10	2.93E-07	1.38E-08	1.02E-08	3.87E-05	3.8633E-05	Res
582640.84_4130733.21	582640.84	4130733.21	1.54E-05	6.35E-09	3.81E-09	6.35E-09	1.25E-07	7.20E-10	2.69E-07	1.27E-08	9.37E-09	3.55E-05	3.55218E-05	Res
582697.41_4130733.21	582697.41	4130733.21	1.45E-05	5.88E-09	3.53E-09	5.88E-09	1.16E-07	6.68E-10	2.49E-07	1.18E-08	8.66E-09	3.29E-05	3.29265E-05	Res
582753.98_4130733.21	582753.98	4130733.21	1.37E-05	5.48E-09	3.29E-09	5.48E-09	1.08E-07	6.23E-10	2.32E-07	1.10E-08	8.06E-09	3.06E-05	3.06816E-05	Res
582810.55_4130733.21	582810.55	4130733.21	1.30E-05	5.15E-09	3.09E-09	5.15E-09	1.01E-07	5.85E-10	2.18E-07	1.03E-08	7.56E-09	2.87E-05	2.88327E-05	Res
582867.12_4130733.21	582867.12	4130733.21	1.23E-05	4.84E-09	2.90E-09	4.84E-09	9.51E-08	5.50E-10	2.04E-07	9.67E-09	7.09E-09	2.70E-05	2.70939E-05	Res
581735.72_4130817.12	581735.72	4130817.12	3.41E-04	1.76E-07	1.05E-07	1.76E-07	3.51E-06	1.97E-08	7.58E-06	3.51E-07	2.66E-07	9.96E-04	0.000978902	Res
581792.29_4130817.12	581792.29	4130817.12	3.84E-04	1.98E-07	1.19E-07	1.98E-07	3.96E-06	2.22E-08	8.56E-06	3.97E-07	3.01E-07	1.13E-03	0.001105803	Res
581848.86_4130817.12	581848.86	4130817.12	3.45E-04	1.78E-07	1.07E-07	1.78E-07	3.55E-06	1.99E-08	7.68E-06	3.56E-07	2.70E-07	1.01E-03	0.000991599	Res
581905.43_4130817.12	581905.43	4130817.12	2.61E-04	1.34E-07	8.05E-08	1.34E-07	2.68E-06	1.50E-08	5.79E-06	2.68E-07	2.04E-07	7.62E-04	0.000748607	Res
581962_4130817.12	581962	4130817.12	1.59E-04	8.10E-08	4.86E-08	8.10E-08	1.62E-06	9.09E-09	3.50E-06	1.62E-07	1.23E-07	4.60E-04	0.00045202	Res
582018.57_4130817.12	582018.57	4130817.12	9.56E-05	4.82E-08	2.89E-08	4.82E-08	9.62E-07	5.40E-09	2.08E-06	9.63E-08	7.29E-08	2.73E-04	0.000268752	Res
582075.14_4130817.12	582075.14	4130817.12	6.24E-05	3.09E-08	1.85E-08	3.09E-08	6.16E-07	3.47E-09	1.33E-06	6.18E-08	4.67E-08	1.75E-04	0.000172329	Res
582131.71_4130817.12	582131.71	4130817.12	4.53E-05	2.20E-08	1.32E-08	2.20E-08	4.39E-07	2.47E-09	9.47E-07	4.40E-08	3.32E-08	1.25E-04	0.000122897	Res
582188.28_4130817.12	582188.28	4130817.12	3.55E-05	1.69E-08	1.02E-08	1.69E-08	3.37E-07	1.90E-09	7.27E-07	3.38E-08	2.55E-08	9.56E-05	9.44764E-05	Res
582244.85_4130817.12	582244.85	4130817.12	2.93E-05	1.37E-08	8.23E-09	1.37E-08	2.73E-07	1.55E-09	5.88E-07	2.74E-08	2.06E-08	7.75E-05	7.66415E-05	Res
582301.42_4130817.12	582301.42	4130817.12	2.52E-05	1.16E-08	6.97E-09	1.16E-08	2.31E-07	1.31E-09	4.97E-07	2.32E-08	1.74E-08	6.55E-05	6.48556E-05	Res
582357.99_4130817.12	582357.99	4130817.12	2.23E-05	1.01E-08	6.07E-09	1.01E-08	2.01E-07	1.14E-09	4.33E-07	2.02E-08	1.51E-08	5.70E-05	5.65401E-05	Res
582414.56_4130817.12	582414.56	4130817.12	2.01E-05	8.99E-09	5.40E-09	8.99E-09	1.78E-07	1.02E-09	3.84E-07	1.80E-08	1.34E-08	5.06E-05	5.02612E-05	Res
582471.13_4130817.12	582471.13	4130817.12	1.85E-05	8.13E-09	4.88E-09	8.13E-09	1.61E-07	9.19E-10	3.47E-07	1.63E-08	1.21E-08	4.57E-05	4.54665E-05	Res
582527.7_4130817.12	582527.7	4130817.12	1.71E-05	7.41E-09	4.45E-09	7.41E-09	1.47E-07	8.38E-10	3.16E-07	1.48E-08	1.10E-08	4.16E-05	4.14389E-05	Res
582584.27_4130817.12	582584.27	4130817.12	1.59E-05	6.82E-09	4.09E-09	6.82E-09	1.35E-07	7.72E-10	2.90E-07	1.36E-08	1.01E-08	3.83E-05	3.81555E-05	Res
582640.84_4130817.12	582640.84	4130817.12	1.50E-05	6.32E-09	3.79E-09	6.32E-09	1.25E-07	7.16E-10	2.69E-07	1.26E-08	9.36E-09	3.54E-05	3.53556E-05	Res
582697.41_4130817.12	582697.41	4130817.12	1.41E-05	5.88E-09	3.53E-09	5.88E-09	1.16E-07	6.67E-10	2.50E-07	1.18E-08	8.69E-09	3.29E-05	3.29065E-05	Res
582753.98_4130817.12	582753.98	4130817.12	1.33E-05	5.48E-09	3.29E-09	5.48E-09	1.08E-07	6.22E-10	2.33E-07	1.10E-08	8.09E-09	3.07E-05	3.06654E-05	Res
582810.55_4130817.12	582810.55	4130817.12	1.26E-05	5.13E-09	3.08E-09	5.13E-09	1.01E-07	5.83E-10	2.17E-07	1.03E-08	7.56E-09	2.87E-05	2.87214E-05	Res
582867.12_4130817.12	582867.12	4130817.12	1.20E-05	4.82E-09	2.89E-09	4.82E-09	9.50E-08	5.48E-10	2.04E-07	9.64E-09	7.09E-09	2.69E-05	2.70011E-05	Res
581735.72_4130901.03	581735.72	4130901.03	6.75E-04	3.50E-07	2.10E-07	3.50E-07	7.00E-06	3.92E-08	1.51E-05	7.00E-07	5.32E-07	1.99E-03	0.001952419	Res

Chronic Calculation, $\sum C_{TAC}$ /REL

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)										Total HI	Receptor Type
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Copper	Mercury	Nickel	Selenium	Chromium VI	Crystalline Silica		
581792.29_4130901.03	581792.29	4130901.03	7.21E-04	3.74E-07	2.24E-07	3.74E-07	7.48E-06	4.19E-08	1.62E-05	7.48E-07	5.68E-07	2.12E-03	0.002085582	Res
581848.86_4130901.03	581848.86	4130901.03	6.43E-04	3.33E-07	2.00E-07	3.33E-07	6.66E-06	3.73E-08	1.44E-05	6.67E-07	5.06E-07	1.89E-03	0.001858378	Res
581905.43_4130901.03	581905.43	4130901.03	3.38E-04	1.75E-07	1.05E-07	1.75E-07	3.49E-06	1.96E-08	7.54E-06	3.49E-07	2.65E-07	9.91E-04	0.000973406	Res
581962_4130901.03	581962	4130901.03	1.38E-04	7.03E-08	4.22E-08	7.03E-08	1.40E-06	7.88E-09	3.03E-06	1.41E-07	1.07E-07	3.99E-04	0.000392118	Res
582018.57_4130901.03	582018.57	4130901.03	7.46E-05	3.73E-08	2.24E-08	3.73E-08	7.45E-07	4.19E-09	1.61E-06	7.46E-08	5.65E-08	2.11E-04	0.00020821	Res
582075.14_4130901.03	582075.14	4130901.03	5.05E-05	2.48E-08	1.49E-08	2.48E-08	4.94E-07	2.78E-09	1.07E-06	4.95E-08	3.74E-08	1.40E-04	0.000138265	Res
582131.71_4130901.03	582131.71	4130901.03	3.89E-05	1.88E-08	1.13E-08	1.88E-08	3.74E-07	2.11E-09	8.08E-07	3.76E-08	2.83E-08	1.06E-04	0.00010491	Res
582188.28_4130901.03	582188.28	4130901.03	3.20E-05	1.53E-08	9.17E-09	1.53E-08	3.04E-07	1.72E-09	6.56E-07	3.06E-08	2.30E-08	8.63E-05	8.52906E-05	Res
582244.85_4130901.03	582244.85	4130901.03	2.74E-05	1.29E-08	7.74E-09	1.29E-08	2.56E-07	1.45E-09	5.53E-07	2.58E-08	1.94E-08	7.28E-05	7.19997E-05	Res
582301.42_4130901.03	582301.42	4130901.03	2.39E-05	1.11E-08	6.68E-09	1.11E-08	2.21E-07	1.25E-09	4.77E-07	2.23E-08	1.67E-08	6.28E-05	6.21869E-05	Res
582357.99_4130901.03	582357.99	4130901.03	2.13E-05	9.79E-09	5.88E-09	9.79E-09	1.95E-07	1.10E-09	4.19E-07	1.96E-08	1.47E-08	5.52E-05	5.47172E-05	Res
582414.56_4130901.03	582414.56	4130901.03	1.92E-05	8.72E-09	5.23E-09	8.72E-09	1.73E-07	9.84E-10	3.73E-07	1.74E-08	1.30E-08	4.91E-05	4.87243E-05	Res
582471.13_4130901.03	582471.13	4130901.03	1.75E-05	7.86E-09	4.72E-09	7.86E-09	1.56E-07	8.87E-10	3.36E-07	1.57E-08	1.17E-08	4.42E-05	4.39294E-05	Res
582527.7_4130901.03	582527.7	4130901.03	1.61E-05	7.14E-09	4.28E-09	7.14E-09	1.42E-07	8.07E-10	3.05E-07	1.43E-08	1.06E-08	4.02E-05	3.99202E-05	Res
582584.27_4130901.03	582584.27	4130901.03	1.50E-05	6.56E-09	3.93E-09	6.56E-09	1.30E-07	7.41E-10	2.80E-07	1.31E-08	9.76E-09	3.68E-05	3.66575E-05	Res
582640.84_4130901.03	582640.84	4130901.03	1.41E-05	6.06E-09	3.64E-09	6.06E-09	1.20E-07	6.86E-10	2.58E-07	1.21E-08	9.01E-09	3.40E-05	3.39148E-05	Res
582697.41_4130901.03	582697.41	4130901.03	1.33E-05	5.64E-09	3.38E-09	5.64E-09	1.12E-07	6.39E-10	2.40E-07	1.13E-08	8.36E-09	3.16E-05	3.15442E-05	Res
582753.98_4130901.03	582753.98	4130901.03	1.25E-05	5.27E-09	3.16E-09	5.27E-09	1.04E-07	5.97E-10	2.24E-07	1.05E-08	7.79E-09	2.95E-05	2.94626E-05	Res
582810.55_4130901.03	582810.55	4130901.03	1.19E-05	4.93E-09	2.96E-09	4.93E-09	9.73E-08	5.59E-10	2.09E-07	9.86E-09	7.28E-09	2.76E-05	2.7576E-05	Res
582867.12_4130901.03	582867.12	4130901.03	1.13E-05	4.64E-09	2.78E-09	4.64E-09	9.15E-08	5.26E-10	1.97E-07	9.27E-09	6.84E-09	2.59E-05	2.59528E-05	Res
581735.72_4130984.94	581735.72	4130984.94	1.80E-03	9.35E-07	5.61E-07	9.35E-07	1.87E-05	1.05E-07	4.04E-05	1.87E-06	1.42E-06	5.31E-03	0.005214004	Res
581792.29_4130984.94	581792.29	4130984.94	2.36E-03	1.23E-06	7.37E-07	1.23E-06	2.46E-05	1.38E-07	5.30E-05	2.46E-06	1.87E-06	6.97E-03	0.006847077	Res
581848.86_4130984.94	581848.86	4130984.94	2.74E-03	1.43E-06	8.57E-07	1.43E-06	2.86E-05	1.60E-07	6.17E-05	2.86E-06	2.17E-06	8.11E-03	0.007966776	Res
581905.43_4130984.94	581905.43	4130984.94	2.20E-04	1.13E-07	6.77E-08	1.13E-07	2.26E-06	1.27E-08	4.87E-06	2.26E-07	1.71E-07	6.41E-04	0.000629617	Res
581962_4130984.94	581962	4130984.94	9.51E-05	4.80E-08	2.88E-08	4.80E-08	9.58E-07	5.38E-09	2.07E-06	9.59E-08	7.26E-08	2.72E-04	0.000267575	Res
582018.57_4130984.94	582018.57	4130984.94	6.16E-05	3.06E-08	1.84E-08	3.06E-08	6.10E-07	3.43E-09	1.32E-06	6.12E-08	4.62E-08	1.73E-04	0.000170707	Res
582075.14_4130984.94	582075.14	4130984.94	4.57E-05	2.23E-08	1.34E-08	2.23E-08	4.45E-07	2.51E-09	9.61E-07	4.47E-08	3.37E-08	1.26E-04	0.000124706	Res
582131.71_4130984.94	582131.71	4130984.94	3.63E-05	1.75E-08	1.05E-08	1.75E-08	3.49E-07	1.97E-09	7.52E-07	3.50E-08	2.64E-08	9.90E-05	9.77373E-05	Res
582188.28_4130984.94	582188.28	4130984.94	3.00E-05	1.43E-08	8.58E-09	1.43E-08	2.85E-07	1.61E-09	6.14E-07	2.86E-08	2.15E-08	8.08E-05	7.98408E-05	Res
582244.85_4130984.94	582244.85	4130984.94	2.55E-05	1.20E-08	7.22E-09	1.20E-08	2.39E-07	1.35E-09	5.16E-07	2.41E-08	1.81E-08	6.79E-05	6.71667E-05	Res
582301.42_4130984.94	582301.42	4130984.94	2.22E-05	1.03E-08	6.21E-09	1.03E-08	2.06E-07	1.17E-09	4.44E-07	2.07E-08	1.55E-08	5.84E-05	5.7807E-05	Res
582357.99_4130984.94	582357.99	4130984.94	1.97E-05	9.07E-09	5.44E-09	9.07E-09	1.80E-07	1.02E-09	3.88E-07	1.81E-08	1.36E-08	5.11E-05	5.06731E-05	Res
582414.56_4130984.94	582414.56	4130984.94	1.77E-05	8.06E-09	4.84E-09	8.06E-09	1.60E-07	9.09E-10	3.45E-07	1.61E-08	1.21E-08	4.54E-05	4.50459E-05	Res
582471.13_4130984.94	582471.13	4130984.94	1.61E-05	7.25E-09	4.35E-09	7.25E-09	1.44E-07	8.18E-10	3.10E-07	1.45E-08	1.08E-08	4.08E-05	4.05091E-05	Res
582527.7_4130984.94	582527.7	4130984.94	1.47E-05	6.58E-09	3.95E-09	6.58E-09	1.30E-07	7.43E-10	2.81E-07	1.32E-08	9.82E-09	3.70E-05	3.67694E-05	Res
582584.27_4130984.94	582584.27	4130984.94	1.37E-05	6.04E-09	3.62E-09	6.04E-09	1.20E-07	6.82E-10	2.58E-07	1.21E-08	9.00E-09	3.40E-05	3.37634E-05	Res
582640.84_4130984.94	582640.84	4130984.94	1.28E-05	5.60E-09	3.36E-09	5.60E-09	1.11E-07	6.34E-10	2.39E-07	1.12E-08	8.34E-09	3.15E-05	3.13284E-05	Res
582697.41_4130984.94	582697.41	4130984.94	1.21E-05	5.21E-09	3.12E-09	5.21E-09	1.03E-07	5.89E-10	2.22E-07	1.04E-08	7.74E-09	2.92E-05	2.91261E-05	Res
582753.98_4130984.94	582753.98	4130984.94	1.15E-05	4.89E-09	2.93E-09	4.89E-09	9.66E-08	5.53E-10	2.08E-07	9.77E-09	7.25E-09	2.74E-05	2.73275E-05	Res
582810.55_4130984.94	582810.55	4130984.94	1.09E-05	4.59E-09	2.76E-09	4.59E-09	9.07E-08	5.20E-10	1.95E-07	9.18E-09	6.80E-09	2.57E-05	2.56908E-05	Res
582867.12_4130984.94	582867.12	4130984.94	1.04E-05	4.33E-09	2.60E-09	4.33E-09	8.55E-08	4.91E-10	1.84E-07	8.66E-09	6.40E-09	2.42E-05	2.42264E-05	Res
581735.72_4131068.85	581735.72	4131068.85	2.95E-04	1.52E-07	9.12E-08	1.52E-07	3.04E-06	1.70E-08	6.56E-06	3.04E-07	2.31E-07	8.63E-04	0.000847568	Res
581792.29_4131068.85	581792.29	4131068.85	2.36E-04	1.21E-07	7.26E-08	1.21E-07	2.42E-06	1.36E-08	5.22E-06	2.42E-07	1.84E-07	6.87E-04	0.000675172	Res
581848.86_4131068.85	581848.86	4131068.85	1.28E-04	6.48E-08	3.89E-08	6.48E-08	1.29E-06	7.26E-09	2.79E-06	1.30E-07	9.81E-08	3.67E-04	0.00036123	Res
581905.43_4131068.85	581905.43	4131068.85	8.17E-05	4.09E-08	2.46E-08	4.09E-08	8.17E-07	4.60E-09	1.76E-06	8.19E-08	6.20E-08	2.32E-04	0.000228457	Res
581962_4131068.85	581962	4131068.85	5.95E-05	2.94E-08	1.77E-08	2.94E-08	5.87E-07	3.31E-09	1.27E-06	5.89E-08	4.45E-08	1.67E-04	0.000164289	Res
582018.57_4131068.85	582018.57	4131068.85	4.53E-05	2.21E-08	1.33E-08	2.21E-08	4.41E-07	2.49E-09	9.52E-07	4.43E-08	3.34E-08	1.25E-04	0.000123512	Res
582075.14_4131068.85	582075.14	4131068.85	3.61E-05	1.74E-08	1.04E-08	1.74E-08	3.47E-07	1.96E-09	7.48E-07	3.48E-08	2.62E-08	9.84E-05	9.71342E-05	Res
582131.71_4131068.85	582131.71	4131068.85	2.99E-05	1.42E-08	8.53E-09	1.42E-08	2.83E-07	1.60E-09	6.10E-07	2.84E-08	2.14E-08	8.03E-05	7.9379E-05	Res

Chronic Calculation, $\sum C_{TAC}$ /REL

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)										Total HI	Receptor Type
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Copper	Mercury	Nickel	Selenium	Chromium VI	Crystalline Silica		
582188.28_4131068.85	582188.28	4131068.85	2.53E-05	1.19E-08	7.14E-09	1.19E-08	2.37E-07	1.34E-09	5.11E-07	2.38E-08	1.79E-08	6.72E-05	6.64944E-05	Res
582244.85_4131068.85	582244.85	4131068.85	2.20E-05	1.02E-08	6.12E-09	1.02E-08	2.03E-07	1.15E-09	4.37E-07	2.04E-08	1.53E-08	5.76E-05	5.70062E-05	Res
582301.42_4131068.85	582301.42	4131068.85	1.93E-05	8.90E-09	5.34E-09	8.90E-09	1.77E-07	1.00E-09	3.81E-07	1.78E-08	1.33E-08	5.02E-05	4.96959E-05	Res
582357.99_4131068.85	582357.99	4131068.85	1.73E-05	7.86E-09	4.72E-09	7.86E-09	1.56E-07	8.87E-10	3.36E-07	1.57E-08	1.18E-08	4.43E-05	4.39241E-05	Res
582414.56_4131068.85	582414.56	4131068.85	1.56E-05	7.04E-09	4.22E-09	7.04E-09	1.40E-07	7.95E-10	3.01E-07	1.41E-08	1.05E-08	3.97E-05	3.93493E-05	Res
582471.13_4131068.85	582471.13	4131068.85	1.42E-05	6.37E-09	3.82E-09	6.37E-09	1.26E-07	7.19E-10	2.72E-07	1.27E-08	9.51E-09	3.58E-05	3.55998E-05	Res
582527.7_4131068.85	582527.7	4131068.85	1.31E-05	5.81E-09	3.49E-09	5.81E-09	1.15E-07	6.56E-10	2.48E-07	1.16E-08	8.66E-09	3.27E-05	3.24757E-05	Res
582584.27_4131068.85	582584.27	4131068.85	1.21E-05	5.33E-09	3.20E-09	5.33E-09	1.06E-07	6.02E-10	2.27E-07	1.07E-08	7.93E-09	3.00E-05	2.97864E-05	Res
582640.84_4131068.85	582640.84	4131068.85	1.14E-05	4.98E-09	2.99E-09	4.98E-09	9.86E-08	5.63E-10	2.12E-07	9.95E-09	7.40E-09	2.80E-05	2.78264E-05	Res
582697.41_4131068.85	582697.41	4131068.85	1.08E-05	4.66E-09	2.79E-09	4.66E-09	9.22E-08	5.27E-10	1.98E-07	9.31E-09	6.92E-09	2.62E-05	2.60415E-05	Res
582753.98_4131068.85	582753.98	4131068.85	1.03E-05	4.40E-09	2.64E-09	4.40E-09	8.70E-08	4.98E-10	1.87E-07	8.80E-09	6.53E-09	2.47E-05	2.46033E-05	Res
582810.55_4131068.85	582810.55	4131068.85	9.82E-06	4.17E-09	2.50E-09	4.17E-09	8.24E-08	4.72E-10	1.77E-07	8.34E-09	6.18E-09	2.34E-05	2.33244E-05	Res
582867.12_4131068.85	582867.12	4131068.85	9.35E-06	3.93E-09	2.36E-09	3.93E-09	7.76E-08	4.45E-10	1.67E-07	7.86E-09	5.82E-09	2.20E-05	2.1982E-05	Res
582018.57_4131152.76	582018.57	4131152.76	3.07E-05	1.45E-08	8.72E-09	1.45E-08	2.89E-07	1.64E-09	6.24E-07	2.91E-08	2.19E-08	8.21E-05	8.11949E-05	Res
582244.85_4131152.76	582244.85	4131152.76	1.87E-05	8.51E-09	5.11E-09	8.51E-09	1.69E-07	9.60E-10	3.64E-07	1.70E-08	1.27E-08	4.80E-05	4.7574E-05	Res
582301.42_4131152.76	582301.42	4131152.76	1.68E-05	7.61E-09	4.57E-09	7.61E-09	1.51E-07	8.59E-10	3.25E-07	1.52E-08	1.14E-08	4.29E-05	4.25198E-05	Res
582357.99_4131152.76	582357.99	4131152.76	1.52E-05	6.82E-09	4.09E-09	6.82E-09	1.35E-07	7.70E-10	2.91E-07	1.36E-08	1.02E-08	3.84E-05	3.80974E-05	Res
582414.56_4131152.76	582414.56	4131152.76	1.39E-05	6.16E-09	3.70E-09	6.16E-09	1.22E-07	6.96E-10	2.63E-07	1.23E-08	9.19E-09	3.47E-05	3.44498E-05	Res
582471.13_4131152.76	582471.13	4131152.76	1.26E-05	5.55E-09	3.33E-09	5.55E-09	1.10E-07	6.27E-10	2.37E-07	1.11E-08	8.27E-09	3.12E-05	3.10276E-05	Res
582527.7_4131152.76	582527.7	4131152.76	1.16E-05	5.07E-09	3.04E-09	5.07E-09	1.00E-07	5.73E-10	2.16E-07	1.01E-08	7.54E-09	2.85E-05	2.83227E-05	Res
582584.27_4131152.76	582584.27	4131152.76	1.07E-05	4.65E-09	2.79E-09	4.65E-09	9.21E-08	5.26E-10	1.98E-07	9.31E-09	6.92E-09	2.61E-05	2.60166E-05	Res
582640.84_4131152.76	582640.84	4131152.76	1.00E-05	4.32E-09	2.59E-09	4.32E-09	8.55E-08	4.89E-10	1.84E-07	8.64E-09	6.42E-09	2.43E-05	2.41703E-05	Res
582697.41_4131152.76	582697.41	4131152.76	9.45E-06	4.04E-09	2.43E-09	4.04E-09	7.99E-08	4.58E-10	1.72E-07	8.08E-09	6.00E-09	2.27E-05	2.2606E-05	Res
582753.98_4131152.76	582753.98	4131152.76	9.02E-06	3.84E-09	2.30E-09	3.84E-09	7.58E-08	4.34E-10	1.63E-07	7.67E-09	5.69E-09	2.15E-05	2.14527E-05	Res
582810.55_4131152.76	582810.55	4131152.76	8.62E-06	3.64E-09	2.19E-09	3.64E-09	7.20E-08	4.13E-10	1.55E-07	7.29E-09	5.40E-09	2.04E-05	2.03815E-05	Res
582867.12_4131152.76	582867.12	4131152.76	8.20E-06	3.44E-09	2.06E-09	3.44E-09	6.79E-08	3.90E-10	1.46E-07	6.88E-09	5.09E-09	1.93E-05	1.9242E-05	Res

HRA Permanente Creek Restoration Project

Construction Year 2027

Emissions Inputs

Construction Activity	Construction Year & Source	DPM Exhaust (tons/year)	PM10 Dust for speciation (tons/year)	Arsenic (tons/year)	Beryllium (tons/year)	Cadmium (tons/year)	Cobalt (tons/year)	Copper (tons/year)	Lead (tons/year)	Mercury (tons/year)	Nickel (tons/year)	Selenium (tons/year)	Chromium VI (tons/year)	Crystalline Silica (tons/year)
Concrete Channel 2024	2024_CONCRTE	0.000	0.00	2.91E-12	1.74E-12	2.91E-12	1.49E-11	3.26E-11	2.91E-12	4.65E-13	5.35E-11	5.81E-12	2.33E-13	8.63E-09
Paved road	2024_PAVED	2.07E-04	0.08	1.04E-07	6.26E-08	1.04E-07	6.68E-08	2.09E-06	1.92E-07	1.17E-08	4.51E-06	2.09E-07	1.59E-07	5.93E-04
Unpaved road	2024_CCP_UNPV	6.27E-05	0.20	2.56E-07	1.54E-07	2.56E-07	1.64E-07	5.12E-06	4.71E-07	2.87E-08	1.11E-05	5.12E-07	3.89E-07	1.46E-03
Channel Widening 2024	2024_CHAN_RCK	0.002	0.16	2.05E-07	1.23E-07	2.05E-07	1.05E-06	2.29E-06	2.05E-07	3.28E-08	3.77E-06	4.09E-07	1.64E-08	6.08E-04
Paved road	2024_PAVED	1.80E-03	2.39	2.99E-06	1.79E-06	2.99E-06	1.91E-06	5.98E-05	5.50E-06	3.35E-07	1.29E-04	5.98E-06	4.54E-06	1.70E-02
Rock Pile Area 2025	2025_CHAN_RCK	0.006	0.25	3.16E-07	1.89E-07	3.16E-07	1.62E-06	3.54E-06	3.16E-07	5.05E-08	5.81E-06	6.31E-07	2.53E-08	9.37E-04
Paved road	2025_PAVED	5.95E-03	2.44	3.05E-06	1.83E-06	3.05E-06	1.95E-06	6.10E-05	5.61E-06	3.41E-07	1.32E-04	6.10E-06	4.63E-06	1.73E-02
Rock Pile Area 2026	2026_CHAN_RCK	0.006	0.25	3.16E-07	1.89E-07	3.16E-07	1.62E-06	3.54E-06	3.16E-07	5.05E-08	5.81E-06	6.31E-07	2.53E-08	9.37E-04
Paved road	2026_PAVED	5.84E-03	2.44	3.05E-06	1.83E-06	3.05E-06	1.95E-06	6.10E-05	5.61E-06	3.41E-07	1.32E-04	6.10E-06	4.63E-06	1.73E-02
Channel Widening 2027	2027_CHAN_RCK	0.002	0.98	1.23E-06	7.36E-07	1.23E-06	6.28E-06	1.37E-05	1.23E-06	1.96E-07	2.26E-05	2.45E-06	9.82E-08	3.64E-03
Paved road	2027_PAVED	5.61E-03	2.39	2.99E-06	1.79E-06	2.99E-06	1.91E-06	5.98E-05	5.50E-06	3.35E-07	1.29E-04	5.98E-06	4.54E-06	1.70E-02
Material Removal 2028	2028_MATRMVL	0.001	0.25	3.15E-07	1.89E-07	3.15E-07	1.62E-06	3.53E-06	3.15E-07	5.05E-08	5.80E-06	6.31E-07	2.52E-08	9.37E-04
Paved road	2028_PAVED	5.57E-03	2.39	2.99E-06	1.80E-06	2.99E-06	1.92E-06	5.98E-05	5.51E-06	3.35E-07	1.29E-04	5.98E-06	4.55E-06	1.70E-02
Unpaved road	2028_UNPAVED	3.40E-03	11.84	1.48E-05	8.88E-06	1.48E-05	9.47E-06	2.96E-04	2.72E-05	1.66E-06	6.40E-04	2.96E-05	2.25E-05	8.41E-02
Material Removal 2029	2029_MATRMVL	0.001	0.25	3.15E-07	1.89E-07	3.15E-07	1.62E-06	3.53E-06	3.15E-07	5.05E-08	5.80E-06	6.31E-07	2.52E-08	9.37E-04
Paved road	2029_PAVED	5.56E-03	2.41	3.01E-06	1.81E-06	3.01E-06	1.93E-06	6.03E-05	5.55E-06	3.38E-07	1.30E-04	6.03E-06	4.58E-06	1.71E-02
Unpaved road	2029_UNPAVED	3.39E-03	11.93	1.49E-05	8.95E-06	1.49E-05	9.55E-06	2.98E-04	2.74E-05	1.67E-06	6.44E-04	2.98E-05	2.27E-05	8.47E-02

Construction Activity	Construction Year	DPM (g/s)	Arsenic (g/s)	Beryllium (g/s)	Cadmium (g/s)	Cobalt (g/s)	Copper (g/s)	Lead (g/s)	Mercury (g/s)	Nickel (g/s)	Selenium (g/s)	Chromium VI (g/s)	Crystalline Silica (g/s)
Concrete Channel 2024	2024_CONCRTE	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Paved road	2024_PAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Unpaved road	2024_CCP_UNPV	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Channel Widening 2024	2024_CHAN_RCK	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Paved road	2024_PAVED	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Rock Pile Area 2025	2025_CHAN_RCK	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Paved road	2025_PAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Rock Pile Area 2026	2026_CHAN_RCK	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Paved road	2026_PAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Channel Widening 2027	2027_CHAN_RCK	5.566E-05	3.53E-08	2.12E-08	3.53E-08	1.81E-07	3.95E-07	3.53E-08	5.65E-09	6.49E-07	7.06E-08	2.82E-09	1.05E-04
Paved road	2027_PAVED	1.614E-04	8.60E-08	5.16E-08	8.60E-08	5.50E-08	1.72E-06	1.58E-07	9.63E-09	3.71E-06	1.72E-07	1.31E-07	4.88E-04
Material Removal 2028	2028_MATRMVL	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Paved road	2028_PAVED	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Unpaved road	2028_UNPAVED	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Material Removal 2029	2029_MATRMVL	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Paved road	2029_PAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Unpaved road	2029_UNPAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

N/A = not including PM10 on-site dust in HRA calculation; it is only for speciating metals.

Chronic REL

TAC	UOM	
DPM	µg/m^3	5
Arsenic	µg/m^3	0.015
Beryllium	µg/m^3	0.007
Cadmium	µg/m^3	0.02
Copper	µg/m^3	100
Mercury	µg/m^3	0.032
Nickel	µg/m^3	0.014
Selenium	µg/m^3	20
Chromium VI	µg/m^3	0.2
Crystalline Silica	µg/m^3	3

	Max
CT House	0.001
Res	0.008

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} (µg/m^3)										Chronic Calculation, $\sum C_{TAC}$ /REL	
													Total HI	Receptor Type
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Copper	Mercury	Nickel	Selenium	Chromium VI	Crystalline Silica		
			5	0.015	0.007	0.02	100	0.032	0.014	20	0.2	3		
581336.22_4131207.48	581336.22	4131207.48	1.86E-04	9.94E-08	5.96E-08	9.94E-08	1.98E-06	1.12E-08	4.28E-06	1.99E-07	1.50E-07	5.62E-04	0.00055138	CT House
581554.22_4130688.06	581554.22	4130688.06	1.25E-04	6.68E-08	4.01E-08	6.68E-08	1.32E-06	7.55E-09	2.85E-06	1.34E-07	9.93E-08	3.75E-04	0.000367763	Res
579793.36_4131503.29	579793.36	4131503.29	8.15E-06	4.54E-09	2.72E-09	4.54E-09	7.99E-08	5.67E-10	1.65E-07	9.07E-09	5.12E-09	2.24E-05	2.18837E-05	Acute
580488.37_4131517.71	580488.37	4131517.71	1.28E-05	6.94E-09	4.17E-09	6.94E-09	1.33E-07	8.12E-10	2.82E-07	1.39E-08	9.53E-09	3.75E-05	3.67147E-05	Acute
581678.43_4131040.03	581678.43	4131040.03	5.96E-04	3.17E-07	1.90E-07	3.17E-07	6.34E-06	3.56E-08	1.37E-05	6.35E-07	4.81E-07	1.80E-03	0.001764469	Res
581635.43_4130978.54	581635.43	4130978.54	1.21E-03	6.43E-07	3.86E-07	6.43E-07	1.28E-05	7.20E-08	2.77E-05	1.29E-06	9.76E-07	3.65E-03	0.003576516	Res
581830.06_4131027.55	581830.06	4131027.55	5.48E-04	2.92E-07	1.75E-07	2.92E-07	5.84E-06	3.28E-08	1.26E-05	5.85E-07	4.43E-07	1.66E-03	0.001625216	Res
581727.48_4130976.54	581727.48	4130976.54	1.46E-03	7.78E-07	4.67E-07	7.78E-07	1.56E-05	8.72E-08	3.36E-05	1.56E-06	1.18E-06	4.42E-03	0.004330893	Res
581789.11_4130419.65	581789.11	4130419.65	9.49E-05	5.09E-08	3.05E-08	5.09E-08	1.00E-06	5.79E-09	2.15E-06	1.02E-07	7.45E-08	2.84E-04	0.000277885	Res
581700.32_4130781.89	581700.32	4130781.89	2.89E-04	1.54E-07	9.24E-08	1.54E-07	3.07E-06	1.73E-08	6.62E-06	3.08E-07	2.32E-07	8.72E-04	0.000854354	Res
581426.07_4131299.01	581426.07	4131299.01	6.68E-05	3.57E-08	2.14E-08	3.57E-08	7.08E-07	4.03E-09	1.52E-06	7.13E-08	5.33E-08	2.01E-04	0.00019682	Acute
582301.42_4129474.56	582301.42	4129474.56	3.05E-05	1.65E-08	9.91E-09	1.65E-08	3.15E-07	1.94E-09	6.69E-07	3.30E-08	2.25E-08	8.90E-05	8.70881E-05	Res
582357.99_4129474.56	582357.99	4129474.56	2.85E-05	1.54E-08	9.27E-09	1.54E-08	2.94E-07	1.81E-09	6.25E-07	3.09E-08	2.10E-08	8.31E-05	8.13394E-05	Res
582414.56_4129474.56	582414.56	4129474.56	2.67E-05	1.45E-08	8.68E-09	1.45E-08	2.75E-07	1.70E-09	5.85E-07	2.89E-08	1.97E-08	7.78E-05	7.61347E-05	Res
582471.13_4129474.56	582471.13	4129474.56	2.50E-05	1.36E-08	8.15E-09	1.36E-08	2.58E-07	1.59E-09	5.49E-07	2.72E-08	1.84E-08	7.30E-05	7.1436E-05	Res
582527.7_4129474.56	582527.7	4129474.56	2.36E-05	1.28E-08	7.69E-09	1.28E-08	2.44E-07	1.51E-09	5.18E-07	2.56E-08	1.74E-08	6.89E-05	6.74019E-05	Res
582584.27_4129474.56	582584.27	4129474.56	2.22E-05	1.21E-08	7.23E-09	1.21E-08	2.29E-07	1.42E-09	4.86E-07	2.41E-08	1.63E-08	6.47E-05	6.33198E-05	Res
582640.84_4129474.56	582640.84	4129474.56	2.07E-05	1.12E-08	6.75E-09	1.12E-08	2.13E-07	1.32E-09	4.53E-07	2.25E-08	1.52E-08	6.03E-05	5.89722E-05	Res
582244.85_4129558.47	582244.85	4129558.47	3.11E-05	1.69E-08	1.01E-08	1.69E-08	3.20E-07	1.99E-09	6.80E-07	3.38E-08	2.27E-08	9.05E-05	8.85352E-05	Res
582301.42_4129558.47	582301.42	4129558.47	3.07E-05	1.67E-08	9.99E-09	1.67E-08	3.17E-07	1.96E-09	6.73E-07	3.33E-08	2.26E-08	8.95E-05	8.76145E-05	Res
582357.99_4129558.47	582357.99	4129558.47	2.91E-05	1.58E-08	9.46E-09	1.58E-08	3.00E-07	1.85E-09	6.38E-07	3.15E-08	2.15E-08	8.48E-05	8.30411E-05	Res
582414.56_4129558.47	582414.56	4129558.47	2.73E-05	1.48E-08	8.87E-09	1.48E-08	2.81E-07	1.74E-09	5.98E-07	2.96E-08	2.01E-08	7.96E-05	7.78593E-05	Res
582471.13_4129558.47	582471.13	4129558.47	2.55E-05	1.38E-08	8.30E-09	1.38E-08	2.63E-07	1.62E-09	5.59E-07	2.77E-08	1.88E-08	7.44E-05	7.27846E-05	Res
582527.7_4129558.47	582527.7	4129558.47	2.39E-05	1.29E-08	7.76E-09	1.29E-08	2.46E-07	1.52E-09	5.23E-07	2.59E-08	1.76E-08	6.95E-05	6.80462E-05	Res
582584.27_4129558.47	582584.27	4129558.47	2.23E-05	1.21E-08	7.26E-09	1.21E-08	2.30E-07	1.42E-09	4.88E-07	2.42E-08	1.64E-08	6.49E-05	6.35603E-05	Res
582640.84_4129558.47	582640.84	4129558.47	2.10E-05	1.14E-08	6.84E-09	1.14E-08	2.16E-07	1.34E-09	4.59E-07	2.28E-08	1.54E-08	6.11E-05	5.97936E-05	Res
582697.41_4129558.47	582697.41	4129558.47	1.97E-05	1.07E-08	6.43E-09	1.07E-08	2.03E-07	1.26E-09	4.31E-07	2.14E-08	1.45E-08	5.74E-05	5.61842E-05	Res
582244.85_4129642.38	582244.85	4129642.38	2.77E-05	1.51E-08	9.05E-09	1.51E-08	2.83E-07	1.79E-09	5.98E-07	3.02E-08	1.98E-08	7.98E-05	7.80518E-05	Res
582301.42_4129642.38	582301.42	4129642.38	3.01E-05	1.63E-08	9.79E-09	1.63E-08	3.09E-07	1.92E-09	6.57E-07	3.26E-08	2.20E-08	8.74E-05	8.55367E-05	Res
582357.99_4129642.38	582357.99	4129642.38	2.96E-05	1.60E-08	9.62E-09	1.60E-08	3.05E-07	1.88E-09	6.49E-07	3.21E-08	2.18E-08	8.63E-05	8.4424E-05	Res
582414.56_4129642.38	582414.56	4129642.38	2.79E-05	1.51E-08	9.07E-09	1.51E-08	2.88E-07	1.77E-09	6.12E-07	3.02E-08	2.06E-08	8.14E-05	7.96606E-05	Res
582471.13_4129642.38	582471.13	4129642.38	2.61E-05	1.42E-08	8.50E-09	1.42E-08	2.70E-07	1.66E-09	5.74E-07	2.83E-08	1.93E-08	7.63E-05	7.4697E-05	Res
582527.7_4129642.38	582527.7	4129642.38	2.46E-05	1.33E-08	7.99E-09	1.33E-08	2.53E-07	1.56E-09	5.39E-07	2.66E-08	1.81E-08	7.17E-05	7.01344E-05	Res
582584.27_4129642.38	582584.27	4129642.38	2.28E-05	1.24E-08	7.43E-09	1.24E-08	2.36E-07	1.45E-09	5.01E-07	2.48E-08	1.68E-08	6.66E-05	6.5177E-05	Res

Chronic Calculation, $\sum C_{TAC}$ /REL

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)										Total HI	Receptor Type
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Copper	Mercury	Nickel	Selenium	Chromium VI	Crystalline Silica		
582640.84_4129642.38	582640.84	4129642.38	2.14E-05	1.16E-08	6.95E-09	1.16E-08	2.20E-07	1.36E-09	4.68E-07	2.32E-08	1.57E-08	6.22E-05	6.0887E-05	Res
582697.41_4129642.38	582697.41	4129642.38	2.00E-05	1.09E-08	6.51E-09	1.09E-08	2.06E-07	1.28E-09	4.37E-07	2.17E-08	1.47E-08	5.82E-05	5.69655E-05	Res
582753.98_4129642.38	582753.98	4129642.38	1.87E-05	1.01E-08	6.09E-09	1.01E-08	1.92E-07	1.19E-09	4.08E-07	2.03E-08	1.37E-08	5.43E-05	5.31604E-05	Res
582810.55_4129642.38	582810.55	4129642.38	1.75E-05	9.51E-09	5.70E-09	9.51E-09	1.80E-07	1.12E-09	3.82E-07	1.90E-08	1.28E-08	5.08E-05	4.97457E-05	Res
582867.12_4129642.38	582867.12	4129642.38	1.62E-05	8.82E-09	5.29E-09	8.82E-09	1.67E-07	1.04E-09	3.53E-07	1.76E-08	1.18E-08	4.71E-05	4.6039E-05	Res
582244.85_4129726.29	582244.85	4129726.29	3.02E-05	1.64E-08	9.85E-09	1.64E-08	3.10E-07	1.94E-09	6.57E-07	3.28E-08	2.19E-08	8.75E-05	8.56098E-05	Res
582301.42_4129726.29	582301.42	4129726.29	2.93E-05	1.59E-08	9.56E-09	1.59E-08	3.01E-07	1.88E-09	6.40E-07	3.19E-08	2.14E-08	8.52E-05	8.33378E-05	Res
582357.99_4129726.29	582357.99	4129726.29	2.98E-05	1.61E-08	9.68E-09	1.61E-08	3.07E-07	1.89E-09	6.53E-07	3.23E-08	2.20E-08	8.69E-05	8.50031E-05	Res
582414.56_4129726.29	582414.56	4129726.29	2.84E-05	1.54E-08	9.23E-09	1.54E-08	2.93E-07	1.80E-09	6.24E-07	3.08E-08	2.10E-08	8.29E-05	8.11747E-05	Res
582471.13_4129726.29	582471.13	4129726.29	2.68E-05	1.45E-08	8.70E-09	1.45E-08	2.77E-07	1.70E-09	5.88E-07	2.90E-08	1.98E-08	7.82E-05	7.65386E-05	Res
582527.7_4129726.29	582527.7	4129726.29	2.52E-05	1.36E-08	8.18E-09	1.36E-08	2.60E-07	1.60E-09	5.53E-07	2.73E-08	1.86E-08	7.35E-05	7.19243E-05	Res
582584.27_4129726.29	582584.27	4129726.29	2.35E-05	1.28E-08	7.66E-09	1.28E-08	2.43E-07	1.50E-09	5.17E-07	2.55E-08	1.74E-08	6.88E-05	6.73002E-05	Res
582640.84_4129726.29	582640.84	4129726.29	2.20E-05	1.19E-08	7.15E-09	1.19E-08	2.27E-07	1.40E-09	4.82E-07	2.38E-08	1.62E-08	6.41E-05	6.27537E-05	Res
582697.41_4129726.29	582697.41	4129726.29	2.03E-05	1.10E-08	6.62E-09	1.10E-08	2.10E-07	1.30E-09	4.45E-07	2.21E-08	1.50E-08	5.93E-05	5.79867E-05	Res
582753.98_4129726.29	582753.98	4129726.29	1.87E-05	1.02E-08	6.10E-09	1.02E-08	1.93E-07	1.20E-09	4.09E-07	2.03E-08	1.37E-08	5.45E-05	5.32833E-05	Res
582810.55_4129726.29	582810.55	4129726.29	1.70E-05	9.26E-09	5.56E-09	9.26E-09	1.75E-07	1.09E-09	3.72E-07	1.85E-08	1.24E-08	4.95E-05	4.84314E-05	Res
582244.85_4129810.2	582244.85	4129810.2	2.94E-05	1.60E-08	9.59E-09	1.60E-08	3.01E-07	1.89E-09	6.39E-07	3.20E-08	2.13E-08	8.51E-05	8.32901E-05	Res
582301.42_4129810.2	582301.42	4129810.2	2.97E-05	1.61E-08	9.66E-09	1.61E-08	3.05E-07	1.90E-09	6.49E-07	3.22E-08	2.17E-08	8.63E-05	8.44579E-05	Res
582357.99_4129810.2	582357.99	4129810.2	2.94E-05	1.59E-08	9.55E-09	1.59E-08	3.03E-07	1.87E-09	6.45E-07	3.18E-08	2.17E-08	8.57E-05	8.38865E-05	Res
582414.56_4129810.2	582414.56	4129810.2	2.86E-05	1.55E-08	9.28E-09	1.55E-08	2.95E-07	1.81E-09	6.29E-07	3.09E-08	2.12E-08	8.35E-05	8.17453E-05	Res
582471.13_4129810.2	582471.13	4129810.2	2.72E-05	1.47E-08	8.85E-09	1.47E-08	2.82E-07	1.72E-09	6.00E-07	2.95E-08	2.03E-08	7.97E-05	7.79924E-05	Res
582527.7_4129810.2	582527.7	4129810.2	2.55E-05	1.38E-08	8.29E-09	1.38E-08	2.64E-07	1.62E-09	5.62E-07	2.76E-08	1.90E-08	7.46E-05	7.30626E-05	Res
582584.27_4129810.2	582584.27	4129810.2	2.38E-05	1.29E-08	7.72E-09	1.29E-08	2.46E-07	1.51E-09	5.22E-07	2.57E-08	1.76E-08	6.94E-05	6.79598E-05	Res
582640.84_4129810.2	582640.84	4129810.2	2.17E-05	1.18E-08	7.07E-09	1.18E-08	2.24E-07	1.38E-09	4.77E-07	2.36E-08	1.61E-08	6.34E-05	6.20582E-05	Res
582697.41_4129810.2	582697.41	4129810.2	1.99E-05	1.08E-08	6.47E-09	1.08E-08	2.05E-07	1.27E-09	4.36E-07	2.16E-08	1.46E-08	5.80E-05	5.6732E-05	Res
581905.43_4129894.11	581905.43	4129894.11	3.75E-05	2.03E-08	1.22E-08	2.03E-08	3.89E-07	2.36E-09	8.30E-07	4.05E-08	2.82E-08	1.10E-04	0.000107822	Res
581962_4129894.11	581962	4129894.11	3.85E-05	2.09E-08	1.25E-08	2.09E-08	3.97E-07	2.46E-09	8.43E-07	4.18E-08	2.83E-08	1.12E-04	0.000109754	Res
582131.71_4129894.11	582131.71	4129894.11	3.37E-05	1.83E-08	1.10E-08	1.83E-08	3.47E-07	2.17E-09	7.35E-07	3.67E-08	2.45E-08	9.79E-05	9.57978E-05	Res
582188.28_4129894.11	582188.28	4129894.11	3.24E-05	1.76E-08	1.06E-08	1.76E-08	3.33E-07	2.07E-09	7.07E-07	3.52E-08	2.37E-08	9.41E-05	9.2116E-05	Res
582244.85_4129894.11	582244.85	4129894.11	3.16E-05	1.72E-08	1.03E-08	1.72E-08	3.26E-07	2.02E-09	6.93E-07	3.43E-08	2.33E-08	9.21E-05	9.01726E-05	Res
582301.42_4129894.11	582301.42	4129894.11	3.05E-05	1.65E-08	9.92E-09	1.65E-08	3.15E-07	1.94E-09	6.69E-07	3.31E-08	2.25E-08	8.89E-05	8.70493E-05	Res
582357.99_4129894.11	582357.99	4129894.11	2.91E-05	1.58E-08	9.45E-09	1.58E-08	3.00E-07	1.85E-09	6.38E-07	3.15E-08	2.15E-08	8.49E-05	8.30622E-05	Res
582414.56_4129894.11	582414.56	4129894.11	2.94E-05	1.59E-08	9.54E-09	1.59E-08	3.05E-07	1.85E-09	6.49E-07	3.18E-08	2.20E-08	8.62E-05	8.43547E-05	Res
582471.13_4129894.11	582471.13	4129894.11	2.75E-05	1.49E-08	8.93E-09	1.49E-08	2.85E-07	1.74E-09	6.07E-07	2.98E-08	2.06E-08	8.07E-05	7.89495E-05	Res
582527.7_4129894.11	582527.7	4129894.11	2.53E-05	1.37E-08	8.23E-09	1.37E-08	2.62E-07	1.60E-09	5.59E-07	2.74E-08	1.89E-08	7.42E-05	7.26232E-05	Res
582584.27_4129894.11	582584.27	4129894.11	2.32E-05	1.26E-08	7.54E-09	1.26E-08	2.40E-07	1.47E-09	5.10E-07	2.51E-08	1.72E-08	6.78E-05	6.63773E-05	Res
582640.84_4129894.11	582640.84	4129894.11	2.12E-05	1.15E-08	6.88E-09	1.15E-08	2.18E-07	1.34E-09	4.65E-07	2.29E-08	1.56E-08	6.18E-05	6.04412E-05	Res
582697.41_4129894.11	582697.41	4129894.11	1.93E-05	1.04E-08	6.27E-09	1.04E-08	1.99E-07	1.23E-09	4.22E-07	2.09E-08	1.42E-08	5.61E-05	5.4924E-05	Res
581962_4129978.02	581962	4129978.02	4.01E-05	2.17E-08	1.30E-08	2.17E-08	4.13E-07	2.55E-09	8.79E-07	4.34E-08	2.95E-08	1.17E-04	0.000114352	Res
582018.57_4129978.02	582018.57	4129978.02	3.79E-05	2.06E-08	1.23E-08	2.06E-08	3.90E-07	2.42E-09	8.28E-07	4.12E-08	2.78E-08	1.10E-04	0.00010787	Res
582075.14_4129978.02	582075.14	4129978.02	3.90E-05	2.11E-08	1.27E-08	2.11E-08	4.02E-07	2.48E-09	8.56E-07	4.23E-08	2.88E-08	1.14E-04	0.000111365	Res
582131.71_4129978.02	582131.71	4129978.02	3.88E-05	2.10E-08	1.26E-08	2.10E-08	4.01E-07	2.45E-09	8.55E-07	4.20E-08	2.89E-08	1.14E-04	0.000111107	Res
582188.28_4129978.02	582188.28	4129978.02	3.86E-05	2.09E-08	1.25E-08	2.09E-08	4.01E-07	2.43E-09	8.54E-07	4.17E-08	2.90E-08	1.13E-04	0.000110952	Res
582244.85_4129978.02	582244.85	4129978.02	3.49E-05	1.89E-08	1.13E-08	1.89E-08	3.62E-07	2.20E-09	7.71E-07	3.77E-08	2.61E-08	1.02E-04	0.000100142	Res
582301.42_4129978.02	582301.42	4129978.02	3.44E-05	1.86E-08	1.11E-08	1.86E-08	3.57E-07	2.16E-09	7.61E-07	3.71E-08	2.59E-08	1.01E-04	9.88694E-05	Res
582357.99_4129978.02	582357.99	4129978.02	3.25E-05	1.75E-08	1.05E-08	1.75E-08	3.37E-07	2.04E-09	7.20E-07	3.51E-08	2.45E-08	9.54E-05	9.34348E-05	Res
582414.56_4129978.02	582414.56	4129978.02	3.00E-05	1.62E-08	9.73E-09	1.62E-08	3.12E-07	1.88E-09	6.65E-07	3.24E-08	2.26E-08	8.82E-05	8.63097E-05	Res

Chronic Calculation, $\sum C_{TAC}$ /REL

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)										Total HI	Receptor Type
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Copper	Mercury	Nickel	Selenium	Chromium VI	Crystalline Silica		
582471.13_4129978.02	582471.13	4129978.02	2.75E-05	1.48E-08	8.91E-09	1.48E-08	2.85E-07	1.73E-09	6.08E-07	2.97E-08	2.06E-08	8.06E-05	7.893E-05	Res
582527.7_4129978.02	582527.7	4129978.02	2.50E-05	1.35E-08	8.11E-09	1.35E-08	2.59E-07	1.58E-09	5.52E-07	2.70E-08	1.87E-08	7.33E-05	7.17056E-05	Res
582584.27_4129978.02	582584.27	4129978.02	2.27E-05	1.23E-08	7.37E-09	1.23E-08	2.35E-07	1.44E-09	5.00E-07	2.46E-08	1.69E-08	6.64E-05	6.50045E-05	Res
582640.84_4129978.02	582640.84	4129978.02	2.06E-05	1.12E-08	6.71E-09	1.12E-08	2.13E-07	1.31E-09	4.53E-07	2.24E-08	1.53E-08	6.03E-05	5.89839E-05	Res
582697.41_4129978.02	582697.41	4129978.02	1.87E-05	1.02E-08	6.10E-09	1.02E-08	1.93E-07	1.19E-09	4.11E-07	2.03E-08	1.38E-08	5.46E-05	5.34509E-05	Res
582753.98_4129978.02	582753.98	4129978.02	1.69E-05	9.16E-09	5.50E-09	9.16E-09	1.74E-07	1.08E-09	3.69E-07	1.83E-08	1.24E-08	4.91E-05	4.80348E-05	Res
582810.55_4129978.02	582810.55	4129978.02	1.49E-05	8.09E-09	4.85E-09	8.09E-09	1.53E-07	9.55E-10	3.24E-07	1.62E-08	1.08E-08	4.31E-05	4.21827E-05	Res
581905.43_4130061.93	581905.43	4130061.93	5.73E-05	3.09E-08	1.85E-08	3.09E-08	5.97E-07	3.58E-09	1.27E-06	6.18E-08	4.34E-08	1.69E-04	0.000165384	Res
581962_4130061.93	581962	4130061.93	5.40E-05	2.91E-08	1.75E-08	2.91E-08	5.62E-07	3.37E-09	1.20E-06	5.82E-08	4.10E-08	1.59E-04	0.000155856	Res
582018.57_4130061.93	582018.57	4130061.93	4.60E-05	2.49E-08	1.49E-08	2.49E-08	4.78E-07	2.89E-09	1.02E-06	4.97E-08	3.46E-08	1.35E-04	0.00013238	Res
582075.14_4130061.93	582075.14	4130061.93	4.11E-05	2.22E-08	1.33E-08	2.22E-08	4.26E-07	2.59E-09	9.08E-07	4.44E-08	3.07E-08	1.20E-04	0.000117935	Res
582131.71_4130061.93	582131.71	4130061.93	4.02E-05	2.17E-08	1.30E-08	2.17E-08	4.18E-07	2.52E-09	8.91E-07	4.34E-08	3.03E-08	1.18E-04	0.000115705	Res
582188.28_4130061.93	582188.28	4130061.93	3.92E-05	2.12E-08	1.27E-08	2.12E-08	4.08E-07	2.45E-09	8.70E-07	4.23E-08	2.96E-08	1.15E-04	0.000112995	Res
582244.85_4130061.93	582244.85	4130061.93	3.83E-05	2.07E-08	1.24E-08	2.07E-08	3.99E-07	2.39E-09	8.53E-07	4.13E-08	2.91E-08	1.13E-04	0.000110663	Res
582301.42_4130061.93	582301.42	4130061.93	3.55E-05	1.92E-08	1.15E-08	1.92E-08	3.70E-07	2.22E-09	7.91E-07	3.83E-08	2.70E-08	1.05E-04	0.000102651	Res
582357.99_4130061.93	582357.99	4130061.93	3.29E-05	1.78E-08	1.07E-08	1.78E-08	3.43E-07	2.06E-09	7.33E-07	3.55E-08	2.50E-08	9.71E-05	9.50833E-05	Res
582414.56_4130061.93	582414.56	4130061.93	3.02E-05	1.63E-08	9.77E-09	1.63E-08	3.14E-07	1.89E-09	6.70E-07	3.26E-08	2.28E-08	8.89E-05	8.70135E-05	Res
582471.13_4130061.93	582471.13	4130061.93	2.74E-05	1.48E-08	8.87E-09	1.48E-08	2.84E-07	1.72E-09	6.07E-07	2.96E-08	2.06E-08	8.05E-05	7.87788E-05	Res
582527.7_4130061.93	582527.7	4130061.93	2.47E-05	1.33E-08	8.00E-09	1.33E-08	2.56E-07	1.55E-09	5.46E-07	2.67E-08	1.85E-08	7.24E-05	7.09079E-05	Res
582584.27_4130061.93	582584.27	4130061.93	2.23E-05	1.20E-08	7.23E-09	1.20E-08	2.31E-07	1.41E-09	4.91E-07	2.41E-08	1.66E-08	6.53E-05	6.38802E-05	Res
582640.84_4130061.93	582640.84	4130061.93	2.00E-05	1.09E-08	6.51E-09	1.09E-08	2.07E-07	1.27E-09	4.41E-07	2.17E-08	1.49E-08	5.86E-05	5.73774E-05	Res
582697.41_4130061.93	582697.41	4130061.93	1.81E-05	9.82E-09	5.89E-09	9.82E-09	1.87E-07	1.15E-09	3.97E-07	1.96E-08	1.34E-08	5.28E-05	5.17206E-05	Res
582753.98_4130061.93	582753.98	4130061.93	1.64E-05	8.91E-09	5.34E-09	8.91E-09	1.69E-07	1.05E-09	3.59E-07	1.78E-08	1.21E-08	4.78E-05	4.67764E-05	Res
582810.55_4130061.93	582810.55	4130061.93	1.49E-05	8.08E-09	4.85E-09	8.08E-09	1.53E-07	9.53E-10	3.25E-07	1.62E-08	1.09E-08	4.32E-05	4.22938E-05	Res
581962_4130145.84	581962	4130145.84	6.25E-05	3.36E-08	2.02E-08	3.36E-08	6.55E-07	3.86E-09	1.40E-06	6.72E-08	4.83E-08	1.86E-04	0.000181764	Res
582018.57_4130145.84	582018.57	4130145.84	5.79E-05	3.11E-08	1.87E-08	3.11E-08	6.06E-07	3.57E-09	1.30E-06	6.22E-08	4.47E-08	1.72E-04	0.000168264	Res
582075.14_4130145.84	582075.14	4130145.84	4.93E-05	2.65E-08	1.59E-08	2.65E-08	5.15E-07	3.06E-09	1.10E-06	5.31E-08	3.78E-08	1.46E-04	0.000142871	Res
582131.71_4130145.84	582131.71	4130145.84	4.56E-05	2.46E-08	1.47E-08	2.46E-08	4.77E-07	2.83E-09	1.02E-06	4.91E-08	3.50E-08	1.35E-04	0.000132237	Res
582188.28_4130145.84	582188.28	4130145.84	4.40E-05	2.37E-08	1.42E-08	2.37E-08	4.60E-07	2.73E-09	9.85E-07	4.74E-08	3.38E-08	1.30E-04	0.000127709	Res
582244.85_4130145.84	582244.85	4130145.84	4.01E-05	2.16E-08	1.30E-08	2.16E-08	4.19E-07	2.49E-09	8.98E-07	4.32E-08	3.08E-08	1.19E-04	0.000116346	Res
582301.42_4130145.84	582301.42	4130145.84	3.64E-05	1.96E-08	1.18E-08	1.96E-08	3.80E-07	2.26E-09	8.12E-07	3.92E-08	2.78E-08	1.08E-04	0.000105342	Res
582357.99_4130145.84	582357.99	4130145.84	3.31E-05	1.78E-08	1.07E-08	1.78E-08	3.45E-07	2.06E-09	7.38E-07	3.57E-08	2.52E-08	9.78E-05	9.57594E-05	Res
582414.56_4130145.84	582414.56	4130145.84	3.00E-05	1.62E-08	9.71E-09	1.62E-08	3.13E-07	1.87E-09	6.69E-07	3.24E-08	2.28E-08	8.86E-05	8.67287E-05	Res
582471.13_4130145.84	582471.13	4130145.84	2.70E-05	1.46E-08	8.74E-09	1.46E-08	2.81E-07	1.69E-09	6.00E-07	2.91E-08	2.04E-08	7.95E-05	7.78756E-05	Res
582527.7_4130145.84	582527.7	4130145.84	2.41E-05	1.30E-08	7.80E-09	1.30E-08	2.50E-07	1.51E-09	5.34E-07	2.60E-08	1.81E-08	7.08E-05	6.93084E-05	Res
582584.27_4130145.84	582584.27	4130145.84	2.14E-05	1.16E-08	6.95E-09	1.16E-08	2.22E-07	1.35E-09	4.74E-07	2.32E-08	1.61E-08	6.29E-05	6.15517E-05	Res
582640.84_4130145.84	582640.84	4130145.84	1.91E-05	1.04E-08	6.22E-09	1.04E-08	1.98E-07	1.21E-09	4.22E-07	2.07E-08	1.43E-08	5.61E-05	5.48762E-05	Res
582697.41_4130145.84	582697.41	4130145.84	1.72E-05	9.33E-09	5.60E-09	9.33E-09	1.78E-07	1.09E-09	3.78E-07	1.87E-08	1.28E-08	5.03E-05	4.92218E-05	Res
582753.98_4130145.84	582753.98	4130145.84	1.56E-05	8.46E-09	5.08E-09	8.46E-09	1.61E-07	9.94E-10	3.42E-07	1.69E-08	1.15E-08	4.55E-05	4.45251E-05	Res
582810.55_4130145.84	582810.55	4130145.84	1.43E-05	7.74E-09	4.64E-09	7.74E-09	1.47E-07	9.11E-10	3.12E-07	1.55E-08	1.04E-08	4.15E-05	4.05813E-05	Res
582867.12_4130145.84	582867.12	4130145.84	1.25E-05	6.82E-09	4.09E-09	6.82E-09	1.29E-07	8.06E-10	2.73E-07	1.36E-08	9.11E-09	3.64E-05	3.55909E-05	Res
581962_4130229.75	581962	4130229.75	6.38E-05	3.43E-08	2.06E-08	3.43E-08	6.69E-07	3.93E-09	1.43E-06	6.86E-08	4.94E-08	1.90E-04	0.000185782	Res
582018.57_4130229.75	582018.57	4130229.75	6.08E-05	3.26E-08	1.96E-08	3.26E-08	6.38E-07	3.74E-09	1.37E-06	6.53E-08	4.72E-08	1.81E-04	0.000177105	Res
582075.14_4130229.75	582075.14	4130229.75	5.65E-05	3.03E-08	1.82E-08	3.03E-08	5.93E-07	3.47E-09	1.27E-06	6.07E-08	4.38E-08	1.68E-04	0.000164533	Res
582131.71_4130229.75	582131.71	4130229.75	5.08E-05	2.73E-08	1.64E-08	2.73E-08	5.33E-07	3.13E-09	1.14E-06	5.46E-08	3.93E-08	1.51E-04	0.000147892	Res
582188.28_4130229.75	582188.28	4130229.75	4.53E-05	2.43E-08	1.46E-08	2.43E-08	4.74E-07	2.79E-09	1.02E-06	4.87E-08	3.50E-08	1.34E-04	0.000131639	Res
582244.85_4130229.75	582244.85	4130229.75	4.04E-05	2.18E-08	1.31E-08	2.18E-08	4.23E-07	2.50E-09	9.07E-07	4.35E-08	3.12E-08	1.20E-04	0.000117506	Res

Chronic Calculation, $\sum C_{TAC}$ /REL

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)										Total HI	Receptor Type
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Copper	Mercury	Nickel	Selenium	Chromium VI	Crystalline Silica		
582301.42_4130229.75	582301.42	4130229.75	3.64E-05	1.96E-08	1.17E-08	1.96E-08	3.80E-07	2.25E-09	8.14E-07	3.91E-08	2.79E-08	1.08E-04	0.000105528	Res
582357.99_4130229.75	582357.99	4130229.75	3.28E-05	1.77E-08	1.06E-08	1.77E-08	3.43E-07	2.03E-09	7.33E-07	3.53E-08	2.51E-08	9.70E-05	9.50108E-05	Res
582414.56_4130229.75	582414.56	4130229.75	2.92E-05	1.58E-08	9.45E-09	1.58E-08	3.05E-07	1.82E-09	6.52E-07	3.15E-08	2.23E-08	8.64E-05	8.46058E-05	Res
582471.13_4130229.75	582471.13	4130229.75	2.58E-05	1.39E-08	8.35E-09	1.39E-08	2.69E-07	1.61E-09	5.74E-07	2.78E-08	1.96E-08	7.61E-05	7.44924E-05	Res
582527.7_4130229.75	582527.7	4130229.75	2.28E-05	1.23E-08	7.37E-09	1.23E-08	2.37E-07	1.43E-09	5.05E-07	2.46E-08	1.72E-08	6.70E-05	6.55771E-05	Res
582584.27_4130229.75	582584.27	4130229.75	2.02E-05	1.09E-08	6.54E-09	1.09E-08	2.09E-07	1.27E-09	4.46E-07	2.18E-08	1.51E-08	5.92E-05	5.80027E-05	Res
582640.84_4130229.75	582640.84	4130229.75	1.80E-05	9.75E-09	5.85E-09	9.75E-09	1.87E-07	1.14E-09	3.98E-07	1.95E-08	1.34E-08	5.28E-05	5.16723E-05	Res
582697.41_4130229.75	582697.41	4130229.75	1.63E-05	8.82E-09	5.29E-09	8.82E-09	1.68E-07	1.03E-09	3.58E-07	1.76E-08	1.21E-08	4.76E-05	4.66138E-05	Res
582753.98_4130229.75	582753.98	4130229.75	1.48E-05	8.03E-09	4.82E-09	8.03E-09	1.53E-07	9.42E-10	3.25E-07	1.61E-08	1.09E-08	4.32E-05	4.23004E-05	Res
582810.55_4130229.75	582810.55	4130229.75	1.36E-05	7.38E-09	4.43E-09	7.38E-09	1.40E-07	8.67E-10	2.98E-07	1.48E-08	1.00E-08	3.96E-05	3.87848E-05	Res
582867.12_4130229.75	582867.12	4130229.75	1.26E-05	6.84E-09	4.10E-09	6.84E-09	1.30E-07	8.05E-10	2.75E-07	1.37E-08	9.22E-09	3.66E-05	3.58383E-05	Res
582018.57_4130313.66	582018.57	4130313.66	6.54E-05	3.51E-08	2.11E-08	3.51E-08	6.88E-07	4.01E-09	1.48E-06	7.02E-08	5.10E-08	1.95E-04	0.000191054	Res
582075.14_4130313.66	582075.14	4130313.66	6.06E-05	3.25E-08	1.95E-08	3.25E-08	6.37E-07	3.71E-09	1.37E-06	6.50E-08	4.72E-08	1.81E-04	0.000176839	Res
582131.71_4130313.66	582131.71	4130313.66	5.30E-05	2.84E-08	1.71E-08	2.84E-08	5.56E-07	3.25E-09	1.19E-06	5.69E-08	4.12E-08	1.58E-04	0.000154509	Res
582188.28_4130313.66	582188.28	4130313.66	4.63E-05	2.49E-08	1.49E-08	2.49E-08	4.86E-07	2.85E-09	1.04E-06	4.97E-08	3.59E-08	1.38E-04	0.0001348	Res
582244.85_4130313.66	582244.85	4130313.66	4.08E-05	2.19E-08	1.32E-08	2.19E-08	4.28E-07	2.52E-09	9.17E-07	4.39E-08	3.15E-08	1.21E-04	0.000118723	Res
582301.42_4130313.66	582301.42	4130313.66	3.62E-05	1.95E-08	1.17E-08	1.95E-08	3.79E-07	2.24E-09	8.12E-07	3.90E-08	2.79E-08	1.07E-04	0.000105199	Res
582357.99_4130313.66	582357.99	4130313.66	3.18E-05	1.71E-08	1.03E-08	1.71E-08	3.32E-07	1.97E-09	7.12E-07	3.43E-08	2.44E-08	9.42E-05	9.22348E-05	Res
582414.56_4130313.66	582414.56	4130313.66	2.77E-05	1.49E-08	8.96E-09	1.49E-08	2.89E-07	1.72E-09	6.18E-07	2.99E-08	2.11E-08	8.18E-05	8.01525E-05	Res
582471.13_4130313.66	582471.13	4130313.66	2.42E-05	1.30E-08	7.82E-09	1.30E-08	2.52E-07	1.51E-09	5.38E-07	2.61E-08	1.83E-08	7.13E-05	6.97864E-05	Res
582527.7_4130313.66	582527.7	4130313.66	2.13E-05	1.15E-08	6.90E-09	1.15E-08	2.21E-07	1.33E-09	4.72E-07	2.30E-08	1.61E-08	6.26E-05	6.13077E-05	Res
582584.27_4130313.66	582584.27	4130313.66	1.89E-05	1.02E-08	6.13E-09	1.02E-08	1.96E-07	1.19E-09	4.18E-07	2.04E-08	1.42E-08	5.55E-05	5.43145E-05	Res
582640.84_4130313.66	582640.84	4130313.66	1.70E-05	9.19E-09	5.52E-09	9.19E-09	1.76E-07	1.07E-09	3.75E-07	1.84E-08	1.27E-08	4.98E-05	4.87147E-05	Res
582697.41_4130313.66	582697.41	4130313.66	1.54E-05	8.34E-09	5.00E-09	8.34E-09	1.59E-07	9.75E-10	3.39E-07	1.67E-08	1.14E-08	4.50E-05	4.40602E-05	Res
582753.98_4130313.66	582753.98	4130313.66	1.40E-05	7.61E-09	4.57E-09	7.61E-09	1.45E-07	8.92E-10	3.08E-07	1.52E-08	1.04E-08	4.10E-05	4.01194E-05	Res
582810.55_4130313.66	582810.55	4130313.66	1.29E-05	6.97E-09	4.18E-09	6.97E-09	1.32E-07	8.19E-10	2.81E-07	1.39E-08	9.45E-09	3.74E-05	3.66403E-05	Res
582867.12_4130313.66	582867.12	4130313.66	1.18E-05	6.41E-09	3.85E-09	6.41E-09	1.22E-07	7.55E-10	2.58E-07	1.28E-08	8.64E-09	3.43E-05	3.36086E-05	Res
581848.86_4130397.57	581848.86	4130397.57	8.98E-05	4.81E-08	2.89E-08	4.81E-08	9.46E-07	5.48E-09	2.03E-06	9.62E-08	7.04E-08	2.68E-04	0.00026279	Res
581905.43_4130397.57	581905.43	4130397.57	8.70E-05	4.66E-08	2.80E-08	4.66E-08	9.17E-07	5.31E-09	1.97E-06	9.32E-08	6.83E-08	2.60E-04	0.000254747	Res
581962_4130397.57	581962	4130397.57	8.22E-05	4.40E-08	2.64E-08	4.40E-08	8.66E-07	5.01E-09	1.86E-06	8.81E-08	6.46E-08	2.46E-04	0.000240745	Res
582018.57_4130397.57	582018.57	4130397.57	7.37E-05	3.95E-08	2.37E-08	3.95E-08	7.76E-07	4.50E-09	1.67E-06	7.90E-08	5.78E-08	2.20E-04	0.000215594	Res
582075.14_4130397.57	582075.14	4130397.57	6.45E-05	3.46E-08	2.07E-08	3.46E-08	6.79E-07	3.94E-09	1.46E-06	6.91E-08	5.05E-08	1.92E-04	0.000188509	Res
582131.71_4130397.57	582131.71	4130397.57	5.51E-05	2.96E-08	1.77E-08	2.96E-08	5.79E-07	3.38E-09	1.24E-06	5.91E-08	4.30E-08	1.64E-04	0.000160824	Res
582188.28_4130397.57	582188.28	4130397.57	4.78E-05	2.56E-08	1.54E-08	2.56E-08	5.01E-07	2.94E-09	1.08E-06	5.13E-08	3.71E-08	1.42E-04	0.000139227	Res
582244.85_4130397.57	582244.85	4130397.57	4.11E-05	2.21E-08	1.33E-08	2.21E-08	4.31E-07	2.53E-09	9.24E-07	4.42E-08	3.18E-08	1.22E-04	0.000119646	Res
582301.42_4130397.57	582301.42	4130397.57	3.53E-05	1.90E-08	1.14E-08	1.90E-08	3.70E-07	2.19E-09	7.92E-07	3.80E-08	2.72E-08	1.05E-04	0.000102639	Res
582357.99_4130397.57	582357.99	4130397.57	3.02E-05	1.63E-08	9.75E-09	1.63E-08	3.15E-07	1.87E-09	6.74E-07	3.25E-08	2.31E-08	8.93E-05	8.74186E-05	Res
582414.56_4130397.57	582414.56	4130397.57	2.60E-05	1.40E-08	8.42E-09	1.40E-08	2.71E-07	1.62E-09	5.80E-07	2.81E-08	1.98E-08	7.69E-05	7.52549E-05	Res
582471.13_4130397.57	582471.13	4130397.57	2.28E-05	1.23E-08	7.37E-09	1.23E-08	2.37E-07	1.42E-09	5.05E-07	2.46E-08	1.72E-08	6.70E-05	6.56002E-05	Res
582527.7_4130397.57	582527.7	4130397.57	2.01E-05	1.09E-08	6.51E-09	1.09E-08	2.09E-07	1.26E-09	4.45E-07	2.17E-08	1.51E-08	5.90E-05	5.77736E-05	Res
582584.27_4130397.57	582584.27	4130397.57	1.79E-05	9.68E-09	5.81E-09	9.68E-09	1.85E-07	1.13E-09	3.95E-07	1.94E-08	1.34E-08	5.25E-05	5.13672E-05	Res
582640.84_4130397.57	582640.84	4130397.57	1.61E-05	8.70E-09	5.22E-09	8.70E-09	1.66E-07	1.02E-09	3.54E-07	1.74E-08	1.20E-08	4.71E-05	4.60547E-05	Res
582697.41_4130397.57	582697.41	4130397.57	1.45E-05	7.84E-09	4.70E-09	7.84E-09	1.49E-07	9.19E-10	3.18E-07	1.57E-08	1.07E-08	4.22E-05	4.13503E-05	Res
582753.98_4130397.57	582753.98	4130397.57	1.31E-05	7.12E-09	4.27E-09	7.12E-09	1.35E-07	8.36E-10	2.88E-07	1.42E-08	9.66E-09	3.82E-05	3.74266E-05	Res
582810.55_4130397.57	582810.55	4130397.57	1.20E-05	6.50E-09	3.90E-09	6.50E-09	1.23E-07	7.65E-10	2.62E-07	1.30E-08	8.76E-09	3.48E-05	3.40662E-05	Res
582867.12_4130397.57	582867.12	4130397.57	1.10E-05	5.96E-09	3.58E-09	5.96E-09	1.13E-07	7.03E-10	2.39E-07	1.19E-08	7.99E-09	3.18E-05	3.11416E-05	Res
581848.86_4130481.48	581848.86	4130481.48	1.16E-04	6.20E-08	3.72E-08	6.20E-08	1.23E-06	7.02E-09	2.64E-06	1.24E-07	9.19E-08	3.48E-04	0.000340697	Res
581905.43_4130481.48	581905.43	4130481.48	1.07E-04	5.74E-08	3.45E-08	5.74E-08	1.14E-06	6.50E-09	2.44E-06	1.15E-07	8.51E-08	3.22E-04	0.000315554	Res
581962_4130481.48	581962	4130481.48	9.14E-05	4.89E-08	2.93E-08	4.89E-08	9.65E-07	5.55E-09	2.08E-06	9.78E-08	7.22E-08	2.74E-04	0.000268308	Res

Chronic Calculation, $\sum C_{TAC}$ /REL

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)										Total HI	Receptor Type
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Copper	Mercury	Nickel	Selenium	Chromium VI	Crystalline Silica		
582018.57_4130481.48	582018.57	4130481.48	8.04E-05	4.30E-08	2.58E-08	4.30E-08	8.48E-07	4.89E-09	1.82E-06	8.61E-08	6.34E-08	2.41E-04	0.000235787	Res
582075.14_4130481.48	582075.14	4130481.48	6.78E-05	3.63E-08	2.18E-08	3.63E-08	7.15E-07	4.13E-09	1.54E-06	7.27E-08	5.33E-08	2.03E-04	0.000198628	Res
582131.71_4130481.48	582131.71	4130481.48	5.74E-05	3.08E-08	1.85E-08	3.08E-08	6.04E-07	3.51E-09	1.30E-06	6.16E-08	4.49E-08	1.71E-04	0.000167908	Res
582188.28_4130481.48	582188.28	4130481.48	4.84E-05	2.60E-08	1.56E-08	2.60E-08	5.09E-07	2.97E-09	1.09E-06	5.20E-08	3.77E-08	1.44E-04	0.000141226	Res
582244.85_4130481.48	582244.85	4130481.48	4.02E-05	2.16E-08	1.30E-08	2.16E-08	4.21E-07	2.48E-09	9.03E-07	4.32E-08	3.11E-08	1.19E-04	0.000116977	Res
582301.42_4130481.48	582301.42	4130481.48	3.36E-05	1.81E-08	1.08E-08	1.81E-08	3.51E-07	2.08E-09	7.52E-07	3.61E-08	2.58E-08	9.95E-05	9.74312E-05	Res
582357.99_4130481.48	582357.99	4130481.48	2.85E-05	1.53E-08	9.21E-09	1.53E-08	2.97E-07	1.77E-09	6.36E-07	3.07E-08	2.17E-08	8.42E-05	8.24238E-05	Res
582414.56_4130481.48	582414.56	4130481.48	2.46E-05	1.33E-08	7.97E-09	1.33E-08	2.56E-07	1.54E-09	5.48E-07	2.66E-08	1.87E-08	7.26E-05	7.10719E-05	Res
582471.13_4130481.48	582471.13	4130481.48	2.15E-05	1.16E-08	6.97E-09	1.16E-08	2.24E-07	1.35E-09	4.77E-07	2.32E-08	1.62E-08	6.33E-05	6.19512E-05	Res
582527.7_4130481.48	582527.7	4130481.48	1.89E-05	1.02E-08	6.14E-09	1.02E-08	1.96E-07	1.19E-09	4.18E-07	2.05E-08	1.42E-08	5.55E-05	5.43548E-05	Res
582584.27_4130481.48	582584.27	4130481.48	1.68E-05	9.10E-09	5.46E-09	9.10E-09	1.74E-07	1.06E-09	3.70E-07	1.82E-08	1.25E-08	4.92E-05	4.81393E-05	Res
582640.84_4130481.48	582640.84	4130481.48	1.50E-05	8.12E-09	4.87E-09	8.12E-09	1.55E-07	9.52E-10	3.29E-07	1.62E-08	1.11E-08	4.37E-05	4.28134E-05	Res
582697.41_4130481.48	582697.41	4130481.48	1.35E-05	7.30E-09	4.38E-09	7.30E-09	1.39E-07	8.58E-10	2.95E-07	1.46E-08	9.89E-09	3.92E-05	3.83705E-05	Res
582753.98_4130481.48	582753.98	4130481.48	1.22E-05	6.64E-09	3.98E-09	6.64E-09	1.26E-07	7.82E-10	2.67E-07	1.33E-08	8.92E-09	3.55E-05	3.4736E-05	Res
582810.55_4130481.48	582810.55	4130481.48	1.12E-05	6.07E-09	3.64E-09	6.07E-09	1.15E-07	7.17E-10	2.43E-07	1.21E-08	8.11E-09	3.24E-05	3.16714E-05	Res
582867.12_4130481.48	582867.12	4130481.48	1.03E-05	5.58E-09	3.35E-09	5.58E-09	1.05E-07	6.61E-10	2.23E-07	1.12E-08	7.41E-09	2.97E-05	2.90427E-05	Res
581735.72_4130565.39	581735.72	4130565.39	1.41E-04	7.52E-08	4.51E-08	7.52E-08	1.49E-06	8.49E-09	3.22E-06	1.50E-07	1.12E-07	4.24E-04	0.000415092	Res
581792.29_4130565.39	581792.29	4130565.39	1.39E-04	7.41E-08	4.45E-08	7.41E-08	1.47E-06	8.36E-09	3.17E-06	1.48E-07	1.11E-07	4.17E-04	0.000408912	Res
581848.86_4130565.39	581848.86	4130565.39	1.32E-04	7.05E-08	4.23E-08	7.05E-08	1.40E-06	7.96E-09	3.01E-06	1.41E-07	1.05E-07	3.97E-04	0.000388895	Res
581905.43_4130565.39	581905.43	4130565.39	1.26E-04	6.73E-08	4.04E-08	6.73E-08	1.34E-06	7.60E-09	2.88E-06	1.35E-07	1.01E-07	3.79E-04	0.000371392	Res
581962_4130565.39	581962	4130565.39	1.09E-04	5.81E-08	3.48E-08	5.81E-08	1.15E-06	6.56E-09	2.48E-06	1.16E-07	8.65E-08	3.26E-04	0.000319861	Res
582018.57_4130565.39	582018.57	4130565.39	8.77E-05	4.69E-08	2.81E-08	4.69E-08	9.28E-07	5.31E-09	2.00E-06	9.38E-08	6.96E-08	2.63E-04	0.000257875	Res
582075.14_4130565.39	582075.14	4130565.39	7.11E-05	3.80E-08	2.28E-08	3.80E-08	7.50E-07	4.32E-09	1.61E-06	7.61E-08	5.61E-08	2.13E-04	0.000208548	Res
582131.71_4130565.39	582131.71	4130565.39	5.81E-05	3.11E-08	1.87E-08	3.11E-08	6.13E-07	3.54E-09	1.32E-06	6.23E-08	4.57E-08	1.74E-04	0.000170256	Res
582188.28_4130565.39	582188.28	4130565.39	4.66E-05	2.50E-08	1.50E-08	2.50E-08	4.90E-07	2.85E-09	1.05E-06	5.00E-08	3.63E-08	1.39E-04	0.000136007	Res
582244.85_4130565.39	582244.85	4130565.39	3.77E-05	2.03E-08	1.22E-08	2.03E-08	3.95E-07	2.32E-09	8.48E-07	4.05E-08	2.92E-08	1.12E-04	0.000109785	Res
582301.42_4130565.39	582301.42	4130565.39	3.16E-05	1.70E-08	1.02E-08	1.70E-08	3.31E-07	1.96E-09	7.09E-07	3.41E-08	2.43E-08	9.38E-05	9.18722E-05	Res
582357.99_4130565.39	582357.99	4130565.39	2.67E-05	1.44E-08	8.63E-09	1.44E-08	2.79E-07	1.66E-09	5.96E-07	2.88E-08	2.04E-08	7.89E-05	7.72937E-05	Res
582414.56_4130565.39	582414.56	4130565.39	2.29E-05	1.24E-08	7.41E-09	1.24E-08	2.38E-07	1.43E-09	5.09E-07	2.47E-08	1.73E-08	6.74E-05	6.60248E-05	Res
582471.13_4130565.39	582471.13	4130565.39	1.99E-05	1.07E-08	6.44E-09	1.07E-08	2.06E-07	1.25E-09	4.40E-07	2.15E-08	1.49E-08	5.84E-05	5.71591E-05	Res
582527.7_4130565.39	582527.7	4130565.39	1.75E-05	9.44E-09	5.67E-09	9.44E-09	1.81E-07	1.10E-09	3.85E-07	1.89E-08	1.30E-08	5.11E-05	5.003E-05	Res
582584.27_4130565.39	582584.27	4130565.39	1.55E-05	8.41E-09	5.05E-09	8.41E-09	1.60E-07	9.85E-10	3.41E-07	1.68E-08	1.15E-08	4.53E-05	4.43517E-05	Res
582640.84_4130565.39	582640.84	4130565.39	1.38E-05	7.51E-09	4.50E-09	7.51E-09	1.42E-07	8.82E-10	3.03E-07	1.50E-08	1.02E-08	4.03E-05	3.94209E-05	Res
582697.41_4130565.39	582697.41	4130565.39	1.25E-05	6.79E-09	4.08E-09	6.79E-09	1.28E-07	8.01E-10	2.73E-07	1.36E-08	9.12E-09	3.63E-05	3.55302E-05	Res
582753.98_4130565.39	582753.98	4130565.39	1.14E-05	6.20E-09	3.72E-09	6.20E-09	1.17E-07	7.33E-10	2.48E-07	1.24E-08	8.26E-09	3.30E-05	3.23126E-05	Res
582810.55_4130565.39	582810.55	4130565.39	1.05E-05	5.71E-09	3.43E-09	5.71E-09	1.07E-07	6.77E-10	2.27E-07	1.14E-08	7.56E-09	3.03E-05	2.96734E-05	Res
582867.12_4130565.39	582867.12	4130565.39	9.72E-06	5.30E-09	3.18E-09	5.30E-09	9.94E-08	6.29E-10	2.10E-07	1.06E-08	6.98E-09	2.81E-05	2.74576E-05	Res
581735.72_4130649.3	581735.72	4130649.3	1.53E-04	8.15E-08	4.89E-08	8.15E-08	1.62E-06	9.19E-09	3.49E-06	1.63E-07	1.22E-07	4.59E-04	0.00045034	Res
581792.29_4130649.3	581792.29	4130649.3	1.48E-04	7.89E-08	4.73E-08	7.89E-08	1.57E-06	8.89E-09	3.38E-06	1.58E-07	1.18E-07	4.45E-04	0.000435865	Res
581905.43_4130649.3	581905.43	4130649.3	1.48E-04	7.89E-08	4.73E-08	7.89E-08	1.57E-06	8.89E-09	3.38E-06	1.58E-07	1.18E-07	4.45E-04	0.000436411	Res
581962_4130649.3	581962	4130649.3	1.23E-04	6.54E-08	3.93E-08	6.54E-08	1.30E-06	7.38E-09	2.80E-06	1.31E-07	9.80E-08	3.69E-04	0.000361492	Res
582018.57_4130649.3	582018.57	4130649.3	9.28E-05	4.96E-08	2.98E-08	4.96E-08	9.83E-07	5.60E-09	2.12E-06	9.92E-08	7.39E-08	2.79E-04	0.000273362	Res
582075.14_4130649.3	582075.14	4130649.3	7.18E-05	3.84E-08	2.31E-08	3.84E-08	7.60E-07	4.35E-09	1.64E-06	7.69E-08	5.70E-08	2.16E-04	0.000211226	Res
582131.71_4130649.3	582131.71	4130649.3	5.56E-05	2.98E-08	1.79E-08	2.98E-08	5.87E-07	3.38E-09	1.26E-06	5.96E-08	4.38E-08	1.66E-04	0.000163118	Res
582188.28_4130649.3	582188.28	4130649.3	4.36E-05	2.34E-08	1.40E-08	2.34E-08	4.59E-07	2.66E-09	9.85E-07	4.67E-08	3.41E-08	1.30E-04	0.000127435	Res
582244.85_4130649.3	582244.85	4130649.3	3.49E-05	1.87E-08	1.12E-08	1.87E-08	3.66E-07	2.14E-09	7.86E-07	3.75E-08	2.71E-08	1.04E-04	0.000101702	Res
582301.42_4130649.3	582301.42	4130649.3	2.87E-05	1.54E-08	9.26E-09	1.54E-08	3.00E-07	1.77E-09	6.43E-07	3.09E-08	2.21E-08	8.51E-05	8.33428E-05	Res
582357.99_4130649.3	582357.99	4130649.3	2.42E-05	1.30E-08	7.82E-09	1.30E-08	2.52E-07	1.50E-09	5.40E-07	2.61E-08	1.85E-08	7.15E-05	6.99802E-05	Res
582414.56_4130649.3	582414.56	4130649.3	2.08E-05	1.12E-08	6.73E-09	1.12E-08	2.16E-07	1.30E-09	4.62E-07	2.24E-08	1.57E-08	6.13E-05	5.99953E-05	Res

Chronic Calculation, $\sum C_{TAC}$ /REL

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)										Total HI	Receptor Type
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Copper	Mercury	Nickel	Selenium	Chromium VI	Crystalline Silica		
582471.13_4130649.3	582471.13	4130649.3	1.81E-05	9.77E-09	5.86E-09	9.77E-09	1.88E-07	1.14E-09	4.00E-07	1.95E-08	1.36E-08	5.31E-05	5.19488E-05	Res
582527.7_4130649.3	582527.7	4130649.3	1.59E-05	8.63E-09	5.18E-09	8.63E-09	1.65E-07	1.01E-09	3.51E-07	1.73E-08	1.19E-08	4.66E-05	4.56533E-05	Res
582584.27_4130649.3	582584.27	4130649.3	1.43E-05	7.73E-09	4.64E-09	7.73E-09	1.47E-07	9.06E-10	3.13E-07	1.55E-08	1.05E-08	4.16E-05	4.07058E-05	Res
582640.84_4130649.3	582640.84	4130649.3	1.29E-05	7.01E-09	4.21E-09	7.01E-09	1.33E-07	8.25E-10	2.82E-07	1.40E-08	9.46E-09	3.76E-05	3.67712E-05	Res
582697.41_4130649.3	582697.41	4130649.3	1.18E-05	6.42E-09	3.85E-09	6.42E-09	1.21E-07	7.58E-10	2.57E-07	1.28E-08	8.60E-09	3.43E-05	3.35564E-05	Res
582753.98_4130649.3	582753.98	4130649.3	1.09E-05	5.95E-09	3.57E-09	5.95E-09	1.12E-07	7.04E-10	2.38E-07	1.19E-08	7.92E-09	3.17E-05	3.09783E-05	Res
582810.55_4130649.3	582810.55	4130649.3	1.02E-05	5.56E-09	3.34E-09	5.56E-09	1.04E-07	6.59E-10	2.21E-07	1.11E-08	7.35E-09	2.95E-05	2.88666E-05	Res
582867.12_4130649.3	582867.12	4130649.3	9.57E-06	5.21E-09	3.13E-09	5.21E-09	9.78E-08	6.19E-10	2.07E-07	1.04E-08	6.86E-09	2.76E-05	2.70056E-05	Res
581848.86_4130733.21	581848.86	4130733.21	2.20E-04	1.17E-07	7.05E-08	1.17E-07	2.34E-06	1.32E-08	5.05E-06	2.35E-07	1.77E-07	6.65E-04	0.000651465	Res
581905.43_4130733.21	581905.43	4130733.21	1.88E-04	1.00E-07	6.01E-08	1.00E-07	2.00E-06	1.13E-08	4.31E-06	2.00E-07	1.51E-07	5.67E-04	0.000555415	Res
581962_4130733.21	581962	4130733.21	1.38E-04	7.35E-08	4.41E-08	7.35E-08	1.46E-06	8.28E-09	3.15E-06	1.47E-07	1.11E-07	4.15E-04	0.000407051	Res
582018.57_4130733.21	582018.57	4130733.21	9.63E-05	5.15E-08	3.09E-08	5.15E-08	1.02E-06	5.80E-09	2.20E-06	1.03E-07	7.70E-08	2.90E-04	0.000284139	Res
582075.14_4130733.21	582075.14	4130733.21	6.78E-05	3.62E-08	2.17E-08	3.62E-08	7.17E-07	4.10E-09	1.54E-06	7.25E-08	5.39E-08	2.04E-04	0.000199496	Res
582131.71_4130733.21	582131.71	4130733.21	4.93E-05	2.64E-08	1.58E-08	2.64E-08	5.21E-07	3.00E-09	1.12E-06	5.28E-08	3.89E-08	1.48E-04	0.000144702	Res
582188.28_4130733.21	582188.28	4130733.21	3.80E-05	2.04E-08	1.22E-08	2.04E-08	4.00E-07	2.32E-09	8.60E-07	4.07E-08	2.98E-08	1.13E-04	0.000111171	Res
582244.85_4130733.21	582244.85	4130733.21	3.04E-05	1.63E-08	9.78E-09	1.63E-08	3.19E-07	1.86E-09	6.84E-07	3.26E-08	2.36E-08	9.04E-05	8.85634E-05	Res
582301.42_4130733.21	582301.42	4130733.21	2.51E-05	1.35E-08	8.10E-09	1.35E-08	2.63E-07	1.55E-09	5.63E-07	2.70E-08	1.94E-08	7.45E-05	7.29635E-05	Res
582357.99_4130733.21	582357.99	4130733.21	2.13E-05	1.15E-08	6.89E-09	1.15E-08	2.23E-07	1.32E-09	4.76E-07	2.30E-08	1.63E-08	6.31E-05	6.17687E-05	Res
582414.56_4130733.21	582414.56	4130733.21	1.85E-05	1.00E-08	6.00E-09	1.00E-08	1.93E-07	1.16E-09	4.12E-07	2.00E-08	1.41E-08	5.46E-05	5.34882E-05	Res
582471.13_4130733.21	582471.13	4130733.21	1.64E-05	8.88E-09	5.33E-09	8.88E-09	1.71E-07	1.03E-09	3.64E-07	1.78E-08	1.24E-08	4.83E-05	4.73063E-05	Res
582527.7_4130733.21	582527.7	4130733.21	1.48E-05	8.02E-09	4.81E-09	8.02E-09	1.54E-07	9.36E-10	3.27E-07	1.60E-08	1.11E-08	4.35E-05	4.25383E-05	Res
582584.27_4130733.21	582584.27	4130733.21	1.36E-05	7.34E-09	4.41E-09	7.34E-09	1.40E-07	8.59E-10	2.98E-07	1.47E-08	1.01E-08	3.96E-05	3.8787E-05	Res
582640.84_4130733.21	582640.84	4130733.21	1.25E-05	6.79E-09	4.07E-09	6.79E-09	1.29E-07	7.97E-10	2.75E-07	1.36E-08	9.23E-09	3.65E-05	3.57279E-05	Res
582697.41_4130733.21	582697.41	4130733.21	1.16E-05	6.32E-09	3.79E-09	6.32E-09	1.20E-07	7.44E-10	2.55E-07	1.26E-08	8.54E-09	3.39E-05	3.31721E-05	Res
582753.98_4130733.21	582753.98	4130733.21	1.09E-05	5.92E-09	3.55E-09	5.92E-09	1.12E-07	6.98E-10	2.38E-07	1.18E-08	7.95E-09	3.16E-05	3.09581E-05	Res
582810.55_4130733.21	582810.55	4130733.21	1.03E-05	5.59E-09	3.35E-09	5.59E-09	1.05E-07	6.60E-10	2.23E-07	1.12E-08	7.46E-09	2.98E-05	2.91318E-05	Res
582867.12_4130733.21	582867.12	4130733.21	9.68E-06	5.27E-09	3.16E-09	5.27E-09	9.92E-08	6.24E-10	2.10E-07	1.05E-08	7.00E-09	2.80E-05	2.74116E-05	Res
581735.72_4130817.12	581735.72	4130817.12	3.24E-04	1.73E-07	1.04E-07	1.73E-07	3.45E-06	1.94E-08	7.44E-06	3.46E-07	2.61E-07	9.79E-04	0.000959752	Res
581792.29_4130817.12	581792.29	4130817.12	3.66E-04	1.95E-07	1.17E-07	1.95E-07	3.89E-06	2.19E-08	8.41E-06	3.90E-07	2.95E-07	1.11E-03	0.001083912	Res
581848.86_4130817.12	581848.86	4130817.12	3.28E-04	1.75E-07	1.05E-07	1.75E-07	3.49E-06	1.96E-08	7.54E-06	3.50E-07	2.65E-07	9.92E-04	0.000972024	Res
581905.43_4130817.12	581905.43	4130817.12	2.48E-04	1.32E-07	7.93E-08	1.32E-07	2.64E-06	1.49E-08	5.69E-06	2.64E-07	2.00E-07	7.49E-04	0.000734037	Res
581962_4130817.12	581962	4130817.12	1.50E-04	8.01E-08	4.80E-08	8.01E-08	1.59E-06	9.00E-09	3.44E-06	1.60E-07	1.21E-07	4.53E-04	0.000443587	Res
582018.57_4130817.12	582018.57	4130817.12	8.95E-05	4.78E-08	2.87E-08	4.78E-08	9.49E-07	5.39E-09	2.05E-06	9.56E-08	7.16E-08	2.69E-04	0.0002641	Res
582075.14_4130817.12	582075.14	4130817.12	5.77E-05	3.08E-08	1.85E-08	3.08E-08	6.10E-07	3.49E-09	1.31E-06	6.17E-08	4.58E-08	1.73E-04	0.000169657	Res
582131.71_4130817.12	582131.71	4130817.12	4.13E-05	2.21E-08	1.33E-08	2.21E-08	4.36E-07	2.51E-09	9.38E-07	4.42E-08	3.26E-08	1.24E-04	0.00012123	Res
582188.28_4130817.12	582188.28	4130817.12	3.19E-05	1.71E-08	1.03E-08	1.71E-08	3.36E-07	1.95E-09	7.22E-07	3.42E-08	2.50E-08	9.53E-05	9.33827E-05	Res
582244.85_4130817.12	582244.85	4130817.12	2.60E-05	1.40E-08	8.38E-09	1.40E-08	2.73E-07	1.60E-09	5.86E-07	2.79E-08	2.02E-08	7.75E-05	7.59047E-05	Res
582301.42_4130817.12	582301.42	4130817.12	2.21E-05	1.19E-08	7.14E-09	1.19E-08	2.32E-07	1.36E-09	4.97E-07	2.38E-08	1.71E-08	6.57E-05	6.43544E-05	Res
582357.99_4130817.12	582357.99	4130817.12	1.94E-05	1.04E-08	6.26E-09	1.04E-08	2.03E-07	1.20E-09	4.34E-07	2.09E-08	1.49E-08	5.74E-05	5.62052E-05	Res
582414.56_4130817.12	582414.56	4130817.12	1.73E-05	9.32E-09	5.59E-09	9.32E-09	1.80E-07	1.08E-09	3.86E-07	1.86E-08	1.32E-08	5.11E-05	5.00524E-05	Res
582471.13_4130817.12	582471.13	4130817.12	1.57E-05	8.47E-09	5.08E-09	8.47E-09	1.64E-07	9.81E-10	3.50E-07	1.69E-08	1.19E-08	4.63E-05	4.53551E-05	Res
582527.7_4130817.12	582527.7	4130817.12	1.44E-05	7.76E-09	4.66E-09	7.76E-09	1.49E-07	9.02E-10	3.19E-07	1.55E-08	1.08E-08	4.23E-05	4.14083E-05	Res
582584.27_4130817.12	582584.27	4130817.12	1.33E-05	7.19E-09	4.31E-09	7.19E-09	1.38E-07	8.37E-10	2.94E-07	1.44E-08	9.97E-09	3.90E-05	3.81912E-05	Res
582640.84_4130817.12	582640.84	4130817.12	1.24E-05	6.69E-09	4.01E-09	6.69E-09	1.28E-07	7.81E-10	2.73E-07	1.34E-08	9.22E-09	3.62E-05	3.5447E-05	Res
582697.41_4130817.12	582697.41	4130817.12	1.16E-05	6.26E-09	3.76E-09	6.26E-09	1.19E-07	7.33E-10	2.54E-07	1.25E-08	8.57E-09	3.38E-05	3.30455E-05	Res
582753.98_4130817.12	582753.98	4130817.12	1.08E-05	5.86E-09	3.52E-09	5.86E-09	1.11E-07	6.88E-10	2.37E-07	1.17E-08	7.97E-09	3.15E-05	3.08458E-05	Res
582810.55_4130817.12	582810.55	4130817.12	1.02E-05	5.52E-09	3.31E-09	5.52E-09	1.05E-07	6.49E-10	2.22E-07	1.10E-08	7.45E-09	2.96E-05	2.89361E-05	Res
582867.12_4130817.12	582867.12	4130817.12	9.59E-06	5.21E-09	3.13E-09	5.21E-09	9.85E-08	6.14E-10	2.09E-07	1.04E-08	6.99E-09	2.78E-05	2.72447E-05	Res
581735.72_4130901.03	581735.72	4130901.03	6.46E-04	3.44E-07	2.06E-07	3.44E-07	6.87E-06	3.86E-08	1.48E-05	6.88E-07	5.22E-07	1.95E-03	0.001912889	Res

Chronic Calculation, $\sum C_{TAC}$ /REL

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)										Total HI	Receptor Type
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Copper	Mercury	Nickel	Selenium	Chromium VI	Crystalline Silica		
581792.29_4130901.03	581792.29	4130901.03	6.89E-04	3.67E-07	2.20E-07	3.67E-07	7.34E-06	4.12E-08	1.58E-05	7.35E-07	5.57E-07	2.08E-03	0.002043203	Res
581848.86_4130901.03	581848.86	4130901.03	6.14E-04	3.27E-07	1.96E-07	3.27E-07	6.54E-06	3.67E-08	1.41E-05	6.55E-07	4.96E-07	1.86E-03	0.001820674	Res
581905.43_4130901.03	581905.43	4130901.03	3.22E-04	1.72E-07	1.03E-07	1.72E-07	3.43E-06	1.93E-08	7.40E-06	3.43E-07	2.60E-07	9.73E-04	0.0009541	Res
581962_4130901.03	581962	4130901.03	1.30E-04	6.95E-08	4.17E-08	6.95E-08	1.38E-06	7.82E-09	2.98E-06	1.39E-07	1.05E-07	3.93E-04	0.000384883	Res
582018.57_4130901.03	582018.57	4130901.03	6.95E-05	3.71E-08	2.23E-08	3.71E-08	7.36E-07	4.19E-09	1.59E-06	7.43E-08	5.54E-08	2.09E-04	0.000204763	Res
582075.14_4130901.03	582075.14	4130901.03	4.64E-05	2.48E-08	1.49E-08	2.48E-08	4.90E-07	2.81E-09	1.05E-06	4.96E-08	3.67E-08	1.39E-04	0.000136238	Res
582131.71_4130901.03	582131.71	4130901.03	3.53E-05	1.89E-08	1.14E-08	1.89E-08	3.73E-07	2.15E-09	8.01E-07	3.78E-08	2.78E-08	1.06E-04	0.000103541	Res
582188.28_4130901.03	582188.28	4130901.03	2.88E-05	1.55E-08	9.27E-09	1.55E-08	3.03E-07	1.76E-09	6.52E-07	3.09E-08	2.26E-08	8.60E-05	8.43013E-05	Res
582244.85_4130901.03	582244.85	4130901.03	2.44E-05	1.31E-08	7.86E-09	1.31E-08	2.57E-07	1.50E-09	5.51E-07	2.62E-08	1.90E-08	7.27E-05	7.12628E-05	Res
582301.42_4130901.03	582301.42	4130901.03	2.12E-05	1.14E-08	6.82E-09	1.14E-08	2.22E-07	1.30E-09	4.76E-07	2.27E-08	1.64E-08	6.29E-05	6.16352E-05	Res
582357.99_4130901.03	582357.99	4130901.03	1.87E-05	1.00E-08	6.02E-09	1.00E-08	1.96E-07	1.15E-09	4.19E-07	2.01E-08	1.44E-08	5.54E-05	5.43067E-05	Res
582414.56_4130901.03	582414.56	4130901.03	1.67E-05	8.98E-09	5.39E-09	8.98E-09	1.75E-07	1.03E-09	3.74E-07	1.80E-08	1.28E-08	4.94E-05	4.84282E-05	Res
582471.13_4130901.03	582471.13	4130901.03	1.51E-05	8.13E-09	4.88E-09	8.13E-09	1.58E-07	9.38E-10	3.37E-07	1.63E-08	1.15E-08	4.46E-05	4.37267E-05	Res
582527.7_4130901.03	582527.7	4130901.03	1.38E-05	7.43E-09	4.46E-09	7.43E-09	1.44E-07	8.59E-10	3.07E-07	1.49E-08	1.05E-08	4.06E-05	3.97971E-05	Res
582584.27_4130901.03	582584.27	4130901.03	1.27E-05	6.85E-09	4.11E-09	6.85E-09	1.32E-07	7.94E-10	2.82E-07	1.37E-08	9.60E-09	3.74E-05	3.66011E-05	Res
582640.84_4130901.03	582640.84	4130901.03	1.18E-05	6.37E-09	3.82E-09	6.37E-09	1.22E-07	7.40E-10	2.61E-07	1.27E-08	8.87E-09	3.46E-05	3.39155E-05	Res
582697.41_4130901.03	582697.41	4130901.03	1.10E-05	5.95E-09	3.57E-09	5.95E-09	1.14E-07	6.94E-10	2.43E-07	1.19E-08	8.23E-09	3.23E-05	3.15948E-05	Res
582753.98_4130901.03	582753.98	4130901.03	1.03E-05	5.59E-09	3.35E-09	5.59E-09	1.07E-07	6.53E-10	2.27E-07	1.12E-08	7.68E-09	3.02E-05	2.95575E-05	Res
582810.55_4130901.03	582810.55	4130901.03	9.70E-06	5.26E-09	3.15E-09	5.26E-09	1.00E-07	6.16E-10	2.13E-07	1.05E-08	7.17E-09	2.83E-05	2.77107E-05	Res
582867.12_4130901.03	582867.12	4130901.03	9.16E-06	4.97E-09	2.98E-09	4.97E-09	9.44E-08	5.84E-10	2.01E-07	9.94E-09	6.74E-09	2.67E-05	2.61214E-05	Res
581735.72_4130984.94	581735.72	4130984.94	1.72E-03	9.18E-07	5.51E-07	9.18E-07	1.83E-05	1.03E-07	3.96E-05	1.84E-06	1.39E-06	5.21E-03	0.005106399	Res
581792.29_4130984.94	581792.29	4130984.94	2.26E-03	1.20E-06	7.23E-07	1.20E-06	2.41E-05	1.35E-07	5.20E-05	2.41E-06	1.83E-06	6.84E-03	0.006705354	Res
581848.86_4130984.94	581848.86	4130984.94	2.63E-03	1.40E-06	8.41E-07	1.40E-06	2.80E-05	1.57E-07	6.05E-05	2.80E-06	2.13E-06	7.96E-03	0.007801647	Res
581905.43_4130984.94	581905.43	4130984.94	2.09E-04	1.11E-07	6.68E-08	1.11E-07	2.22E-06	1.25E-08	4.79E-06	2.23E-07	1.68E-07	6.30E-04	0.000617449	Res
581962_4130984.94	581962	4130984.94	8.91E-05	4.76E-08	2.85E-08	4.76E-08	9.45E-07	5.36E-09	2.04E-06	9.52E-08	7.13E-08	2.68E-04	0.000262907	Res
582018.57_4130984.94	582018.57	4130984.94	5.71E-05	3.05E-08	1.83E-08	3.05E-08	6.04E-07	3.45E-09	1.30E-06	6.10E-08	4.54E-08	1.71E-04	0.000168013	Res
582075.14_4130984.94	582075.14	4130984.94	4.19E-05	2.24E-08	1.34E-08	2.24E-08	4.42E-07	2.54E-09	9.51E-07	4.48E-08	3.31E-08	1.25E-04	0.00012293	Res
582131.71_4130984.94	582131.71	4130984.94	3.29E-05	1.76E-08	1.06E-08	1.76E-08	3.47E-07	2.01E-09	7.46E-07	3.53E-08	2.59E-08	9.85E-05	9.6484E-05	Res
582188.28_4130984.94	582188.28	4130984.94	2.70E-05	1.45E-08	8.68E-09	1.45E-08	2.84E-07	1.65E-09	6.10E-07	2.89E-08	2.11E-08	8.06E-05	7.89245E-05	Res
582244.85_4130984.94	582244.85	4130984.94	2.28E-05	1.22E-08	7.33E-09	1.22E-08	2.39E-07	1.40E-09	5.14E-07	2.44E-08	1.78E-08	6.79E-05	6.64828E-05	Res
582301.42_4130984.94	582301.42	4130984.94	1.97E-05	1.06E-08	6.34E-09	1.06E-08	2.06E-07	1.21E-09	4.43E-07	2.11E-08	1.53E-08	5.85E-05	5.729E-05	Res
582357.99_4130984.94	582357.99	4130984.94	1.73E-05	9.29E-09	5.57E-09	9.29E-09	1.81E-07	1.07E-09	3.88E-07	1.86E-08	1.34E-08	5.13E-05	5.02815E-05	Res
582414.56_4130984.94	582414.56	4130984.94	1.54E-05	8.29E-09	4.97E-09	8.29E-09	1.61E-07	9.53E-10	3.45E-07	1.66E-08	1.19E-08	4.57E-05	4.47526E-05	Res
582471.13_4130984.94	582471.13	4130984.94	1.39E-05	7.48E-09	4.49E-09	7.48E-09	1.45E-07	8.62E-10	3.11E-07	1.50E-08	1.07E-08	4.11E-05	4.02954E-05	Res
582527.7_4130984.94	582527.7	4130984.94	1.27E-05	6.82E-09	4.09E-09	6.82E-09	1.32E-07	7.88E-10	2.82E-07	1.36E-08	9.65E-09	3.74E-05	3.66227E-05	Res
582584.27_4130984.94	582584.27	4130984.94	1.17E-05	6.29E-09	3.77E-09	6.29E-09	1.21E-07	7.28E-10	2.60E-07	1.26E-08	8.85E-09	3.44E-05	3.36722E-05	Res
582640.84_4130984.94	582640.84	4130984.94	1.09E-05	5.86E-09	3.51E-09	5.86E-09	1.13E-07	6.79E-10	2.41E-07	1.17E-08	8.20E-09	3.20E-05	3.1284E-05	Res
582697.41_4130984.94	582697.41	4130984.94	1.01E-05	5.47E-09	3.28E-09	5.47E-09	1.05E-07	6.36E-10	2.24E-07	1.09E-08	7.62E-09	2.97E-05	2.91259E-05	Res
582753.98_4130984.94	582753.98	4130984.94	9.53E-06	5.15E-09	3.09E-09	5.15E-09	9.88E-08	6.00E-10	2.11E-07	1.03E-08	7.13E-09	2.80E-05	2.73652E-05	Res
582810.55_4130984.94	582810.55	4130984.94	8.99E-06	4.87E-09	2.92E-09	4.87E-09	9.30E-08	5.68E-10	1.98E-07	9.73E-09	6.70E-09	2.63E-05	2.57635E-05	Res
582867.12_4130984.94	582867.12	4130984.94	8.51E-06	4.61E-09	2.77E-09	4.61E-09	8.79E-08	5.40E-10	1.87E-07	9.22E-09	6.31E-09	2.49E-05	2.43314E-05	Res
581735.72_4131068.85	581735.72	4131068.85	2.81E-04	1.50E-07	8.98E-08	1.50E-07	2.99E-06	1.68E-08	6.44E-06	2.99E-07	2.26E-07	8.48E-04	0.000830963	Res
581792.29_4131068.85	581792.29	4131068.85	2.24E-04	1.19E-07	7.16E-08	1.19E-07	2.38E-06	1.34E-08	5.13E-06	2.39E-07	1.80E-07	6.75E-04	0.00066211	Res
581848.86_4131068.85	581848.86	4131068.85	1.20E-04	6.41E-08	3.84E-08	6.41E-08	1.27E-06	7.21E-09	2.75E-06	1.28E-07	9.63E-08	3.62E-04	0.000354666	Res
581905.43_4131068.85	581905.43	4131068.85	7.62E-05	4.07E-08	2.44E-08	4.07E-08	8.08E-07	4.59E-09	1.74E-06	8.14E-08	6.08E-08	2.29E-04	0.000224615	Res
581962_4131068.85	581962	4131068.85	5.50E-05	2.94E-08	1.76E-08	2.94E-08	5.82E-07	3.33E-09	1.25E-06	5.88E-08	4.37E-08	1.65E-04	0.000161745	Res
582018.57_4131068.85	582018.57	4131068.85	4.15E-05	2.22E-08	1.33E-08	2.22E-08	4.38E-07	2.52E-09	9.42E-07	4.44E-08	3.28E-08	1.24E-04	0.000121777	Res
582075.14_4131068.85	582075.14	4131068.85	3.27E-05	1.75E-08	1.05E-08	1.75E-08	3.45E-07	2.00E-09	7.42E-07	3.51E-08	2.57E-08	9.79E-05	9.59112E-05	Res
582131.71_4131068.85	582131.71	4131068.85	2.68E-05	1.44E-08	8.64E-09	1.44E-08	2.83E-07	1.64E-09	6.07E-07	2.88E-08	2.10E-08	8.01E-05	7.84895E-05	Res

Chronic Calculation, $\sum C_{TAC}$ /REL

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)										Total HI	Receptor Type
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Copper	Mercury	Nickel	Selenium	Chromium VI	Crystalline Silica		
582188.28_4131068.85	582188.28	4131068.85	2.26E-05	1.21E-08	7.27E-09	1.21E-08	2.37E-07	1.38E-09	5.09E-07	2.42E-08	1.76E-08	6.72E-05	6.58378E-05	Res
582244.85_4131068.85	582244.85	4131068.85	1.94E-05	1.04E-08	6.25E-09	1.04E-08	2.04E-07	1.19E-09	4.36E-07	2.08E-08	1.50E-08	5.77E-05	5.65143E-05	Res
582301.42_4131068.85	582301.42	4131068.85	1.70E-05	9.12E-09	5.47E-09	9.12E-09	1.78E-07	1.05E-09	3.81E-07	1.82E-08	1.31E-08	5.04E-05	4.93251E-05	Res
582357.99_4131068.85	582357.99	4131068.85	1.50E-05	8.09E-09	4.85E-09	8.09E-09	1.57E-07	9.30E-10	3.37E-07	1.62E-08	1.16E-08	4.46E-05	4.36449E-05	Res
582414.56_4131068.85	582414.56	4131068.85	1.35E-05	7.27E-09	4.36E-09	7.27E-09	1.41E-07	8.38E-10	3.02E-07	1.45E-08	1.03E-08	4.00E-05	3.91399E-05	Res
582471.13_4131068.85	582471.13	4131068.85	1.22E-05	6.60E-09	3.96E-09	6.60E-09	1.28E-07	7.61E-10	2.73E-07	1.32E-08	9.35E-09	3.62E-05	3.5446E-05	Res
582527.7_4131068.85	582527.7	4131068.85	1.12E-05	6.04E-09	3.62E-09	6.04E-09	1.17E-07	6.98E-10	2.50E-07	1.21E-08	8.52E-09	3.31E-05	3.23681E-05	Res
582584.27_4131068.85	582584.27	4131068.85	1.03E-05	5.56E-09	3.33E-09	5.56E-09	1.07E-07	6.43E-10	2.29E-07	1.11E-08	7.81E-09	3.04E-05	2.97194E-05	Res
582640.84_4131068.85	582640.84	4131068.85	9.64E-06	5.20E-09	3.12E-09	5.20E-09	1.00E-07	6.04E-10	2.14E-07	1.04E-08	7.29E-09	2.84E-05	2.77892E-05	Res
582697.41_4131068.85	582697.41	4131068.85	9.04E-06	4.89E-09	2.93E-09	4.89E-09	9.40E-08	5.68E-10	2.00E-07	9.77E-09	6.81E-09	2.66E-05	2.60335E-05	Res
582753.98_4131068.85	582753.98	4131068.85	8.57E-06	4.63E-09	2.78E-09	4.63E-09	8.89E-08	5.39E-10	1.90E-07	9.26E-09	6.43E-09	2.51E-05	2.46209E-05	Res
582810.55_4131068.85	582810.55	4131068.85	8.14E-06	4.40E-09	2.64E-09	4.40E-09	8.44E-08	5.14E-10	1.80E-07	8.81E-09	6.09E-09	2.39E-05	2.33665E-05	Res
582867.12_4131068.85	582867.12	4131068.85	7.70E-06	4.17E-09	2.50E-09	4.17E-09	7.96E-08	4.87E-10	1.70E-07	8.33E-09	5.73E-09	2.25E-05	2.20498E-05	Res
582018.57_4131152.76	582018.57	4131152.76	2.75E-05	1.47E-08	8.85E-09	1.47E-08	2.89E-07	1.68E-09	6.21E-07	2.95E-08	2.15E-08	8.20E-05	8.03149E-05	Res
582244.85_4131152.76	582244.85	4131152.76	1.63E-05	8.76E-09	5.25E-09	8.76E-09	1.70E-07	1.01E-09	3.65E-07	1.75E-08	1.25E-08	4.83E-05	4.72664E-05	Res
582301.42_4131152.76	582301.42	4131152.76	1.46E-05	7.85E-09	4.71E-09	7.85E-09	1.52E-07	9.05E-10	3.26E-07	1.57E-08	1.12E-08	4.32E-05	4.2288E-05	Res
582357.99_4131152.76	582357.99	4131152.76	1.31E-05	7.06E-09	4.23E-09	7.06E-09	1.37E-07	8.14E-10	2.93E-07	1.41E-08	1.00E-08	3.87E-05	3.79291E-05	Res
582414.56_4131152.76	582414.56	4131152.76	1.19E-05	6.40E-09	3.84E-09	6.40E-09	1.24E-07	7.40E-10	2.65E-07	1.28E-08	9.04E-09	3.51E-05	3.43306E-05	Res
582471.13_4131152.76	582471.13	4131152.76	1.07E-05	5.78E-09	3.47E-09	5.78E-09	1.12E-07	6.70E-10	2.39E-07	1.16E-08	8.13E-09	3.16E-05	3.09533E-05	Res
582527.7_4131152.76	582527.7	4131152.76	9.81E-06	5.29E-09	3.18E-09	5.29E-09	1.02E-07	6.14E-10	2.18E-07	1.06E-08	7.42E-09	2.89E-05	2.82808E-05	Res
582584.27_4131152.76	582584.27	4131152.76	9.03E-06	4.88E-09	2.93E-09	4.88E-09	9.38E-08	5.66E-10	2.00E-07	9.75E-09	6.81E-09	2.66E-05	2.60012E-05	Res
582640.84_4131152.76	582640.84	4131152.76	8.40E-06	4.54E-09	2.73E-09	4.54E-09	8.73E-08	5.28E-10	1.86E-07	9.08E-09	6.32E-09	2.47E-05	2.41757E-05	Res
582697.41_4131152.76	582697.41	4131152.76	7.88E-06	4.26E-09	2.55E-09	4.26E-09	8.17E-08	4.96E-10	1.74E-07	8.52E-09	5.90E-09	2.31E-05	2.2629E-05	Res
582753.98_4131152.76	582753.98	4131152.76	7.49E-06	4.05E-09	2.43E-09	4.05E-09	7.76E-08	4.72E-10	1.65E-07	8.10E-09	5.60E-09	2.20E-05	2.14887E-05	Res
582810.55_4131152.76	582810.55	4131152.76	7.13E-06	3.86E-09	2.31E-09	3.86E-09	7.38E-08	4.50E-10	1.57E-07	7.71E-09	5.32E-09	2.09E-05	2.04319E-05	Res
582867.12_4131152.76	582867.12	4131152.76	6.74E-06	3.65E-09	2.19E-09	3.65E-09	6.97E-08	4.27E-10	1.48E-07	7.30E-09	5.01E-09	1.97E-05	1.93081E-05	Res

HRA Permanente Creek Restoration Project

Construction Year 2028

Emissions Inputs

Construction Activity	Construction Year & Source	DPM Exhaust (tons/year)	PM10 Dust for speciation (tons/year)	Arsenic (tons/year)	Beryllium (tons/year)	Cadmium (tons/year)	Cobalt (tons/year)	Copper (tons/year)	Lead (tons/year)	Mercury (tons/year)	Nickel (tons/year)	Selenium (tons/year)	Chromium VI (tons/year)	Crystalline Silica (tons/year)
Concrete Channel 2024	2024_CONCRTE	0.000	0.00	2.91E-12	1.74E-12	2.91E-12	1.49E-11	3.26E-11	2.91E-12	4.65E-13	5.35E-11	5.81E-12	2.33E-13	8.63E-09
Paved road	2024_PAVED	2.07E-04	0.08	1.04E-07	6.26E-08	1.04E-07	6.68E-08	2.09E-06	1.92E-07	1.17E-08	4.51E-06	2.09E-07	1.59E-07	5.93E-04
Unpaved road	2024_CCP_UNPV	6.27E-05	0.20	2.56E-07	1.54E-07	2.56E-07	1.64E-07	5.12E-06	4.71E-07	2.87E-08	1.11E-05	5.12E-07	3.89E-07	1.46E-03
Channel Widening 2024	2024_CHAN_RCK	0.002	0.16	2.05E-07	1.23E-07	2.05E-07	1.05E-06	2.29E-06	2.05E-07	3.28E-08	3.77E-06	4.09E-07	1.64E-08	6.08E-04
Paved road	2024_PAVED	1.80E-03	2.39	2.99E-06	1.79E-06	2.99E-06	1.91E-06	5.98E-05	5.50E-06	3.35E-07	1.29E-04	5.98E-06	4.54E-06	1.70E-02
Rock Pile Area 2025	2025_CHAN_RCK	0.006	0.25	3.16E-07	1.89E-07	3.16E-07	1.62E-06	3.54E-06	3.16E-07	5.05E-08	5.81E-06	6.31E-07	2.53E-08	9.37E-04
Paved road	2025_PAVED	5.95E-03	2.44	3.05E-06	1.83E-06	3.05E-06	1.95E-06	6.10E-05	5.61E-06	3.41E-07	1.32E-04	6.10E-06	4.63E-06	1.73E-02
Rock Pile Area 2026	2026_CHAN_RCK	0.006	0.25	3.16E-07	1.89E-07	3.16E-07	1.62E-06	3.54E-06	3.16E-07	5.05E-08	5.81E-06	6.31E-07	2.53E-08	9.37E-04
Paved road	2026_PAVED	5.84E-03	2.44	3.05E-06	1.83E-06	3.05E-06	1.95E-06	6.10E-05	5.61E-06	3.41E-07	1.32E-04	6.10E-06	4.63E-06	1.73E-02
Channel Widening 2027	2027_CHAN_RCK	0.002	0.98	1.23E-06	7.36E-07	1.23E-06	6.28E-06	1.37E-05	1.23E-06	1.96E-07	2.26E-05	2.45E-06	9.82E-08	3.64E-03
Paved road	2027_PAVED	5.61E-03	2.39	2.99E-06	1.79E-06	2.99E-06	1.91E-06	5.98E-05	5.50E-06	3.35E-07	1.29E-04	5.98E-06	4.54E-06	1.70E-02
Material Removal 2028	2028_MATRMVL	0.001	0.25	3.15E-07	1.89E-07	3.15E-07	1.62E-06	3.53E-06	3.15E-07	5.05E-08	5.80E-06	6.31E-07	2.52E-08	9.37E-04
Paved road	2028_PAVED	5.57E-03	2.39	2.99E-06	1.80E-06	2.99E-06	1.92E-06	5.98E-05	5.51E-06	3.35E-07	1.29E-04	5.98E-06	4.55E-06	1.70E-02
Unpaved road	2028_UNPAVED	3.40E-03	11.84	1.48E-05	8.88E-06	1.48E-05	9.47E-06	2.96E-04	2.72E-05	1.66E-06	6.40E-04	2.96E-05	2.25E-05	8.41E-02
Material Removal 2029	2029_MATRMVL	0.001	0.25	3.15E-07	1.89E-07	3.15E-07	1.62E-06	3.53E-06	3.15E-07	5.05E-08	5.80E-06	6.31E-07	2.52E-08	9.37E-04
Paved road	2029_PAVED	5.56E-03	2.41	3.01E-06	1.81E-06	3.01E-06	1.93E-06	6.03E-05	5.55E-06	3.38E-07	1.30E-04	6.03E-06	4.58E-06	1.71E-02
Unpaved road	2029_UNPAVED	3.39E-03	11.93	1.49E-05	8.95E-06	1.49E-05	9.55E-06	2.98E-04	2.74E-05	1.67E-06	6.44E-04	2.98E-05	2.27E-05	8.47E-02

Construction Activity	Construction Year	DPM (g/s)	Arsenic (g/s)	Beryllium (g/s)	Cadmium (g/s)	Cobalt (g/s)	Copper (g/s)	Lead (g/s)	Mercury (g/s)	Nickel (g/s)	Selenium (g/s)	Chromium VI (g/s)	Crystalline Silica (g/s)
Concrete Channel 2024	2024_CONCRTE	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Paved road	2024_PAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Unpaved road	2024_CCP_UNPV	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Channel Widening 2024	2024_CHAN_RCK	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Paved road	2024_PAVED	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Rock Pile Area 2025	2025_CHAN_RCK	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Paved road	2025_PAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Rock Pile Area 2026	2026_CHAN_RCK	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Paved road	2026_PAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Channel Widening 2027	2027_CHAN_RCK	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Paved road	2027_PAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Material Removal 2028	2028_MATRMVL	3.324E-05	9.075E-09	5.445E-09	9.075E-09	4.647E-08	1.016E-07	9.075E-09	1.452E-09	1.670E-07	1.815E-08	7.260E-10	2.696E-05
Paved road	2028_PAVED	1.603E-04	8.608E-08	5.165E-08	8.608E-08	5.509E-08	1.722E-06	1.584E-07	9.641E-09	3.719E-06	1.722E-07	1.308E-07	4.889E-04
Unpaved road	2028_UNPAVED	9.795E-05	4.259E-07	2.555E-07	4.259E-07	2.726E-07	8.517E-06	7.836E-07	4.770E-08	1.840E-05	8.517E-07	6.473E-07	2.419E-03
Material Removal 2029	2029_MATRMVL	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Paved road	2029_PAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Unpaved road	2029_UNPAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

N/A = not including PM10 on-site dust in HRA calculation; it is only for speciating metals.

Chronic REL

TAC	UOM	
DPM	µg/m^3	5
Arsenic	µg/m^3	0.015
Beryllium	µg/m^3	0.007
Cadmium	µg/m^3	0.02
Copper	µg/m^3	100
Mercury	µg/m^3	0.032
Nickel	µg/m^3	0.014
Selenium	µg/m^3	20
Chromium VI	µg/m^3	0.2
Crystalline Silica	µg/m^3	3

	Max
CT House	0.001
Res	0.008

Chronic Calculation, $\sum C_{TAC}$ /REL

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} (µg/m^3)										Total HI	Receptor Type
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Copper	Mercury	Nickel	Selenium	Chromium VI	Crystalline Silica		
			5	0.015	0.007	0.02	100	0.032	0.014	20	0.2	3		
581336.22_4131207.48	581336.22	4131207.48	1.87E-04	1.10E-07	6.58E-08	1.10E-07	2.19E-06	1.23E-08	4.73E-06	2.19E-07	1.66E-07	6.22E-04	0.000606251	CT House
581554.22_4130688.06	581554.22	4130688.06	1.25E-04	7.92E-08	4.75E-08	7.92E-08	1.58E-06	8.87E-09	3.42E-06	1.58E-07	1.20E-07	4.49E-04	0.000435769	Res
579793.36_4131503.29	579793.36	4131503.29	1.11E-05	2.14E-08	1.29E-08	2.14E-08	4.26E-07	2.41E-09	9.20E-07	4.28E-08	3.22E-08	1.21E-04	0.000112855	Acute
580488.37_4131517.71	580488.37	4131517.71	1.46E-05	1.75E-08	1.05E-08	1.75E-08	3.49E-07	1.97E-09	7.53E-07	3.50E-08	2.64E-08	9.90E-05	9.34226E-05	Acute
581678.43_4131040.03	581678.43	4131040.03	5.93E-04	3.26E-07	1.96E-07	3.26E-07	6.52E-06	3.65E-08	1.41E-05	6.52E-07	4.96E-07	1.85E-03	0.00181177	Res
581635.43_4130978.54	581635.43	4130978.54	1.20E-03	6.53E-07	3.92E-07	6.53E-07	1.30E-05	7.31E-08	2.82E-05	1.31E-06	9.92E-07	3.71E-03	0.00362792	Res
581830.06_4131027.55	581830.06	4131027.55	5.46E-04	3.00E-07	1.80E-07	3.00E-07	6.01E-06	3.36E-08	1.30E-05	6.01E-07	4.56E-07	1.71E-03	0.001668443	Res
581727.48_4130976.54	581727.48	4130976.54	1.45E-03	7.88E-07	4.73E-07	7.88E-07	1.58E-05	8.82E-08	3.40E-05	1.58E-06	1.20E-06	4.47E-03	0.004379859	Res
581789.11_4130419.65	581789.11	4130419.65	9.48E-05	6.23E-08	3.74E-08	6.23E-08	1.24E-06	6.99E-09	2.69E-06	1.25E-07	9.45E-08	3.53E-04	0.000342076	Res
581700.32_4130781.89	581700.32	4130781.89	2.88E-04	1.64E-07	9.85E-08	1.64E-07	3.28E-06	1.84E-08	7.09E-06	3.28E-07	2.49E-07	9.32E-04	0.000909344	Res
581426.07_4131299.01	581426.07	4131299.01	6.79E-05	4.44E-08	2.67E-08	4.44E-08	8.88E-07	4.98E-09	1.92E-06	8.89E-08	6.74E-08	2.52E-04	0.000243978	Acute
582301.42_4129474.56	582301.42	4129474.56	3.02E-05	2.48E-08	1.49E-08	2.48E-08	4.95E-07	2.78E-09	1.07E-06	4.96E-08	3.75E-08	1.40E-04	0.000134382	Res
582357.99_4129474.56	582357.99	4129474.56	2.83E-05	2.34E-08	1.40E-08	2.34E-08	4.66E-07	2.62E-09	1.01E-06	4.67E-08	3.53E-08	1.32E-04	0.00012659	Res
582414.56_4129474.56	582414.56	4129474.56	2.65E-05	2.21E-08	1.32E-08	2.21E-08	4.40E-07	2.48E-09	9.50E-07	4.41E-08	3.34E-08	1.25E-04	0.000119517	Res
582471.13_4129474.56	582471.13	4129474.56	2.49E-05	2.09E-08	1.25E-08	2.09E-08	4.17E-07	2.34E-09	8.99E-07	4.18E-08	3.16E-08	1.18E-04	0.000113072	Res
582527.7_4129474.56	582527.7	4129474.56	2.35E-05	1.99E-08	1.19E-08	1.99E-08	3.96E-07	2.23E-09	8.55E-07	3.97E-08	3.00E-08	1.12E-04	0.000107487	Res
582584.27_4129474.56	582584.27	4129474.56	2.22E-05	1.88E-08	1.13E-08	1.88E-08	3.76E-07	2.11E-09	8.10E-07	3.77E-08	2.85E-08	1.07E-04	0.000101881	Res
582640.84_4129474.56	582640.84	4129474.56	2.07E-05	1.78E-08	1.07E-08	1.78E-08	3.55E-07	2.00E-09	7.65E-07	3.56E-08	2.69E-08	1.01E-04	9.61485E-05	Res
582244.85_4129558.47	582244.85	4129558.47	3.05E-05	2.52E-08	1.51E-08	2.52E-08	5.02E-07	2.82E-09	1.08E-06	5.03E-08	3.80E-08	1.43E-04	0.000136381	Res
582301.42_4129558.47	582301.42	4129558.47	3.03E-05	2.46E-08	1.48E-08	2.46E-08	4.91E-07	2.76E-09	1.06E-06	4.92E-08	3.72E-08	1.39E-04	0.000133416	Res
582357.99_4129558.47	582357.99	4129558.47	2.88E-05	2.34E-08	1.40E-08	2.34E-08	4.67E-07	2.63E-09	1.01E-06	4.68E-08	3.54E-08	1.33E-04	0.000126948	Res
582414.56_4129558.47	582414.56	4129558.47	2.70E-05	2.22E-08	1.33E-08	2.22E-08	4.42E-07	2.49E-09	9.54E-07	4.43E-08	3.35E-08	1.26E-04	0.000120123	Res
582471.13_4129558.47	582471.13	4129558.47	2.53E-05	2.09E-08	1.26E-08	2.09E-08	4.17E-07	2.35E-09	9.01E-07	4.19E-08	3.16E-08	1.19E-04	0.000113409	Res
582527.7_4129558.47	582527.7	4129558.47	2.37E-05	1.98E-08	1.19E-08	1.98E-08	3.95E-07	2.22E-09	8.53E-07	3.96E-08	2.99E-08	1.12E-04	0.00010729	Res
582584.27_4129558.47	582584.27	4129558.47	2.22E-05	1.88E-08	1.13E-08	1.88E-08	3.74E-07	2.11E-09	8.07E-07	3.75E-08	2.83E-08	1.06E-04	0.000101517	Res
582640.84_4129558.47	582640.84	4129558.47	2.09E-05	1.79E-08	1.07E-08	1.79E-08	3.56E-07	2.01E-09	7.69E-07	3.57E-08	2.70E-08	1.01E-04	9.66179E-05	Res
582697.41_4129558.47	582697.41	4129558.47	1.97E-05	1.70E-08	1.02E-08	1.70E-08	3.39E-07	1.91E-09	7.32E-07	3.40E-08	2.57E-08	9.63E-05	9.19568E-05	Res
582244.85_4129642.38	582244.85	4129642.38	2.69E-05	2.31E-08	1.39E-08	2.31E-08	4.61E-07	2.59E-09	9.94E-07	4.62E-08	3.49E-08	1.31E-04	0.000124939	Res
582301.42_4129642.38	582301.42	4129642.38	2.95E-05	2.41E-08	1.45E-08	2.41E-08	4.81E-07	2.70E-09	1.04E-06	4.82E-08	3.64E-08	1.36E-04	0.000130602	Res
582357.99_4129642.38	582357.99	4129642.38	2.92E-05	2.36E-08	1.41E-08	2.36E-08	4.70E-07	2.64E-09	1.01E-06	4.71E-08	3.56E-08	1.33E-04	0.000127811	Res
582414.56_4129642.38	582414.56	4129642.38	2.76E-05	2.24E-08	1.34E-08	2.24E-08	4.47E-07	2.52E-09	9.65E-07	4.48E-08	3.39E-08	1.27E-04	0.00012154	Res
582471.13_4129642.38	582471.13	4129642.38	2.60E-05	2.13E-08	1.28E-08	2.13E-08	4.24E-07	2.39E-09	9.15E-07	4.25E-08	3.21E-08	1.20E-04	0.000115225	Res
582527.7_4129642.38	582527.7	4129642.38	2.44E-05	2.02E-08	1.21E-08	2.02E-08	4.03E-07	2.27E-09	8.70E-07	4.04E-08	3.05E-08	1.14E-04	0.000109448	Res
582584.27_4129642.38	582584.27	4129642.38	2.28E-05	1.91E-08	1.15E-08	1.91E-08	3.81E-07	2.14E-09	8.22E-07	3.82E-08	2.88E-08	1.08E-04	0.000103349	Res

Chronic Calculation, $\sum C_{TAC}$ /REL

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)										Total HI	Receptor Type
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Copper	Mercury	Nickel	Selenium	Chromium VI	Crystalline Silica		
582640.84_4129642.38	582640.84	4129642.38	2.13E-05	1.81E-08	1.09E-08	1.81E-08	3.61E-07	2.03E-09	7.80E-07	3.62E-08	2.74E-08	1.03E-04	9.80488E-05	Res
582697.41_4129642.38	582697.41	4129642.38	2.00E-05	1.72E-08	1.03E-08	1.72E-08	3.44E-07	1.94E-09	7.42E-07	3.45E-08	2.60E-08	9.76E-05	9.31875E-05	Res
582753.98_4129642.38	582753.98	4129642.38	1.87E-05	1.64E-08	9.83E-09	1.64E-08	3.27E-07	1.84E-09	7.05E-07	3.28E-08	2.47E-08	9.27E-05	8.85161E-05	Res
582810.55_4129642.38	582810.55	4129642.38	1.76E-05	1.56E-08	9.37E-09	1.56E-08	3.11E-07	1.75E-09	6.72E-07	3.12E-08	2.36E-08	8.84E-05	8.43079E-05	Res
582867.12_4129642.38	582867.12	4129642.38	1.64E-05	1.48E-08	8.88E-09	1.48E-08	2.95E-07	1.66E-09	6.37E-07	2.96E-08	2.23E-08	8.38E-05	7.98307E-05	Res
582244.85_4129726.29	582244.85	4129726.29	2.95E-05	2.44E-08	1.46E-08	2.44E-08	4.87E-07	2.74E-09	1.05E-06	4.88E-08	3.69E-08	1.38E-04	0.000132284	Res
582301.42_4129726.29	582301.42	4129726.29	2.88E-05	2.37E-08	1.42E-08	2.37E-08	4.73E-07	2.66E-09	1.02E-06	4.74E-08	3.59E-08	1.34E-04	0.000128529	Res
582357.99_4129726.29	582357.99	4129726.29	2.94E-05	2.37E-08	1.42E-08	2.37E-08	4.73E-07	2.66E-09	1.02E-06	4.75E-08	3.59E-08	1.34E-04	0.000128733	Res
582414.56_4129726.29	582414.56	4129726.29	2.81E-05	2.28E-08	1.37E-08	2.28E-08	4.55E-07	2.56E-09	9.81E-07	4.56E-08	3.44E-08	1.29E-04	0.000123584	Res
582471.13_4129726.29	582471.13	4129726.29	2.66E-05	2.17E-08	1.30E-08	2.17E-08	4.33E-07	2.44E-09	9.35E-07	4.34E-08	3.28E-08	1.23E-04	0.000117728	Res
582527.7_4129726.29	582527.7	4129726.29	2.51E-05	2.07E-08	1.24E-08	2.07E-08	4.12E-07	2.32E-09	8.89E-07	4.13E-08	3.12E-08	1.17E-04	0.000111966	Res
582584.27_4129726.29	582584.27	4129726.29	2.35E-05	1.96E-08	1.18E-08	1.96E-08	3.91E-07	2.20E-09	8.45E-07	3.92E-08	2.97E-08	1.11E-04	0.000106286	Res
582640.84_4129726.29	582640.84	4129726.29	2.20E-05	1.86E-08	1.12E-08	1.86E-08	3.71E-07	2.09E-09	8.01E-07	3.72E-08	2.81E-08	1.05E-04	0.000100772	Res
582697.41_4129726.29	582697.41	4129726.29	2.04E-05	1.76E-08	1.05E-08	1.76E-08	3.51E-07	1.97E-09	7.57E-07	3.52E-08	2.66E-08	9.95E-05	9.50669E-05	Res
582753.98_4129726.29	582753.98	4129726.29	1.88E-05	1.66E-08	9.94E-09	1.66E-08	3.30E-07	1.86E-09	7.13E-07	3.31E-08	2.50E-08	9.38E-05	8.94816E-05	Res
582810.55_4129726.29	582810.55	4129726.29	1.72E-05	1.55E-08	9.31E-09	1.55E-08	3.09E-07	1.74E-09	6.68E-07	3.10E-08	2.34E-08	8.78E-05	8.37255E-05	Res
582244.85_4129810.2	582244.85	4129810.2	2.87E-05	2.41E-08	1.45E-08	2.41E-08	4.82E-07	2.71E-09	1.04E-06	4.83E-08	3.65E-08	1.37E-04	0.000130745	Res
582301.42_4129810.2	582301.42	4129810.2	2.92E-05	2.41E-08	1.44E-08	2.41E-08	4.80E-07	2.70E-09	1.04E-06	4.81E-08	3.64E-08	1.36E-04	0.000130462	Res
582357.99_4129810.2	582357.99	4129810.2	2.91E-05	2.37E-08	1.42E-08	2.37E-08	4.73E-07	2.66E-09	1.02E-06	4.74E-08	3.58E-08	1.34E-04	0.00012856	Res
582414.56_4129810.2	582414.56	4129810.2	2.84E-05	2.31E-08	1.38E-08	2.31E-08	4.60E-07	2.59E-09	9.93E-07	4.61E-08	3.49E-08	1.31E-04	0.000125095	Res
582471.13_4129810.2	582471.13	4129810.2	2.72E-05	2.21E-08	1.33E-08	2.21E-08	4.42E-07	2.49E-09	9.54E-07	4.43E-08	3.35E-08	1.25E-04	0.00012009	Res
582527.7_4129810.2	582527.7	4129810.2	2.55E-05	2.10E-08	1.26E-08	2.10E-08	4.20E-07	2.36E-09	9.06E-07	4.21E-08	3.18E-08	1.19E-04	0.000114046	Res
582584.27_4129810.2	582584.27	4129810.2	2.38E-05	1.99E-08	1.19E-08	1.99E-08	3.97E-07	2.24E-09	8.57E-07	3.98E-08	3.01E-08	1.13E-04	0.000107842	Res
582640.84_4129810.2	582640.84	4129810.2	2.18E-05	1.86E-08	1.12E-08	1.86E-08	3.72E-07	2.09E-09	8.03E-07	3.73E-08	2.82E-08	1.06E-04	0.000100891	Res
582697.41_4129810.2	582697.41	4129810.2	2.00E-05	1.75E-08	1.05E-08	1.75E-08	3.49E-07	1.97E-09	7.53E-07	3.50E-08	2.64E-08	9.91E-05	9.4581E-05	Res
581905.43_4129894.11	581905.43	4129894.11	3.80E-05	3.17E-08	1.90E-08	3.17E-08	6.33E-07	3.56E-09	1.37E-06	6.34E-08	4.80E-08	1.80E-04	0.000171826	Res
581962_4129894.11	581962	4129894.11	3.79E-05	3.11E-08	1.86E-08	3.11E-08	6.20E-07	3.49E-09	1.34E-06	6.21E-08	4.70E-08	1.76E-04	0.000168483	Res
582131.71_4129894.11	582131.71	4129894.11	3.29E-05	2.72E-08	1.63E-08	2.72E-08	5.43E-07	3.05E-09	1.17E-06	5.44E-08	4.11E-08	1.54E-04	0.000147464	Res
582188.28_4129894.11	582188.28	4129894.11	3.18E-05	2.62E-08	1.57E-08	2.62E-08	5.23E-07	2.94E-09	1.13E-06	5.24E-08	3.97E-08	1.49E-04	0.000142132	Res
582244.85_4129894.11	582244.85	4129894.11	3.12E-05	2.56E-08	1.53E-08	2.56E-08	5.10E-07	2.87E-09	1.10E-06	5.11E-08	3.87E-08	1.45E-04	0.000138656	Res
582301.42_4129894.11	582301.42	4129894.11	3.02E-05	2.47E-08	1.48E-08	2.47E-08	4.94E-07	2.78E-09	1.07E-06	4.95E-08	3.74E-08	1.40E-04	0.000134118	Res
582357.99_4129894.11	582357.99	4129894.11	2.89E-05	2.37E-08	1.42E-08	2.37E-08	4.74E-07	2.67E-09	1.02E-06	4.75E-08	3.59E-08	1.35E-04	0.00012874	Res
582414.56_4129894.11	582414.56	4129894.11	2.94E-05	2.37E-08	1.42E-08	2.37E-08	4.73E-07	2.66E-09	1.02E-06	4.74E-08	3.58E-08	1.34E-04	0.00012857	Res
582471.13_4129894.11	582471.13	4129894.11	2.76E-05	2.25E-08	1.35E-08	2.25E-08	4.48E-07	2.52E-09	9.67E-07	4.49E-08	3.40E-08	1.27E-04	0.000121795	Res
582527.7_4129894.11	582527.7	4129894.11	2.54E-05	2.11E-08	1.27E-08	2.11E-08	4.21E-07	2.37E-09	9.08E-07	4.22E-08	3.19E-08	1.19E-04	0.000114275	Res
582584.27_4129894.11	582584.27	4129894.11	2.33E-05	1.97E-08	1.18E-08	1.97E-08	3.94E-07	2.22E-09	8.50E-07	3.95E-08	2.98E-08	1.12E-04	0.000106881	Res
582640.84_4129894.11	582640.84	4129894.11	2.13E-05	1.85E-08	1.11E-08	1.85E-08	3.68E-07	2.07E-09	7.95E-07	3.69E-08	2.79E-08	1.05E-04	9.98504E-05	Res
582697.41_4129894.11	582697.41	4129894.11	1.95E-05	1.73E-08	1.04E-08	1.73E-08	3.44E-07	1.94E-09	7.43E-07	3.45E-08	2.61E-08	9.78E-05	9.32499E-05	Res
581962_4129978.02	581962	4129978.02	3.95E-05	3.21E-08	1.93E-08	3.21E-08	6.41E-07	3.60E-09	1.38E-06	6.42E-08	4.86E-08	1.82E-04	0.000174181	Res
582018.57_4129978.02	582018.57	4129978.02	3.71E-05	3.04E-08	1.82E-08	3.04E-08	6.07E-07	3.41E-09	1.31E-06	6.08E-08	4.60E-08	1.72E-04	0.000164964	Res
582075.14_4129978.02	582075.14	4129978.02	3.83E-05	3.05E-08	1.83E-08	3.05E-08	6.10E-07	3.43E-09	1.32E-06	6.11E-08	4.62E-08	1.73E-04	0.000165905	Res
582131.71_4129978.02	582131.71	4129978.02	3.83E-05	3.01E-08	1.81E-08	3.01E-08	6.02E-07	3.38E-09	1.30E-06	6.03E-08	4.56E-08	1.71E-04	0.000163791	Res
582188.28_4129978.02	582188.28	4129978.02	3.83E-05	2.98E-08	1.79E-08	2.98E-08	5.94E-07	3.34E-09	1.28E-06	5.95E-08	4.51E-08	1.69E-04	0.000161901	Res
582244.85_4129978.02	582244.85	4129978.02	3.47E-05	2.75E-08	1.65E-08	2.75E-08	5.49E-07	3.09E-09	1.19E-06	5.50E-08	4.16E-08	1.56E-04	0.000149503	Res
582301.42_4129978.02	582301.42	4129978.02	3.43E-05	2.70E-08	1.62E-08	2.70E-08	5.38E-07	3.03E-09	1.16E-06	5.39E-08	4.08E-08	1.53E-04	0.000146569	Res
582357.99_4129978.02	582357.99	4129978.02	3.25E-05	2.57E-08	1.54E-08	2.57E-08	5.13E-07	2.88E-09	1.11E-06	5.14E-08	3.89E-08	1.46E-04	0.000139558	Res
582414.56_4129978.02	582414.56	4129978.02	3.01E-05	2.41E-08	1.45E-08	2.41E-08	4.81E-07	2.71E-09	1.04E-06	4.83E-08	3.65E-08	1.37E-04	0.000130981	Res

Chronic Calculation, $\sum C_{TAC}$ /REL

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)										Total HI	Receptor Type
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Copper	Mercury	Nickel	Selenium	Chromium VI	Crystalline Silica		
582471.13_4129978.02	582471.13	4129978.02	2.76E-05	2.25E-08	1.35E-08	2.25E-08	4.50E-07	2.53E-09	9.71E-07	4.51E-08	3.41E-08	1.28E-04	0.000122234	Res
582527.7_4129978.02	582527.7	4129978.02	2.52E-05	2.10E-08	1.26E-08	2.10E-08	4.19E-07	2.36E-09	9.04E-07	4.20E-08	3.17E-08	1.19E-04	0.000113705	Res
582584.27_4129978.02	582584.27	4129978.02	2.29E-05	1.95E-08	1.17E-08	1.95E-08	3.90E-07	2.19E-09	8.42E-07	3.91E-08	2.95E-08	1.11E-04	0.000105774	Res
582640.84_4129978.02	582640.84	4129978.02	2.09E-05	1.82E-08	1.09E-08	1.82E-08	3.64E-07	2.05E-09	7.85E-07	3.65E-08	2.76E-08	1.03E-04	9.85537E-05	Res
582697.41_4129978.02	582697.41	4129978.02	1.90E-05	1.70E-08	1.02E-08	1.70E-08	3.39E-07	1.91E-09	7.33E-07	3.40E-08	2.57E-08	9.64E-05	9.19025E-05	Res
582753.98_4129978.02	582753.98	4129978.02	1.72E-05	1.58E-08	9.50E-09	1.58E-08	3.16E-07	1.78E-09	6.81E-07	3.17E-08	2.39E-08	8.96E-05	8.53436E-05	Res
582810.55_4129978.02	582810.55	4129978.02	1.52E-05	1.46E-08	8.73E-09	1.46E-08	2.90E-07	1.63E-09	6.26E-07	2.91E-08	2.20E-08	8.24E-05	7.83358E-05	Res
581905.43_4130061.93	581905.43	4130061.93	5.66E-05	4.16E-08	2.50E-08	4.16E-08	8.31E-07	4.67E-09	1.79E-06	8.32E-08	6.30E-08	2.36E-04	0.000226994	Res
581962_4130061.93	581962	4130061.93	5.35E-05	3.95E-08	2.37E-08	3.95E-08	7.88E-07	4.43E-09	1.70E-06	7.89E-08	5.98E-08	2.24E-04	0.000215236	Res
582018.57_4130061.93	582018.57	4130061.93	4.55E-05	3.49E-08	2.09E-08	3.49E-08	6.96E-07	3.91E-09	1.50E-06	6.97E-08	5.28E-08	1.98E-04	0.00018975	Res
582075.14_4130061.93	582075.14	4130061.93	4.07E-05	3.19E-08	1.91E-08	3.19E-08	6.37E-07	3.58E-09	1.37E-06	6.38E-08	4.83E-08	1.81E-04	0.000173345	Res
582131.71_4130061.93	582131.71	4130061.93	4.00E-05	3.11E-08	1.87E-08	3.11E-08	6.21E-07	3.49E-09	1.34E-06	6.22E-08	4.71E-08	1.76E-04	0.000169114	Res
582188.28_4130061.93	582188.28	4130061.93	3.91E-05	3.02E-08	1.81E-08	3.02E-08	6.04E-07	3.39E-09	1.30E-06	6.05E-08	4.58E-08	1.71E-04	0.000164489	Res
582244.85_4130061.93	582244.85	4130061.93	3.84E-05	2.95E-08	1.77E-08	2.95E-08	5.88E-07	3.31E-09	1.27E-06	5.89E-08	4.46E-08	1.67E-04	0.000160294	Res
582301.42_4130061.93	582301.42	4130061.93	3.57E-05	2.77E-08	1.66E-08	2.77E-08	5.53E-07	3.11E-09	1.19E-06	5.54E-08	4.19E-08	1.57E-04	0.000150551	Res
582357.99_4130061.93	582357.99	4130061.93	3.31E-05	2.60E-08	1.56E-08	2.60E-08	5.19E-07	2.92E-09	1.12E-06	5.20E-08	3.94E-08	1.47E-04	0.000141377	Res
582414.56_4130061.93	582414.56	4130061.93	3.04E-05	2.43E-08	1.46E-08	2.43E-08	4.84E-07	2.72E-09	1.05E-06	4.85E-08	3.67E-08	1.37E-04	0.000131756	Res
582471.13_4130061.93	582471.13	4130061.93	2.76E-05	2.25E-08	1.35E-08	2.25E-08	4.49E-07	2.53E-09	9.69E-07	4.50E-08	3.40E-08	1.27E-04	0.000122065	Res
582527.7_4130061.93	582527.7	4130061.93	2.50E-05	2.08E-08	1.25E-08	2.08E-08	4.15E-07	2.34E-09	8.97E-07	4.16E-08	3.15E-08	1.18E-04	0.000112804	Res
582584.27_4130061.93	582584.27	4130061.93	2.26E-05	1.93E-08	1.16E-08	1.93E-08	3.85E-07	2.17E-09	8.31E-07	3.86E-08	2.92E-08	1.09E-04	0.000104483	Res
582640.84_4130061.93	582640.84	4130061.93	2.04E-05	1.79E-08	1.07E-08	1.79E-08	3.57E-07	2.01E-09	7.70E-07	3.58E-08	2.70E-08	1.01E-04	9.67254E-05	Res
582697.41_4130061.93	582697.41	4130061.93	1.85E-05	1.66E-08	9.99E-09	1.66E-08	3.32E-07	1.87E-09	7.17E-07	3.33E-08	2.52E-08	9.43E-05	8.98683E-05	Res
582753.98_4130061.93	582753.98	4130061.93	1.68E-05	1.55E-08	9.32E-09	1.55E-08	3.10E-07	1.75E-09	6.69E-07	3.11E-08	2.35E-08	8.80E-05	8.3783E-05	Res
582810.55_4130061.93	582810.55	4130061.93	1.53E-05	1.45E-08	8.71E-09	1.45E-08	2.90E-07	1.63E-09	6.25E-07	2.90E-08	2.19E-08	8.22E-05	7.82015E-05	Res
581962_4130145.84	581962	4130145.84	6.24E-05	4.42E-08	2.65E-08	4.42E-08	8.82E-07	4.95E-09	1.90E-06	8.83E-08	6.69E-08	2.50E-04	0.000241396	Res
582018.57_4130145.84	582018.57	4130145.84	5.79E-05	4.13E-08	2.48E-08	4.13E-08	8.25E-07	4.63E-09	1.78E-06	8.26E-08	6.26E-08	2.34E-04	0.000225628	Res
582075.14_4130145.84	582075.14	4130145.84	4.93E-05	3.63E-08	2.18E-08	3.63E-08	7.26E-07	4.08E-09	1.57E-06	7.27E-08	5.50E-08	2.06E-04	0.000198216	Res
582131.71_4130145.84	582131.71	4130145.84	4.57E-05	3.40E-08	2.04E-08	3.40E-08	6.80E-07	3.82E-09	1.47E-06	6.81E-08	5.15E-08	1.93E-04	0.000185517	Res
582188.28_4130145.84	582188.28	4130145.84	4.42E-05	3.28E-08	1.97E-08	3.28E-08	6.55E-07	3.68E-09	1.41E-06	6.56E-08	4.97E-08	1.86E-04	0.000178866	Res
582244.85_4130145.84	582244.85	4130145.84	4.04E-05	3.04E-08	1.82E-08	3.04E-08	6.07E-07	3.41E-09	1.31E-06	6.08E-08	4.60E-08	1.72E-04	0.000165634	Res
582301.42_4130145.84	582301.42	4130145.84	3.67E-05	2.81E-08	1.69E-08	2.81E-08	5.61E-07	3.15E-09	1.21E-06	5.62E-08	4.25E-08	1.59E-04	0.000152898	Res
582357.99_4130145.84	582357.99	4130145.84	3.34E-05	2.61E-08	1.56E-08	2.61E-08	5.20E-07	2.92E-09	1.12E-06	5.21E-08	3.94E-08	1.48E-04	0.00014166	Res
582414.56_4130145.84	582414.56	4130145.84	3.04E-05	2.41E-08	1.45E-08	2.41E-08	4.82E-07	2.71E-09	1.04E-06	4.83E-08	3.65E-08	1.37E-04	0.00013107	Res
582471.13_4130145.84	582471.13	4130145.84	2.74E-05	2.23E-08	1.34E-08	2.23E-08	4.44E-07	2.50E-09	9.59E-07	4.45E-08	3.37E-08	1.26E-04	0.000120733	Res
582527.7_4130145.84	582527.7	4130145.84	2.45E-05	2.04E-08	1.23E-08	2.04E-08	4.08E-07	2.29E-09	8.80E-07	4.09E-08	3.09E-08	1.16E-04	0.000110736	Res
582584.27_4130145.84	582584.27	4130145.84	2.19E-05	1.88E-08	1.13E-08	1.88E-08	3.75E-07	2.11E-09	8.09E-07	3.76E-08	2.84E-08	1.06E-04	0.000101651	Res
582640.84_4130145.84	582640.84	4130145.84	1.96E-05	1.73E-08	1.04E-08	1.73E-08	3.46E-07	1.95E-09	7.47E-07	3.47E-08	2.62E-08	9.82E-05	9.36839E-05	Res
582697.41_4130145.84	582697.41	4130145.84	1.77E-05	1.61E-08	9.66E-09	1.61E-08	3.21E-07	1.81E-09	6.93E-07	3.22E-08	2.43E-08	9.11E-05	8.68173E-05	Res
582753.98_4130145.84	582753.98	4130145.84	1.61E-05	1.50E-08	9.02E-09	1.50E-08	3.00E-07	1.69E-09	6.47E-07	3.01E-08	2.27E-08	8.51E-05	8.09889E-05	Res
582810.55_4130145.84	582810.55	4130145.84	1.47E-05	1.41E-08	8.47E-09	1.41E-08	2.81E-07	1.59E-09	6.07E-07	2.82E-08	2.13E-08	7.99E-05	7.59528E-05	Res
582867.12_4130145.84	582867.12	4130145.84	1.30E-05	1.30E-08	7.79E-09	1.30E-08	2.59E-07	1.46E-09	5.58E-07	2.60E-08	1.96E-08	7.35E-05	6.97613E-05	Res
581962_4130229.75	581962	4130229.75	6.38E-05	4.48E-08	2.69E-08	4.48E-08	8.95E-07	5.02E-09	1.93E-06	8.96E-08	6.79E-08	2.54E-04	0.000244948	Res
582018.57_4130229.75	582018.57	4130229.75	6.09E-05	4.28E-08	2.57E-08	4.28E-08	8.54E-07	4.80E-09	1.84E-06	8.55E-08	6.48E-08	2.42E-04	0.000233852	Res
582075.14_4130229.75	582075.14	4130229.75	5.67E-05	4.01E-08	2.40E-08	4.01E-08	8.00E-07	4.49E-09	1.73E-06	8.01E-08	6.07E-08	2.27E-04	0.000218999	Res
582131.71_4130229.75	582131.71	4130229.75	5.11E-05	3.67E-08	2.20E-08	3.67E-08	7.32E-07	4.11E-09	1.58E-06	7.33E-08	5.55E-08	2.08E-04	0.000200244	Res
582188.28_4130229.75	582188.28	4130229.75	4.56E-05	3.34E-08	2.00E-08	3.34E-08	6.66E-07	3.74E-09	1.44E-06	6.67E-08	5.05E-08	1.89E-04	0.00018204	Res
582244.85_4130229.75	582244.85	4130229.75	4.08E-05	3.05E-08	1.83E-08	3.05E-08	6.08E-07	3.42E-09	1.31E-06	6.09E-08	4.61E-08	1.73E-04	0.000166069	Res

Chronic Calculation, $\sum C_{TAC}$ /REL

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)										Total HI	Receptor Type
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Copper	Mercury	Nickel	Selenium	Chromium VI	Crystalline Silica		
582301.42_4130229.75	582301.42	4130229.75	3.68E-05	2.80E-08	1.68E-08	2.80E-08	5.59E-07	3.14E-09	1.21E-06	5.60E-08	4.24E-08	1.59E-04	0.000152368	Res
582357.99_4130229.75	582357.99	4130229.75	3.32E-05	2.58E-08	1.55E-08	2.58E-08	5.15E-07	2.89E-09	1.11E-06	5.16E-08	3.90E-08	1.46E-04	0.000140204	Res
582414.56_4130229.75	582414.56	4130229.75	2.97E-05	2.36E-08	1.42E-08	2.36E-08	4.71E-07	2.65E-09	1.02E-06	4.72E-08	3.57E-08	1.34E-04	0.000128248	Res
582471.13_4130229.75	582471.13	4130229.75	2.63E-05	2.15E-08	1.29E-08	2.15E-08	4.29E-07	2.41E-09	9.26E-07	4.30E-08	3.25E-08	1.22E-04	0.000116659	Res
582527.7_4130229.75	582527.7	4130229.75	2.33E-05	1.96E-08	1.18E-08	1.96E-08	3.92E-07	2.21E-09	8.46E-07	3.93E-08	2.97E-08	1.11E-04	0.000106348	Res
582584.27_4130229.75	582584.27	4130229.75	2.07E-05	1.80E-08	1.08E-08	1.80E-08	3.60E-07	2.02E-09	7.76E-07	3.61E-08	2.72E-08	1.02E-04	9.74581E-05	Res
582640.84_4130229.75	582640.84	4130229.75	1.86E-05	1.66E-08	9.99E-09	1.66E-08	3.32E-07	1.87E-09	7.17E-07	3.33E-08	2.52E-08	9.43E-05	8.98714E-05	Res
582697.41_4130229.75	582697.41	4130229.75	1.68E-05	1.55E-08	9.31E-09	1.55E-08	3.09E-07	1.74E-09	6.68E-07	3.10E-08	2.34E-08	8.78E-05	8.36341E-05	Res
582753.98_4130229.75	582753.98	4130229.75	1.54E-05	1.45E-08	8.71E-09	1.45E-08	2.89E-07	1.63E-09	6.25E-07	2.90E-08	2.19E-08	8.22E-05	7.81839E-05	Res
582810.55_4130229.75	582810.55	4130229.75	1.42E-05	1.37E-08	8.21E-09	1.37E-08	2.73E-07	1.54E-09	5.88E-07	2.74E-08	2.06E-08	7.74E-05	7.35917E-05	Res
582867.12_4130229.75	582867.12	4130229.75	1.32E-05	1.30E-08	7.77E-09	1.30E-08	2.58E-07	1.46E-09	5.57E-07	2.59E-08	1.95E-08	7.33E-05	6.96271E-05	Res
582018.57_4130313.66	582018.57	4130313.66	6.56E-05	4.50E-08	2.70E-08	4.50E-08	9.00E-07	5.05E-09	1.94E-06	9.01E-08	6.83E-08	2.55E-04	0.000246616	Res
582075.14_4130313.66	582075.14	4130313.66	6.08E-05	4.20E-08	2.52E-08	4.20E-08	8.40E-07	4.72E-09	1.81E-06	8.41E-08	6.37E-08	2.38E-04	0.000230114	Res
582131.71_4130313.66	582131.71	4130313.66	5.33E-05	3.76E-08	2.26E-08	3.76E-08	7.52E-07	4.22E-09	1.62E-06	7.53E-08	5.70E-08	2.13E-04	0.000205774	Res
582188.28_4130313.66	582188.28	4130313.66	4.67E-05	3.37E-08	2.02E-08	3.37E-08	6.74E-07	3.78E-09	1.45E-06	6.75E-08	5.11E-08	1.91E-04	0.000184187	Res
582244.85_4130313.66	582244.85	4130313.66	4.12E-05	3.05E-08	1.83E-08	3.05E-08	6.09E-07	3.42E-09	1.31E-06	6.10E-08	4.62E-08	1.73E-04	0.000166329	Res
582301.42_4130313.66	582301.42	4130313.66	3.67E-05	2.78E-08	1.67E-08	2.78E-08	5.54E-07	3.11E-09	1.20E-06	5.55E-08	4.20E-08	1.57E-04	0.000151144	Res
582357.99_4130313.66	582357.99	4130313.66	3.23E-05	2.51E-08	1.51E-08	2.51E-08	5.01E-07	2.82E-09	1.08E-06	5.02E-08	3.80E-08	1.42E-04	0.000136594	Res
582414.56_4130313.66	582414.56	4130313.66	2.82E-05	2.27E-08	1.36E-08	2.27E-08	4.52E-07	2.54E-09	9.76E-07	4.53E-08	3.43E-08	1.28E-04	0.000123023	Res
582471.13_4130313.66	582471.13	4130313.66	2.47E-05	2.05E-08	1.23E-08	2.05E-08	4.10E-07	2.30E-09	8.84E-07	4.11E-08	3.10E-08	1.16E-04	0.000111226	Res
582527.7_4130313.66	582527.7	4130313.66	2.19E-05	1.87E-08	1.12E-08	1.87E-08	3.74E-07	2.10E-09	8.07E-07	3.75E-08	2.83E-08	1.06E-04	0.000101417	Res
582584.27_4130313.66	582584.27	4130313.66	1.95E-05	1.72E-08	1.03E-08	1.72E-08	3.44E-07	1.94E-09	7.42E-07	3.45E-08	2.61E-08	9.76E-05	9.31521E-05	Res
582640.84_4130313.66	582640.84	4130313.66	1.76E-05	1.60E-08	9.60E-09	1.60E-08	3.19E-07	1.80E-09	6.89E-07	3.20E-08	2.42E-08	9.06E-05	8.63384E-05	Res
582697.41_4130313.66	582697.41	4130313.66	1.60E-05	1.49E-08	8.97E-09	1.49E-08	2.98E-07	1.68E-09	6.43E-07	2.99E-08	2.26E-08	8.46E-05	8.05306E-05	Res
582753.98_4130313.66	582753.98	4130313.66	1.47E-05	1.40E-08	8.42E-09	1.40E-08	2.80E-07	1.58E-09	6.04E-07	2.81E-08	2.12E-08	7.94E-05	7.55165E-05	Res
582810.55_4130313.66	582810.55	4130313.66	1.35E-05	1.32E-08	7.92E-09	1.32E-08	2.63E-07	1.48E-09	5.68E-07	2.64E-08	1.99E-08	7.47E-05	7.10027E-05	Res
582867.12_4130313.66	582867.12	4130313.66	1.24E-05	1.25E-08	7.48E-09	1.25E-08	2.49E-07	1.40E-09	5.36E-07	2.49E-08	1.88E-08	7.06E-05	6.69965E-05	Res
581848.86_4130397.57	581848.86	4130397.57	8.97E-05	5.91E-08	3.55E-08	5.91E-08	1.18E-06	6.63E-09	2.55E-06	1.18E-07	8.96E-08	3.35E-04	0.000324397	Res
581905.43_4130397.57	581905.43	4130397.57	8.70E-05	5.71E-08	3.43E-08	5.71E-08	1.14E-06	6.41E-09	2.46E-06	1.14E-07	8.66E-08	3.24E-04	0.000313714	Res
581962_4130397.57	581962	4130397.57	8.23E-05	5.41E-08	3.25E-08	5.41E-08	1.08E-06	6.07E-09	2.34E-06	1.08E-07	8.21E-08	3.07E-04	0.000297195	Res
582018.57_4130397.57	582018.57	4130397.57	7.38E-05	4.92E-08	2.95E-08	4.92E-08	9.82E-07	5.51E-09	2.12E-06	9.84E-08	7.46E-08	2.79E-04	0.000269766	Res
582075.14_4130397.57	582075.14	4130397.57	6.47E-05	4.39E-08	2.63E-08	4.39E-08	8.77E-07	4.92E-09	1.89E-06	8.78E-08	6.65E-08	2.49E-04	0.000240535	Res
582131.71_4130397.57	582131.71	4130397.57	5.54E-05	3.86E-08	2.31E-08	3.86E-08	7.70E-07	4.32E-09	1.66E-06	7.71E-08	5.84E-08	2.19E-04	0.000210935	Res
582188.28_4130397.57	582188.28	4130397.57	4.81E-05	3.43E-08	2.06E-08	3.43E-08	6.85E-07	3.85E-09	1.48E-06	6.87E-08	5.20E-08	1.95E-04	0.000187526	Res
582244.85_4130397.57	582244.85	4130397.57	4.15E-05	3.05E-08	1.83E-08	3.05E-08	6.09E-07	3.42E-09	1.31E-06	6.10E-08	4.62E-08	1.73E-04	0.000166254	Res
582301.42_4130397.57	582301.42	4130397.57	3.58E-05	2.71E-08	1.63E-08	2.71E-08	5.41E-07	3.04E-09	1.17E-06	5.42E-08	4.10E-08	1.54E-04	0.000147662	Res
582357.99_4130397.57	582357.99	4130397.57	3.07E-05	2.41E-08	1.45E-08	2.41E-08	4.81E-07	2.70E-09	1.04E-06	4.82E-08	3.65E-08	1.37E-04	0.000130936	Res
582414.56_4130397.57	582414.56	4130397.57	2.66E-05	2.16E-08	1.30E-08	2.16E-08	4.32E-07	2.43E-09	9.32E-07	4.33E-08	3.27E-08	1.23E-04	0.000117329	Res
582471.13_4130397.57	582471.13	4130397.57	2.33E-05	1.96E-08	1.18E-08	1.96E-08	3.92E-07	2.20E-09	8.46E-07	3.93E-08	2.97E-08	1.11E-04	0.000106329	Res
582527.7_4130397.57	582527.7	4130397.57	2.07E-05	1.80E-08	1.08E-08	1.80E-08	3.59E-07	2.02E-09	7.74E-07	3.60E-08	2.72E-08	1.02E-04	9.72397E-05	Res
582584.27_4130397.57	582584.27	4130397.57	1.85E-05	1.66E-08	9.96E-09	1.66E-08	3.31E-07	1.86E-09	7.15E-07	3.32E-08	2.51E-08	9.40E-05	8.96305E-05	Res
582640.84_4130397.57	582640.84	4130397.57	1.67E-05	1.54E-08	9.26E-09	1.54E-08	3.08E-07	1.73E-09	6.64E-07	3.09E-08	2.33E-08	8.73E-05	8.31715E-05	Res
582697.41_4130397.57	582697.41	4130397.57	1.51E-05	1.44E-08	8.62E-09	1.44E-08	2.86E-07	1.61E-09	6.18E-07	2.87E-08	2.17E-08	8.13E-05	7.73607E-05	Res
582753.98_4130397.57	582753.98	4130397.57	1.38E-05	1.35E-08	8.08E-09	1.35E-08	2.68E-07	1.51E-09	5.79E-07	2.69E-08	2.03E-08	7.62E-05	7.24107E-05	Res
582810.55_4130397.57	582810.55	4130397.57	1.26E-05	1.27E-08	7.60E-09	1.27E-08	2.53E-07	1.42E-09	5.45E-07	2.53E-08	1.91E-08	7.17E-05	6.80612E-05	Res
582867.12_4130397.57	582867.12	4130397.57	1.16E-05	1.20E-08	7.18E-09	1.20E-08	2.39E-07	1.34E-09	5.15E-07	2.39E-08	1.81E-08	6.77E-05	6.42099E-05	Res
581848.86_4130481.48	581848.86	4130481.48	1.16E-04	7.27E-08	4.36E-08	7.27E-08	1.45E-06	8.15E-09	3.14E-06	1.45E-07	1.10E-07	4.13E-04	0.000400505	Res
581905.43_4130481.48	581905.43	4130481.48	1.07E-04	6.77E-08	4.06E-08	6.77E-08	1.35E-06	7.59E-09	2.92E-06	1.35E-07	1.03E-07	3.84E-04	0.000372836	Res
581962_4130481.48	581962	4130481.48	9.15E-05	5.88E-08	3.53E-08	5.88E-08	1.18E-06	6.59E-09	2.54E-06	1.18E-07	8.92E-08	3.34E-04	0.000323366	Res

Chronic Calculation, $\sum C_{TAC}$ /REL

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)										Total HI	Receptor Type
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Copper	Mercury	Nickel	Selenium	Chromium VI	Crystalline Silica		
582018.57_4130481.48	582018.57	4130481.48	8.06E-05	5.25E-08	3.15E-08	5.25E-08	1.05E-06	5.89E-09	2.27E-06	1.05E-07	7.97E-08	2.98E-04	0.00028859	Res
582075.14_4130481.48	582075.14	4130481.48	6.81E-05	4.55E-08	2.73E-08	4.55E-08	9.08E-07	5.10E-09	1.96E-06	9.09E-08	6.89E-08	2.58E-04	0.000249391	Res
582131.71_4130481.48	582131.71	4130481.48	5.78E-05	3.96E-08	2.38E-08	3.96E-08	7.91E-07	4.44E-09	1.71E-06	7.92E-08	6.00E-08	2.25E-04	0.000216786	Res
582188.28_4130481.48	582188.28	4130481.48	4.88E-05	3.45E-08	2.07E-08	3.45E-08	6.88E-07	3.87E-09	1.49E-06	6.89E-08	5.22E-08	1.95E-04	0.000188371	Res
582244.85_4130481.48	582244.85	4130481.48	4.06E-05	2.98E-08	1.79E-08	2.98E-08	5.95E-07	3.34E-09	1.28E-06	5.96E-08	4.51E-08	1.69E-04	0.000162498	Res
582301.42_4130481.48	582301.42	4130481.48	3.40E-05	2.60E-08	1.56E-08	2.60E-08	5.19E-07	2.92E-09	1.12E-06	5.20E-08	3.93E-08	1.47E-04	0.000141422	Res
582357.99_4130481.48	582357.99	4130481.48	2.90E-05	2.30E-08	1.38E-08	2.30E-08	4.59E-07	2.58E-09	9.91E-07	4.60E-08	3.48E-08	1.30E-04	0.000124973	Res
582414.56_4130481.48	582414.56	4130481.48	2.51E-05	2.07E-08	1.24E-08	2.07E-08	4.13E-07	2.32E-09	8.92E-07	4.14E-08	3.13E-08	1.17E-04	0.000112268	Res
582471.13_4130481.48	582471.13	4130481.48	2.21E-05	1.88E-08	1.13E-08	1.88E-08	3.76E-07	2.11E-09	8.11E-07	3.77E-08	2.85E-08	1.07E-04	0.000101876	Res
582527.7_4130481.48	582527.7	4130481.48	1.95E-05	1.72E-08	1.03E-08	1.72E-08	3.44E-07	1.93E-09	7.41E-07	3.44E-08	2.60E-08	9.75E-05	9.30515E-05	Res
582584.27_4130481.48	582584.27	4130481.48	1.74E-05	1.59E-08	9.53E-09	1.59E-08	3.17E-07	1.78E-09	6.84E-07	3.18E-08	2.40E-08	8.99E-05	8.56919E-05	Res
582640.84_4130481.48	582640.84	4130481.48	1.56E-05	1.47E-08	8.83E-09	1.47E-08	2.93E-07	1.65E-09	6.33E-07	2.94E-08	2.22E-08	8.33E-05	7.92629E-05	Res
582697.41_4130481.48	582697.41	4130481.48	1.41E-05	1.37E-08	8.23E-09	1.37E-08	2.73E-07	1.54E-09	5.90E-07	2.74E-08	2.07E-08	7.76E-05	7.3778E-05	Res
582753.98_4130481.48	582753.98	4130481.48	1.28E-05	1.29E-08	7.73E-09	1.29E-08	2.57E-07	1.45E-09	5.54E-07	2.58E-08	1.94E-08	7.29E-05	6.91603E-05	Res
582810.55_4130481.48	582810.55	4130481.48	1.18E-05	1.21E-08	7.29E-09	1.21E-08	2.42E-07	1.37E-09	5.22E-07	2.43E-08	1.83E-08	6.87E-05	6.5175E-05	Res
582867.12_4130481.48	582867.12	4130481.48	1.09E-05	1.15E-08	6.90E-09	1.15E-08	2.29E-07	1.29E-09	4.95E-07	2.30E-08	1.73E-08	6.51E-05	6.16436E-05	Res
581735.72_4130565.39	581735.72	4130565.39	1.41E-04	8.68E-08	5.21E-08	8.68E-08	1.73E-06	9.72E-09	3.74E-06	1.74E-07	1.32E-07	4.92E-04	0.000478349	Res
581792.29_4130565.39	581792.29	4130565.39	1.39E-04	8.51E-08	5.11E-08	8.51E-08	1.70E-06	9.54E-09	3.67E-06	1.70E-07	1.29E-07	4.83E-04	0.000469443	Res
581848.86_4130565.39	581848.86	4130565.39	1.32E-04	8.10E-08	4.86E-08	8.10E-08	1.62E-06	9.08E-09	3.50E-06	1.62E-07	1.23E-07	4.60E-04	0.00044687	Res
581905.43_4130565.39	581905.43	4130565.39	1.26E-04	7.74E-08	4.64E-08	7.74E-08	1.55E-06	8.68E-09	3.34E-06	1.55E-07	1.17E-07	4.39E-04	0.000426823	Res
581962_4130565.39	581962	4130565.39	1.09E-04	6.77E-08	4.06E-08	6.77E-08	1.35E-06	7.59E-09	2.92E-06	1.35E-07	1.03E-07	3.84E-04	0.000372992	Res
582018.57_4130565.39	582018.57	4130565.39	8.81E-05	5.62E-08	3.37E-08	5.62E-08	1.12E-06	6.30E-09	2.42E-06	1.12E-07	8.52E-08	3.19E-04	0.000308948	Res
582075.14_4130565.39	582075.14	4130565.39	7.15E-05	4.69E-08	2.82E-08	4.69E-08	9.38E-07	5.26E-09	2.02E-06	9.39E-08	7.12E-08	2.66E-04	0.000257669	Res
582131.71_4130565.39	582131.71	4130565.39	5.86E-05	3.97E-08	2.38E-08	3.97E-08	7.93E-07	4.45E-09	1.71E-06	7.94E-08	6.02E-08	2.25E-04	0.000217594	Res
582188.28_4130565.39	582188.28	4130565.39	4.70E-05	3.32E-08	1.99E-08	3.32E-08	6.64E-07	3.73E-09	1.43E-06	6.65E-08	5.04E-08	1.88E-04	0.000181695	Res
582244.85_4130565.39	582244.85	4130565.39	3.82E-05	2.82E-08	1.69E-08	2.82E-08	5.64E-07	3.17E-09	1.22E-06	5.65E-08	4.27E-08	1.60E-04	0.000153903	Res
582301.42_4130565.39	582301.42	4130565.39	3.22E-05	2.47E-08	1.48E-08	2.47E-08	4.93E-07	2.77E-09	1.07E-06	4.94E-08	3.74E-08	1.40E-04	0.000134502	Res
582357.99_4130565.39	582357.99	4130565.39	2.72E-05	2.18E-08	1.31E-08	2.18E-08	4.36E-07	2.45E-09	9.41E-07	4.37E-08	3.30E-08	1.24E-04	0.000118548	Res
582414.56_4130565.39	582414.56	4130565.39	2.34E-05	1.96E-08	1.17E-08	1.96E-08	3.90E-07	2.20E-09	8.42E-07	3.91E-08	2.96E-08	1.11E-04	0.000105976	Res
582471.13_4130565.39	582471.13	4130565.39	2.04E-05	1.77E-08	1.06E-08	1.77E-08	3.54E-07	1.99E-09	7.63E-07	3.55E-08	2.68E-08	1.00E-04	9.58766E-05	Res
582527.7_4130565.39	582527.7	4130565.39	1.80E-05	1.62E-08	9.74E-09	1.62E-08	3.24E-07	1.82E-09	6.99E-07	3.25E-08	2.45E-08	9.19E-05	8.7605E-05	Res
582584.27_4130565.39	582584.27	4130565.39	1.61E-05	1.50E-08	9.00E-09	1.50E-08	2.99E-07	1.69E-09	6.46E-07	3.00E-08	2.27E-08	8.49E-05	8.08475E-05	Res
582640.84_4130565.39	582640.84	4130565.39	1.44E-05	1.39E-08	8.35E-09	1.39E-08	2.77E-07	1.56E-09	5.99E-07	2.78E-08	2.10E-08	7.88E-05	7.48644E-05	Res
582697.41_4130565.39	582697.41	4130565.39	1.31E-05	1.30E-08	7.81E-09	1.30E-08	2.60E-07	1.46E-09	5.60E-07	2.60E-08	1.97E-08	7.37E-05	6.99832E-05	Res
582753.98_4130565.39	582753.98	4130565.39	1.20E-05	1.23E-08	7.36E-09	1.23E-08	2.45E-07	1.38E-09	5.28E-07	2.45E-08	1.85E-08	6.94E-05	6.58402E-05	Res
582810.55_4130565.39	582810.55	4130565.39	1.11E-05	1.16E-08	6.97E-09	1.16E-08	2.32E-07	1.31E-09	5.00E-07	2.32E-08	1.75E-08	6.58E-05	6.23167E-05	Res
582867.12_4130565.39	582867.12	4130565.39	1.03E-05	1.11E-08	6.64E-09	1.11E-08	2.20E-07	1.24E-09	4.76E-07	2.21E-08	1.67E-08	6.26E-05	5.92596E-05	Res
581735.72_4130649.3	581735.72	4130649.3	1.53E-04	9.25E-08	5.55E-08	9.25E-08	1.85E-06	1.04E-08	3.99E-06	1.85E-07	1.40E-07	5.25E-04	0.000510599	Res
581792.29_4130649.3	581792.29	4130649.3	1.48E-04	8.94E-08	5.37E-08	8.94E-08	1.79E-06	1.00E-08	3.86E-06	1.79E-07	1.36E-07	5.08E-04	0.00049364	Res
581905.43_4130649.3	581905.43	4130649.3	1.48E-04	8.86E-08	5.31E-08	8.86E-08	1.77E-06	9.93E-09	3.82E-06	1.77E-07	1.34E-07	5.03E-04	0.000489235	Res
581962_4130649.3	581962	4130649.3	1.23E-04	7.47E-08	4.48E-08	7.47E-08	1.49E-06	8.37E-09	3.22E-06	1.49E-07	1.13E-07	4.24E-04	0.000412146	Res
582018.57_4130649.3	582018.57	4130649.3	9.33E-05	5.85E-08	3.51E-08	5.85E-08	1.17E-06	6.56E-09	2.52E-06	1.17E-07	8.87E-08	3.32E-04	0.000322093	Res
582075.14_4130649.3	582075.14	4130649.3	7.24E-05	4.70E-08	2.82E-08	4.70E-08	9.39E-07	5.27E-09	2.03E-06	9.40E-08	7.12E-08	2.67E-04	0.000258142	Res
582131.71_4130649.3	582131.71	4130649.3	5.62E-05	3.80E-08	2.28E-08	3.80E-08	7.59E-07	4.26E-09	1.64E-06	7.60E-08	5.76E-08	2.16E-04	0.000208333	Res
582188.28_4130649.3	582188.28	4130649.3	4.42E-05	3.13E-08	1.88E-08	3.13E-08	6.25E-07	3.51E-09	1.35E-06	6.26E-08	4.74E-08	1.77E-04	0.000171049	Res
582244.85_4130649.3	582244.85	4130649.3	3.55E-05	2.64E-08	1.58E-08	2.64E-08	5.27E-07	2.96E-09	1.14E-06	5.28E-08	4.00E-08	1.50E-04	0.000143831	Res
582301.42_4130649.3	582301.42	4130649.3	2.93E-05	2.28E-08	1.37E-08	2.28E-08	4.55E-07	2.56E-09	9.83E-07	4.56E-08	3.45E-08	1.29E-04	0.000124068	Res
582357.99_4130649.3	582357.99	4130649.3	2.48E-05	2.02E-08	1.21E-08	2.02E-08	4.02E-07	2.26E-09	8.69E-07	4.03E-08	3.05E-08	1.14E-04	0.000109395	Res
582414.56_4130649.3	582414.56	4130649.3	2.14E-05	1.81E-08	1.09E-08	1.81E-08	3.62E-07	2.04E-09	7.81E-07	3.63E-08	2.74E-08	1.03E-04	9.81934E-05	Res

Chronic Calculation, $\sum C_{TAC}$ /REL

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)										Total HI	Receptor Type
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Copper	Mercury	Nickel	Selenium	Chromium VI	Crystalline Silica		
582471.13_4130649.3	582471.13	4130649.3	1.86E-05	1.65E-08	9.88E-09	1.65E-08	3.28E-07	1.85E-09	7.09E-07	3.29E-08	2.49E-08	9.32E-05	8.89642E-05	Res
582527.7_4130649.3	582527.7	4130649.3	1.65E-05	1.51E-08	9.08E-09	1.51E-08	3.02E-07	1.70E-09	6.51E-07	3.03E-08	2.28E-08	8.56E-05	8.15775E-05	Res
582584.27_4130649.3	582584.27	4130649.3	1.48E-05	1.40E-08	8.42E-09	1.40E-08	2.80E-07	1.58E-09	6.04E-07	2.81E-08	2.12E-08	7.95E-05	7.56093E-05	Res
582640.84_4130649.3	582640.84	4130649.3	1.35E-05	1.31E-08	7.89E-09	1.31E-08	2.62E-07	1.48E-09	5.66E-07	2.63E-08	1.98E-08	7.44E-05	7.07012E-05	Res
582697.41_4130649.3	582697.41	4130649.3	1.24E-05	1.24E-08	7.43E-09	1.24E-08	2.47E-07	1.39E-09	5.33E-07	2.48E-08	1.87E-08	7.01E-05	6.6539E-05	Res
582753.98_4130649.3	582753.98	4130649.3	1.15E-05	1.18E-08	7.05E-09	1.18E-08	2.34E-07	1.32E-09	5.06E-07	2.35E-08	1.77E-08	6.65E-05	6.31035E-05	Res
582810.55_4130649.3	582810.55	4130649.3	1.07E-05	1.12E-08	6.73E-09	1.12E-08	2.24E-07	1.26E-09	4.82E-07	2.24E-08	1.69E-08	6.35E-05	6.01552E-05	Res
582867.12_4130649.3	582867.12	4130649.3	1.01E-05	1.07E-08	6.44E-09	1.07E-08	2.14E-07	1.21E-09	4.61E-07	2.15E-08	1.62E-08	6.07E-05	5.75055E-05	Res
581848.86_4130733.21	581848.86	4130733.21	2.20E-04	1.27E-07	7.62E-08	1.27E-07	2.54E-06	1.42E-08	5.48E-06	2.54E-07	1.93E-07	7.21E-04	0.000702994	Res
581905.43_4130733.21	581905.43	4130733.21	1.88E-04	1.09E-07	6.56E-08	1.09E-07	2.19E-06	1.22E-08	4.72E-06	2.19E-07	1.66E-07	6.20E-04	0.000604853	Res
581962_4130733.21	581962	4130733.21	1.38E-04	8.23E-08	4.94E-08	8.23E-08	1.64E-06	9.22E-09	3.55E-06	1.65E-07	1.25E-07	4.67E-04	0.000454527	Res
582018.57_4130733.21	582018.57	4130733.21	9.69E-05	5.98E-08	3.59E-08	5.98E-08	1.20E-06	6.71E-09	2.58E-06	1.20E-07	9.08E-08	3.40E-04	0.000329844	Res
582075.14_4130733.21	582075.14	4130733.21	6.85E-05	4.43E-08	2.66E-08	4.43E-08	8.85E-07	4.97E-09	1.91E-06	8.86E-08	6.72E-08	2.51E-04	0.00024353	Res
582131.71_4130733.21	582131.71	4130733.21	5.00E-05	3.42E-08	2.05E-08	3.42E-08	6.83E-07	3.83E-09	1.47E-06	6.83E-08	5.18E-08	1.94E-04	0.000187164	Res
582188.28_4130733.21	582188.28	4130733.21	3.87E-05	2.79E-08	1.67E-08	2.79E-08	5.56E-07	3.13E-09	1.20E-06	5.57E-08	4.22E-08	1.58E-04	0.000152179	Res
582244.85_4130733.21	582244.85	4130733.21	3.11E-05	2.35E-08	1.41E-08	2.35E-08	4.70E-07	2.64E-09	1.01E-06	4.71E-08	3.56E-08	1.33E-04	0.000128187	Res
582301.42_4130733.21	582301.42	4130733.21	2.58E-05	2.05E-08	1.23E-08	2.05E-08	4.09E-07	2.30E-09	8.83E-07	4.10E-08	3.10E-08	1.16E-04	0.000111293	Res
582357.99_4130733.21	582357.99	4130733.21	2.20E-05	1.82E-08	1.09E-08	1.82E-08	3.64E-07	2.05E-09	7.86E-07	3.65E-08	2.76E-08	1.03E-04	9.88962E-05	Res
582414.56_4130733.21	582414.56	4130733.21	1.92E-05	1.65E-08	9.92E-09	1.65E-08	3.30E-07	1.86E-09	7.12E-07	3.31E-08	2.50E-08	9.36E-05	8.94389E-05	Res
582471.13_4130733.21	582471.13	4130733.21	1.71E-05	1.52E-08	9.13E-09	1.52E-08	3.03E-07	1.71E-09	6.55E-07	3.04E-08	2.30E-08	8.61E-05	8.21518E-05	Res
582527.7_4130733.21	582527.7	4130733.21	1.54E-05	1.42E-08	8.49E-09	1.42E-08	2.82E-07	1.59E-09	6.09E-07	2.83E-08	2.14E-08	8.02E-05	7.63496E-05	Res
582584.27_4130733.21	582584.27	4130733.21	1.41E-05	1.33E-08	7.98E-09	1.33E-08	2.65E-07	1.49E-09	5.72E-07	2.66E-08	2.01E-08	7.53E-05	7.16352E-05	Res
582640.84_4130733.21	582640.84	4130733.21	1.31E-05	1.26E-08	7.54E-09	1.26E-08	2.51E-07	1.41E-09	5.41E-07	2.51E-08	1.90E-08	7.12E-05	6.766E-05	Res
582697.41_4130733.21	582697.41	4130733.21	1.22E-05	1.20E-08	7.17E-09	1.20E-08	2.38E-07	1.34E-09	5.14E-07	2.39E-08	1.80E-08	6.76E-05	6.42601E-05	Res
582753.98_4130733.21	582753.98	4130733.21	1.14E-05	1.14E-08	6.84E-09	1.14E-08	2.27E-07	1.28E-09	4.90E-07	2.28E-08	1.72E-08	6.45E-05	6.12271E-05	Res
582810.55_4130733.21	582810.55	4130733.21	1.08E-05	1.09E-08	6.55E-09	1.09E-08	2.18E-07	1.23E-09	4.70E-07	2.18E-08	1.65E-08	6.18E-05	5.86274E-05	Res
582867.12_4130733.21	582867.12	4130733.21	1.02E-05	1.05E-08	6.28E-09	1.05E-08	2.09E-07	1.18E-09	4.50E-07	2.09E-08	1.58E-08	5.92E-05	5.61825E-05	Res
581735.72_4130817.12	581735.72	4130817.12	3.23E-04	1.82E-07	1.09E-07	1.82E-07	3.65E-06	2.04E-08	7.88E-06	3.65E-07	2.77E-07	1.04E-03	0.001011817	Res
581792.29_4130817.12	581792.29	4130817.12	3.65E-04	2.04E-07	1.23E-07	2.04E-07	4.09E-06	2.29E-08	8.83E-06	4.09E-07	3.10E-07	1.16E-03	0.001133876	Res
581848.86_4130817.12	581848.86	4130817.12	3.27E-04	1.84E-07	1.10E-07	1.84E-07	3.68E-06	2.06E-08	7.94E-06	3.68E-07	2.79E-07	1.04E-03	0.001020021	Res
581905.43_4130817.12	581905.43	4130817.12	2.48E-04	1.41E-07	8.44E-08	1.41E-07	2.81E-06	1.58E-08	6.08E-06	2.81E-07	2.14E-07	7.99E-04	0.000780041	Res
581962_4130817.12	581962	4130817.12	1.50E-04	8.82E-08	5.29E-08	8.82E-08	1.76E-06	9.88E-09	3.81E-06	1.76E-07	1.34E-07	5.01E-04	0.000487754	Res
582018.57_4130817.12	582018.57	4130817.12	9.01E-05	5.56E-08	3.34E-08	5.56E-08	1.11E-06	6.24E-09	2.40E-06	1.11E-07	8.44E-08	3.16E-04	0.000306623	Res
582075.14_4130817.12	582075.14	4130817.12	5.84E-05	3.84E-08	2.30E-08	3.84E-08	7.67E-07	4.30E-09	1.66E-06	7.67E-08	5.82E-08	2.18E-04	0.000210661	Res
582131.71_4130817.12	582131.71	4130817.12	4.21E-05	2.94E-08	1.76E-08	2.94E-08	5.87E-07	3.30E-09	1.27E-06	5.88E-08	4.45E-08	1.67E-04	0.000160825	Res
582188.28_4130817.12	582188.28	4130817.12	3.27E-05	2.41E-08	1.45E-08	2.41E-08	4.82E-07	2.71E-09	1.04E-06	4.83E-08	3.66E-08	1.37E-04	0.000131635	Res
582244.85_4130817.12	582244.85	4130817.12	2.68E-05	2.08E-08	1.25E-08	2.08E-08	4.14E-07	2.33E-09	8.94E-07	4.15E-08	3.14E-08	1.18E-04	0.0001129	Res
582301.42_4130817.12	582301.42	4130817.12	2.29E-05	1.85E-08	1.11E-08	1.85E-08	3.68E-07	2.07E-09	7.95E-07	3.69E-08	2.79E-08	1.05E-04	0.000100154	Res
582357.99_4130817.12	582357.99	4130817.12	2.01E-05	1.68E-08	1.01E-08	1.68E-08	3.35E-07	1.88E-09	7.22E-07	3.35E-08	2.54E-08	9.50E-05	9.08705E-05	Res
582414.56_4130817.12	582414.56	4130817.12	1.80E-05	1.55E-08	9.27E-09	1.55E-08	3.08E-07	1.74E-09	6.66E-07	3.09E-08	2.34E-08	8.75E-05	8.36252E-05	Res
582471.13_4130817.12	582471.13	4130817.12	1.64E-05	1.44E-08	8.65E-09	1.44E-08	2.88E-07	1.62E-09	6.21E-07	2.88E-08	2.18E-08	8.17E-05	7.79208E-05	Res
582527.7_4130817.12	582527.7	4130817.12	1.50E-05	1.35E-08	8.12E-09	1.35E-08	2.70E-07	1.52E-09	5.82E-07	2.71E-08	2.04E-08	7.66E-05	7.30135E-05	Res
582584.27_4130817.12	582584.27	4130817.12	1.39E-05	1.28E-08	7.67E-09	1.28E-08	2.55E-07	1.44E-09	5.50E-07	2.56E-08	1.93E-08	7.23E-05	6.89015E-05	Res
582640.84_4130817.12	582640.84	4130817.12	1.29E-05	1.21E-08	7.27E-09	1.21E-08	2.42E-07	1.36E-09	5.21E-07	2.42E-08	1.83E-08	6.86E-05	6.5286E-05	Res
582697.41_4130817.12	582697.41	4130817.12	1.21E-05	1.15E-08	6.92E-09	1.15E-08	2.30E-07	1.30E-09	4.96E-07	2.31E-08	1.74E-08	6.53E-05	6.20827E-05	Res
582753.98_4130817.12	582753.98	4130817.12	1.13E-05	1.10E-08	6.59E-09	1.10E-08	2.19E-07	1.23E-09	4.73E-07	2.20E-08	1.66E-08	6.22E-05	5.91077E-05	Res
582810.55_4130817.12	582810.55	4130817.12	1.06E-05	1.05E-08	6.31E-09	1.05E-08	2.10E-07	1.18E-09	4.52E-07	2.10E-08	1.59E-08	5.95E-05	5.64924E-05	Res
582867.12_4130817.12	582867.12	4130817.12	1.01E-05	1.01E-08	6.04E-09	1.01E-08	2.01E-07	1.13E-09	4.33E-07	2.01E-08	1.52E-08	5.70E-05	5.40971E-05	Res
581735.72_4130901.03	581735.72	4130901.03	6.42E-04	3.53E-07	2.12E-07	3.53E-07	7.06E-06	3.96E-08	1.53E-05	7.06E-07	5.37E-07	2.01E-03	0.001962073	Res

Chronic Calculation, $\sum C_{TAC}$ /REL

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)										Total HI	Receptor Type
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Copper	Mercury	Nickel	Selenium	Chromium VI	Crystalline Silica		
581792.29_4130901.03	581792.29	4130901.03	6.86E-04	3.76E-07	2.26E-07	3.76E-07	7.52E-06	4.21E-08	1.63E-05	7.52E-07	5.72E-07	2.14E-03	0.00209062	Res
581848.86_4130901.03	581848.86	4130901.03	6.11E-04	3.36E-07	2.02E-07	3.36E-07	6.72E-06	3.76E-08	1.45E-05	6.72E-07	5.10E-07	1.91E-03	0.00186622	Res
581905.43_4130901.03	581905.43	4130901.03	3.21E-04	1.80E-07	1.08E-07	1.80E-07	3.59E-06	2.01E-08	7.76E-06	3.60E-07	2.73E-07	1.02E-03	0.000997397	Res
581962_4130901.03	581962	4130901.03	1.30E-04	7.71E-08	4.63E-08	7.71E-08	1.54E-06	8.64E-09	3.33E-06	1.54E-07	1.17E-07	4.38E-04	0.000426316	Res
582018.57_4130901.03	582018.57	4130901.03	7.01E-05	4.45E-08	2.67E-08	4.45E-08	8.88E-07	4.98E-09	1.92E-06	8.89E-08	6.74E-08	2.52E-04	0.000244611	Res
582075.14_4130901.03	582075.14	4130901.03	4.71E-05	3.19E-08	1.91E-08	3.19E-08	6.37E-07	3.58E-09	1.37E-06	6.38E-08	4.83E-08	1.81E-04	0.000174716	Res
582131.71_4130901.03	582131.71	4130901.03	3.61E-05	2.58E-08	1.55E-08	2.58E-08	5.14E-07	2.89E-09	1.11E-06	5.15E-08	3.90E-08	1.46E-04	0.000140712	Res
582188.28_4130901.03	582188.28	4130901.03	2.96E-05	2.21E-08	1.32E-08	2.21E-08	4.40E-07	2.48E-09	9.51E-07	4.41E-08	3.34E-08	1.25E-04	0.000120248	Res
582244.85_4130901.03	582244.85	4130901.03	2.52E-05	1.95E-08	1.17E-08	1.95E-08	3.89E-07	2.19E-09	8.40E-07	3.90E-08	2.95E-08	1.10E-04	0.000106023	Res
582301.42_4130901.03	582301.42	4130901.03	2.19E-05	1.75E-08	1.05E-08	1.75E-08	3.50E-07	1.97E-09	7.56E-07	3.51E-08	2.65E-08	9.94E-05	9.52665E-05	Res
582357.99_4130901.03	582357.99	4130901.03	1.94E-05	1.60E-08	9.62E-09	1.60E-08	3.20E-07	1.80E-09	6.90E-07	3.21E-08	2.42E-08	9.08E-05	8.68893E-05	Res
582414.56_4130901.03	582414.56	4130901.03	1.74E-05	1.48E-08	8.87E-09	1.48E-08	2.95E-07	1.66E-09	6.36E-07	2.96E-08	2.23E-08	8.37E-05	7.99985E-05	Res
582471.13_4130901.03	582471.13	4130901.03	1.58E-05	1.37E-08	8.25E-09	1.37E-08	2.74E-07	1.54E-09	5.92E-07	2.75E-08	2.08E-08	7.78E-05	7.43219E-05	Res
582527.7_4130901.03	582527.7	4130901.03	1.45E-05	1.29E-08	7.72E-09	1.29E-08	2.57E-07	1.44E-09	5.54E-07	2.57E-08	1.94E-08	7.28E-05	6.94786E-05	Res
582584.27_4130901.03	582584.27	4130901.03	1.33E-05	1.21E-08	7.28E-09	1.21E-08	2.42E-07	1.36E-09	5.22E-07	2.43E-08	1.83E-08	6.87E-05	6.54307E-05	Res
582640.84_4130901.03	582640.84	4130901.03	1.24E-05	1.15E-08	6.89E-09	1.15E-08	2.29E-07	1.29E-09	4.94E-07	2.30E-08	1.73E-08	6.50E-05	6.19128E-05	Res
582697.41_4130901.03	582697.41	4130901.03	1.16E-05	1.09E-08	6.55E-09	1.09E-08	2.18E-07	1.23E-09	4.70E-07	2.18E-08	1.65E-08	6.18E-05	5.88263E-05	Res
582753.98_4130901.03	582753.98	4130901.03	1.09E-05	1.04E-08	6.25E-09	1.04E-08	2.08E-07	1.17E-09	4.48E-07	2.08E-08	1.57E-08	5.89E-05	5.6045E-05	Res
582810.55_4130901.03	582810.55	4130901.03	1.02E-05	9.95E-09	5.97E-09	9.95E-09	1.98E-07	1.12E-09	4.28E-07	1.99E-08	1.50E-08	5.63E-05	5.34999E-05	Res
582867.12_4130901.03	582867.12	4130901.03	9.65E-06	9.53E-09	5.72E-09	9.53E-09	1.90E-07	1.07E-09	4.10E-07	1.91E-08	1.44E-08	5.39E-05	5.12361E-05	Res
581735.72_4130984.94	581735.72	4130984.94	1.71E-03	9.27E-07	5.56E-07	9.27E-07	1.85E-05	1.04E-07	4.00E-05	1.85E-06	1.41E-06	5.26E-03	0.005155455	Res
581792.29_4130984.94	581792.29	4130984.94	2.25E-03	1.21E-06	7.28E-07	1.21E-06	2.43E-05	1.36E-07	5.24E-05	2.43E-06	1.85E-06	6.90E-03	0.006753817	Res
581848.86_4130984.94	581848.86	4130984.94	2.61E-03	1.41E-06	8.47E-07	1.41E-06	2.82E-05	1.58E-07	6.10E-05	2.82E-06	2.14E-06	8.01E-03	0.007849274	Res
581905.43_4130984.94	581905.43	4130984.94	2.08E-04	1.19E-07	7.13E-08	1.19E-07	2.38E-06	1.33E-08	5.13E-06	2.38E-07	1.81E-07	6.75E-04	0.000658747	Res
581962_4130984.94	581962	4130984.94	8.95E-05	5.49E-08	3.29E-08	5.49E-08	1.10E-06	6.15E-09	2.37E-06	1.10E-07	8.33E-08	3.11E-04	0.000302528	Res
582018.57_4130984.94	582018.57	4130984.94	5.77E-05	3.75E-08	2.25E-08	3.75E-08	7.50E-07	4.21E-09	1.62E-06	7.51E-08	5.69E-08	2.13E-04	0.000206194	Res
582075.14_4130984.94	582075.14	4130984.94	4.26E-05	2.92E-08	1.75E-08	2.92E-08	5.83E-07	3.27E-09	1.26E-06	5.84E-08	4.42E-08	1.65E-04	0.000159784	Res
582131.71_4130984.94	582131.71	4130984.94	3.37E-05	2.42E-08	1.45E-08	2.42E-08	4.83E-07	2.71E-09	1.04E-06	4.84E-08	3.66E-08	1.37E-04	0.000132108	Res
582188.28_4130984.94	582188.28	4130984.94	2.78E-05	2.08E-08	1.25E-08	2.08E-08	4.15E-07	2.33E-09	8.97E-07	4.16E-08	3.15E-08	1.18E-04	0.000113362	Res
582244.85_4130984.94	582244.85	4130984.94	2.36E-05	1.84E-08	1.10E-08	1.84E-08	3.66E-07	2.06E-09	7.91E-07	3.67E-08	2.78E-08	1.04E-04	9.9795E-05	Res
582301.42_4130984.94	582301.42	4130984.94	2.05E-05	1.65E-08	9.90E-09	1.65E-08	3.29E-07	1.85E-09	7.10E-07	3.30E-08	2.50E-08	9.35E-05	8.95159E-05	Res
582357.99_4130984.94	582357.99	4130984.94	1.81E-05	1.50E-08	9.03E-09	1.50E-08	3.00E-07	1.69E-09	6.48E-07	3.01E-08	2.27E-08	8.52E-05	8.15008E-05	Res
582414.56_4130984.94	582414.56	4130984.94	1.62E-05	1.39E-08	8.32E-09	1.39E-08	2.76E-07	1.56E-09	5.97E-07	2.77E-08	2.09E-08	7.85E-05	7.49792E-05	Res
582471.13_4130984.94	582471.13	4130984.94	1.47E-05	1.29E-08	7.73E-09	1.29E-08	2.57E-07	1.45E-09	5.54E-07	2.58E-08	1.95E-08	7.29E-05	6.95883E-05	Res
582527.7_4130984.94	582527.7	4130984.94	1.34E-05	1.20E-08	7.23E-09	1.20E-08	2.40E-07	1.35E-09	5.18E-07	2.41E-08	1.82E-08	6.82E-05	6.50181E-05	Res
582584.27_4130984.94	582584.27	4130984.94	1.24E-05	1.14E-08	6.81E-09	1.14E-08	2.26E-07	1.28E-09	4.89E-07	2.27E-08	1.71E-08	6.43E-05	6.12289E-05	Res
582640.84_4130984.94	582640.84	4130984.94	1.15E-05	1.08E-08	6.46E-09	1.08E-08	2.15E-07	1.21E-09	4.64E-07	2.15E-08	1.63E-08	6.10E-05	5.80402E-05	Res
582697.41_4130984.94	582697.41	4130984.94	1.08E-05	1.02E-08	6.14E-09	1.02E-08	2.04E-07	1.15E-09	4.40E-07	2.05E-08	1.55E-08	5.80E-05	5.51213E-05	Res
582753.98_4130984.94	582753.98	4130984.94	1.01E-05	9.78E-09	5.87E-09	9.78E-09	1.95E-07	1.10E-09	4.21E-07	1.96E-08	1.48E-08	5.54E-05	5.26181E-05	Res
582810.55_4130984.94	582810.55	4130984.94	9.56E-06	9.36E-09	5.62E-09	9.36E-09	1.87E-07	1.05E-09	4.03E-07	1.87E-08	1.41E-08	5.30E-05	5.03173E-05	Res
582867.12_4130984.94	582867.12	4130984.94	9.04E-06	8.98E-09	5.39E-09	8.98E-09	1.79E-07	1.01E-09	3.86E-07	1.80E-08	1.35E-08	5.08E-05	4.82291E-05	Res
581735.72_4131068.85	581735.72	4131068.85	2.80E-04	1.58E-07	9.47E-08	1.58E-07	3.16E-06	1.77E-08	6.82E-06	3.16E-07	2.40E-07	8.96E-04	0.000875576	Res
581792.29_4131068.85	581792.29	4131068.85	2.23E-04	1.27E-07	7.63E-08	1.27E-07	2.54E-06	1.43E-08	5.49E-06	2.54E-07	1.93E-07	7.22E-04	0.000705088	Res
581848.86_4131068.85	581848.86	4131068.85	1.20E-04	7.17E-08	4.30E-08	7.17E-08	1.43E-06	8.03E-09	3.09E-06	1.43E-07	1.09E-07	4.07E-04	0.000396017	Res
581905.43_4131068.85	581905.43	4131068.85	7.67E-05	4.80E-08	2.88E-08	4.80E-08	9.60E-07	5.38E-09	2.07E-06	9.61E-08	7.29E-08	2.73E-04	0.000264502	Res
581962_4131068.85	581962	4131068.85	5.56E-05	3.65E-08	2.19E-08	3.65E-08	7.29E-07	4.09E-09	1.57E-06	7.30E-08	5.53E-08	2.07E-04	0.00020029	Res
582018.57_4131068.85	582018.57	4131068.85	4.22E-05	2.90E-08	1.74E-08	2.90E-08	5.80E-07	3.26E-09	1.25E-06	5.81E-08	4.40E-08	1.65E-04	0.000159017	Res
582075.14_4131068.85	582075.14	4131068.85	3.35E-05	2.42E-08	1.45E-08	2.42E-08	4.82E-07	2.71E-09	1.04E-06	4.83E-08	3.66E-08	1.37E-04	0.000131919	Res
582131.71_4131068.85	582131.71	4131068.85	2.76E-05	2.08E-08	1.25E-08	2.08E-08	4.15E-07	2.33E-09	8.97E-07	4.16E-08	3.15E-08	1.18E-04	0.000113334	Res

Chronic Calculation, $\sum C_{TAC}$ /REL

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)										Total HI	Receptor Type
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Copper	Mercury	Nickel	Selenium	Chromium VI	Crystalline Silica		
582188.28_4131068.85	582188.28	4131068.85	2.34E-05	1.83E-08	1.10E-08	1.83E-08	3.66E-07	2.06E-09	7.89E-07	3.66E-08	2.77E-08	1.04E-04	9.95432E-05	Res
582244.85_4131068.85	582244.85	4131068.85	2.02E-05	1.64E-08	9.86E-09	1.64E-08	3.28E-07	1.84E-09	7.08E-07	3.29E-08	2.48E-08	9.31E-05	8.91214E-05	Res
582301.42_4131068.85	582301.42	4131068.85	1.78E-05	1.49E-08	8.96E-09	1.49E-08	2.98E-07	1.68E-09	6.43E-07	2.99E-08	2.26E-08	8.46E-05	8.08985E-05	Res
582357.99_4131068.85	582357.99	4131068.85	1.58E-05	1.37E-08	8.23E-09	1.37E-08	2.74E-07	1.54E-09	5.91E-07	2.74E-08	2.07E-08	7.77E-05	7.42024E-05	Res
582414.56_4131068.85	582414.56	4131068.85	1.43E-05	1.27E-08	7.64E-09	1.27E-08	2.54E-07	1.43E-09	5.48E-07	2.55E-08	1.92E-08	7.21E-05	6.87647E-05	Res
582471.13_4131068.85	582471.13	4131068.85	1.30E-05	1.19E-08	7.13E-09	1.19E-08	2.37E-07	1.34E-09	5.12E-07	2.38E-08	1.80E-08	6.73E-05	6.4132E-05	Res
582527.7_4131068.85	582527.7	4131068.85	1.20E-05	1.12E-08	6.70E-09	1.12E-08	2.23E-07	1.25E-09	4.81E-07	2.23E-08	1.69E-08	6.32E-05	6.01746E-05	Res
582584.27_4131068.85	582584.27	4131068.85	1.10E-05	1.05E-08	6.32E-09	1.05E-08	2.10E-07	1.18E-09	4.53E-07	2.11E-08	1.59E-08	5.96E-05	5.66837E-05	Res
582640.84_4131068.85	582640.84	4131068.85	1.04E-05	1.00E-08	6.02E-09	1.00E-08	2.00E-07	1.13E-09	4.31E-07	2.01E-08	1.51E-08	5.68E-05	5.3947E-05	Res
582697.41_4131068.85	582697.41	4131068.85	9.73E-06	9.56E-09	5.74E-09	9.56E-09	1.91E-07	1.07E-09	4.11E-07	1.91E-08	1.44E-08	5.41E-05	5.14003E-05	Res
582753.98_4131068.85	582753.98	4131068.85	9.23E-06	9.17E-09	5.50E-09	9.17E-09	1.83E-07	1.03E-09	3.94E-07	1.83E-08	1.38E-08	5.19E-05	4.92784E-05	Res
582810.55_4131068.85	582810.55	4131068.85	8.77E-06	8.81E-09	5.29E-09	8.81E-09	1.76E-07	9.90E-10	3.79E-07	1.76E-08	1.33E-08	4.99E-05	4.73324E-05	Res
582867.12_4131068.85	582867.12	4131068.85	8.30E-06	8.44E-09	5.07E-09	8.44E-09	1.68E-07	9.49E-10	3.63E-07	1.69E-08	1.27E-08	4.78E-05	4.53238E-05	Res
582018.57_4131152.76	582018.57	4131152.76	2.83E-05	2.15E-08	1.29E-08	2.15E-08	4.29E-07	2.41E-09	9.25E-07	4.30E-08	3.25E-08	1.22E-04	0.000116922	Res
582244.85_4131152.76	582244.85	4131152.76	1.71E-05	1.47E-08	8.83E-09	1.47E-08	2.94E-07	1.65E-09	6.34E-07	2.94E-08	2.22E-08	8.33E-05	7.9604E-05	Res
582301.42_4131152.76	582301.42	4131152.76	1.54E-05	1.36E-08	8.18E-09	1.36E-08	2.72E-07	1.53E-09	5.87E-07	2.73E-08	2.06E-08	7.72E-05	7.36335E-05	Res
582357.99_4131152.76	582357.99	4131152.76	1.39E-05	1.27E-08	7.60E-09	1.27E-08	2.53E-07	1.42E-09	5.45E-07	2.53E-08	1.91E-08	7.17E-05	6.83262E-05	Res
582414.56_4131152.76	582414.56	4131152.76	1.27E-05	1.18E-08	7.11E-09	1.18E-08	2.36E-07	1.33E-09	5.10E-07	2.37E-08	1.79E-08	6.70E-05	6.38206E-05	Res
582471.13_4131152.76	582471.13	4131152.76	1.15E-05	1.11E-08	6.64E-09	1.11E-08	2.21E-07	1.24E-09	4.76E-07	2.21E-08	1.67E-08	6.26E-05	5.95354E-05	Res
582527.7_4131152.76	582527.7	4131152.76	1.06E-05	1.04E-08	6.25E-09	1.04E-08	2.08E-07	1.17E-09	4.48E-07	2.08E-08	1.57E-08	5.89E-05	5.59945E-05	Res
582584.27_4131152.76	582584.27	4131152.76	9.80E-06	9.84E-09	5.90E-09	9.84E-09	1.96E-07	1.11E-09	4.23E-07	1.97E-08	1.49E-08	5.57E-05	5.28642E-05	Res
582640.84_4131152.76	582640.84	4131152.76	9.16E-06	9.36E-09	5.62E-09	9.36E-09	1.87E-07	1.05E-09	4.03E-07	1.87E-08	1.41E-08	5.30E-05	5.02467E-05	Res
582697.41_4131152.76	582697.41	4131152.76	8.61E-06	8.93E-09	5.36E-09	8.93E-09	1.78E-07	1.00E-09	3.84E-07	1.79E-08	1.35E-08	5.05E-05	4.79248E-05	Res
582753.98_4131152.76	582753.98	4131152.76	8.20E-06	8.59E-09	5.15E-09	8.59E-09	1.71E-07	9.65E-10	3.69E-07	1.72E-08	1.30E-08	4.86E-05	4.60457E-05	Res
582810.55_4131152.76	582810.55	4131152.76	7.82E-06	8.27E-09	4.96E-09	8.27E-09	1.65E-07	9.29E-10	3.55E-07	1.65E-08	1.25E-08	4.68E-05	4.43101E-05	Res
582867.12_4131152.76	582867.12	4131152.76	7.41E-06	7.93E-09	4.76E-09	7.93E-09	1.58E-07	8.91E-10	3.41E-07	1.59E-08	1.20E-08	4.49E-05	4.24852E-05	Res

HRA Permanente Creek Restoration Project

Construction Year 2029

Emissions Inputs

Construction Activity	Construction Year & Source	DPM Exhaust (tons/year)	PM10 Dust for speciation (tons/year)	Arsenic (tons/year)	Beryllium (tons/year)	Cadmium (tons/year)	Cobalt (tons/year)	Copper (tons/year)	Lead (tons/year)	Mercury (tons/year)	Nickel (tons/year)	Selenium (tons/year)	Chromium VI (tons/year)	Crystalline Silica (tons/year)
Concrete Channel 2024	2024_CONCRTE	0.000	0.00	2.91E-12	1.74E-12	2.91E-12	1.49E-11	3.26E-11	2.91E-12	4.65E-13	5.35E-11	5.81E-12	2.33E-13	8.63E-09
Paved road	2024_PAVED	2.07E-04	0.08	1.04E-07	6.26E-08	1.04E-07	6.68E-08	2.09E-06	1.92E-07	1.17E-08	4.51E-06	2.09E-07	1.59E-07	5.93E-04
Unpaved road	2024_CCP_UNPV	6.27E-05	0.20	2.56E-07	1.54E-07	2.56E-07	1.64E-07	5.12E-06	4.71E-07	2.87E-08	1.11E-05	5.12E-07	3.89E-07	1.46E-03
Channel Widening 2024	2024_CHAN_RCK	0.002	0.16	2.05E-07	1.23E-07	2.05E-07	1.05E-06	2.29E-06	2.05E-07	3.28E-08	3.77E-06	4.09E-07	1.64E-08	6.08E-04
Paved road	2024_PAVED	1.80E-03	2.39	2.99E-06	1.79E-06	2.99E-06	1.91E-06	5.98E-05	5.50E-06	3.35E-07	1.29E-04	5.98E-06	4.54E-06	1.70E-02
Rock Pile Area 2025	2025_CHAN_RCK	0.006	0.25	3.16E-07	1.89E-07	3.16E-07	1.62E-06	3.54E-06	3.16E-07	5.05E-08	5.81E-06	6.31E-07	2.53E-08	9.37E-04
Paved road	2025_PAVED	5.95E-03	2.44	3.05E-06	1.83E-06	3.05E-06	1.95E-06	6.10E-05	5.61E-06	3.41E-07	1.32E-04	6.10E-06	4.63E-06	1.73E-02
Rock Pile Area 2026	2026_CHAN_RCK	0.006	0.25	3.16E-07	1.89E-07	3.16E-07	1.62E-06	3.54E-06	3.16E-07	5.05E-08	5.81E-06	6.31E-07	2.53E-08	9.37E-04
Paved road	2026_PAVED	5.84E-03	2.44	3.05E-06	1.83E-06	3.05E-06	1.95E-06	6.10E-05	5.61E-06	3.41E-07	1.32E-04	6.10E-06	4.63E-06	1.73E-02
Channel Widening 2027	2027_CHAN_RCK	0.002	0.98	1.23E-06	7.36E-07	1.23E-06	6.28E-06	1.37E-05	1.23E-06	1.96E-07	2.26E-05	2.45E-06	9.82E-08	3.64E-03
Paved road	2027_PAVED	5.61E-03	2.39	2.99E-06	1.79E-06	2.99E-06	1.91E-06	5.98E-05	5.50E-06	3.35E-07	1.29E-04	5.98E-06	4.54E-06	1.70E-02
Material Removal 2028	2028_MATRMVL	0.001	0.25	3.15E-07	1.89E-07	3.15E-07	1.62E-06	3.53E-06	3.15E-07	5.05E-08	5.80E-06	6.31E-07	2.52E-08	9.37E-04
Paved road	2028_PAVED	5.57E-03	2.39	2.99E-06	1.80E-06	2.99E-06	1.92E-06	5.98E-05	5.51E-06	3.35E-07	1.29E-04	5.98E-06	4.55E-06	1.70E-02
Unpaved road	2028_UNPAVED	3.40E-03	11.84	1.48E-05	8.88E-06	1.48E-05	9.47E-06	2.96E-04	2.72E-05	1.66E-06	6.40E-04	2.96E-05	2.25E-05	8.41E-02
Material Removal 2029	2029_MATRMVL	0.001	0.25	3.15E-07	1.89E-07	3.15E-07	1.62E-06	3.53E-06	3.15E-07	5.05E-08	5.80E-06	6.31E-07	2.52E-08	9.37E-04
Paved road	2029_PAVED	5.56E-03	2.41	3.01E-06	1.81E-06	3.01E-06	1.93E-06	6.03E-05	5.55E-06	3.38E-07	1.30E-04	6.03E-06	4.58E-06	1.71E-02
Unpaved road	2029_UNPAVED	3.39E-03	11.93	1.49E-05	8.95E-06	1.49E-05	9.55E-06	2.98E-04	2.74E-05	1.67E-06	6.44E-04	2.98E-05	2.27E-05	8.47E-02

Construction Activity	Construction Year	DPM (g/s)	Arsenic (g/s)	Beryllium (g/s)	Cadmium (g/s)	Cobalt (g/s)	Copper (g/s)	Lead (g/s)	Mercury (g/s)	Nickel (g/s)	Selenium (g/s)	Chromium VI (g/s)	Crystalline Silica (g/s)
Concrete Channel 2024	2024_CONCRTE	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Paved road	2024_PAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Unpaved road	2024_CCP_UNPV	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Channel Widening 2024	2024_CHAN_RCK	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Paved road	2024_PAVED	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Rock Pile Area 2025	2025_CHAN_RCK	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Paved road	2025_PAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Rock Pile Area 2026	2026_CHAN_RCK	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Paved road	2026_PAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Channel Widening 2027	2027_CHAN_RCK	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Paved road	2027_PAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Material Removal 2028	2028_MATRMVL	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Paved road	2028_PAVED	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Unpaved road	2028_UNPAVED	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Material Removal 2029	2029_MATRMVL	3.324E-05	9.08E-09	5.45E-09	9.08E-09	4.65E-08	1.02E-07	9.08E-09	1.45E-09	1.67E-07	1.82E-08	7.26E-10	2.70E-05
Paved road	2029_PAVED	1.598E-04	8.67E-08	5.20E-08	8.67E-08	5.55E-08	1.73E-06	1.60E-07	9.71E-09	3.75E-06	1.73E-07	1.32E-07	4.93E-04
Unpaved road	2029_UNPAVED	9.761E-05	4.29E-07	2.57E-07	4.29E-07	2.75E-07	8.58E-06	7.89E-07	4.81E-08	1.85E-05	8.58E-07	6.52E-07	2.44E-03

N/A = not including PM10 on-site dust in HRA calculation; it is only for speciating metals.

Chronic REL

TAC	UOM	
DPM	µg/m^3	5
Arsenic	µg/m^3	0.015
Beryllium	µg/m^3	0.007
Cadmium	µg/m^3	0.02
Copper	µg/m^3	100
Mercury	µg/m^3	0.032
Nickel	µg/m^3	0.014
Selenium	µg/m^3	20
Chromium VI	µg/m^3	0.2
Crystalline Silica	µg/m^3	3

	Max
CT House	0.001
Res	0.008

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} (µg/m^3)										Chronic Calculation, $\sum C_{TAC}$ /REL	
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Copper	Mercury	Nickel	Selenium	Chromium VI	Crystalline Silica	Total HI	Receptor Type
			5	0.015	0.007	0.02	100	0.032	0.014	20	0.2	3		
581336.22_4131207.48	581336.22	4131207.48	1.86E-04	1.10E-07	6.63E-08	1.10E-07	2.21E-06	1.24E-08	4.77E-06	2.21E-07	1.68E-07	6.27E-04	0.0006104	CT House
581554.22_4130688.06	581554.22	4130688.06	1.25E-04	7.98E-08	4.79E-08	7.98E-08	1.59E-06	8.94E-09	3.44E-06	1.60E-07	1.21E-07	4.53E-04	0.00043877	Res
579793.36_4131503.29	579793.36	4131503.29	1.11E-05	2.16E-08	1.29E-08	2.16E-08	4.30E-07	2.43E-09	9.27E-07	4.32E-08	3.25E-08	1.22E-04	0.000113676	Acute
580488.37_4131517.71	580488.37	4131517.71	1.46E-05	1.76E-08	1.06E-08	1.76E-08	3.51E-07	1.98E-09	7.58E-07	3.52E-08	2.66E-08	9.97E-05	9.40912E-05	Acute
581678.43_4131040.03	581678.43	4131040.03	5.91E-04	3.29E-07	1.97E-07	3.29E-07	6.57E-06	3.68E-08	1.42E-05	6.57E-07	4.99E-07	1.87E-03	0.001824101	Res
581635.43_4130978.54	581635.43	4130978.54	1.20E-03	6.57E-07	3.94E-07	6.57E-07	1.31E-05	7.36E-08	2.84E-05	1.31E-06	9.99E-07	3.73E-03	0.003652585	Res
581830.06_4131027.55	581830.06	4131027.55	5.44E-04	3.03E-07	1.82E-07	3.03E-07	6.05E-06	3.39E-08	1.31E-05	6.05E-07	4.60E-07	1.72E-03	0.001679798	Res
581727.48_4130976.54	581727.48	4130976.54	1.45E-03	7.94E-07	4.76E-07	7.94E-07	1.59E-05	8.89E-08	3.43E-05	1.59E-06	1.21E-06	4.51E-03	0.004409628	Res
581789.11_4130419.65	581789.11	4130419.65	9.45E-05	6.28E-08	3.77E-08	6.28E-08	1.25E-06	7.04E-09	2.71E-06	1.26E-07	9.52E-08	3.56E-04	0.000344439	Res
581700.32_4130781.89	581700.32	4130781.89	2.87E-04	1.65E-07	9.92E-08	1.65E-07	3.31E-06	1.85E-08	7.14E-06	3.31E-07	2.51E-07	9.39E-04	0.000915552	Res
581426.07_4131299.01	581426.07	4131299.01	6.77E-05	4.48E-08	2.69E-08	4.48E-08	8.94E-07	5.02E-09	1.93E-06	8.95E-08	6.79E-08	2.54E-04	0.000245663	Acute
582301.42_4129474.56	582301.42	4129474.56	3.01E-05	2.50E-08	1.50E-08	2.50E-08	4.98E-07	2.80E-09	1.08E-06	4.99E-08	3.78E-08	1.41E-04	0.000135325	Res
582357.99_4129474.56	582357.99	4129474.56	2.82E-05	2.35E-08	1.41E-08	2.35E-08	4.69E-07	2.64E-09	1.01E-06	4.71E-08	3.56E-08	1.33E-04	0.000127479	Res
582414.56_4129474.56	582414.56	4129474.56	2.64E-05	2.22E-08	1.33E-08	2.22E-08	4.43E-07	2.49E-09	9.57E-07	4.44E-08	3.36E-08	1.26E-04	0.000120356	Res
582471.13_4129474.56	582471.13	4129474.56	2.48E-05	2.10E-08	1.26E-08	2.10E-08	4.20E-07	2.36E-09	9.06E-07	4.21E-08	3.18E-08	1.19E-04	0.000113866	Res
582527.7_4129474.56	582527.7	4129474.56	2.35E-05	2.00E-08	1.20E-08	2.00E-08	3.99E-07	2.25E-09	8.61E-07	4.00E-08	3.02E-08	1.13E-04	0.000108242	Res
582584.27_4129474.56	582584.27	4129474.56	2.21E-05	1.90E-08	1.14E-08	1.90E-08	3.78E-07	2.13E-09	8.17E-07	3.79E-08	2.87E-08	1.07E-04	0.000102597	Res
582640.84_4129474.56	582640.84	4129474.56	2.06E-05	1.79E-08	1.07E-08	1.79E-08	3.57E-07	2.01E-09	7.71E-07	3.58E-08	2.71E-08	1.01E-04	9.68246E-05	Res
582244.85_4129558.47	582244.85	4129558.47	3.04E-05	2.53E-08	1.52E-08	2.53E-08	5.06E-07	2.85E-09	1.09E-06	5.07E-08	3.83E-08	1.44E-04	0.000137338	Res
582301.42_4129558.47	582301.42	4129558.47	3.02E-05	2.48E-08	1.49E-08	2.48E-08	4.94E-07	2.78E-09	1.07E-06	4.96E-08	3.75E-08	1.40E-04	0.000134351	Res
582357.99_4129558.47	582357.99	4129558.47	2.87E-05	2.36E-08	1.41E-08	2.36E-08	4.70E-07	2.65E-09	1.02E-06	4.72E-08	3.57E-08	1.34E-04	0.000127838	Res
582414.56_4129558.47	582414.56	4129558.47	2.69E-05	2.23E-08	1.34E-08	2.23E-08	4.45E-07	2.51E-09	9.61E-07	4.46E-08	3.38E-08	1.26E-04	0.000120965	Res
582471.13_4129558.47	582471.13	4129558.47	2.52E-05	2.11E-08	1.27E-08	2.11E-08	4.21E-07	2.37E-09	9.08E-07	4.22E-08	3.19E-08	1.19E-04	0.000114205	Res
582527.7_4129558.47	582527.7	4129558.47	2.36E-05	2.00E-08	1.20E-08	2.00E-08	3.98E-07	2.24E-09	8.59E-07	3.99E-08	3.02E-08	1.13E-04	0.000108043	Res
582584.27_4129558.47	582584.27	4129558.47	2.21E-05	1.89E-08	1.13E-08	1.89E-08	3.77E-07	2.12E-09	8.13E-07	3.78E-08	2.86E-08	1.07E-04	0.00010223	Res
582640.84_4129558.47	582640.84	4129558.47	2.09E-05	1.80E-08	1.08E-08	1.80E-08	3.59E-07	2.02E-09	7.74E-07	3.60E-08	2.72E-08	1.02E-04	9.7297E-05	Res
582697.41_4129558.47	582697.41	4129558.47	1.97E-05	1.71E-08	1.03E-08	1.71E-08	3.42E-07	1.92E-09	7.37E-07	3.43E-08	2.59E-08	9.70E-05	9.26035E-05	Res
582244.85_4129642.38	582244.85	4129642.38	2.68E-05	2.33E-08	1.40E-08	2.33E-08	4.64E-07	2.61E-09	1.00E-06	4.65E-08	3.52E-08	1.32E-04	0.000125818	Res
582301.42_4129642.38	582301.42	4129642.38	2.94E-05	2.43E-08	1.46E-08	2.43E-08	4.84E-07	2.72E-09	1.04E-06	4.85E-08	3.67E-08	1.37E-04	0.000131518	Res
582357.99_4129642.38	582357.99	4129642.38	2.91E-05	2.37E-08	1.42E-08	2.37E-08	4.74E-07	2.66E-09	1.02E-06	4.75E-08	3.59E-08	1.34E-04	0.000128707	Res
582414.56_4129642.38	582414.56	4129642.38	2.75E-05	2.26E-08	1.35E-08	2.26E-08	4.50E-07	2.53E-09	9.72E-07	4.51E-08	3.41E-08	1.28E-04	0.000122392	Res
582471.13_4129642.38	582471.13	4129642.38	2.59E-05	2.14E-08	1.28E-08	2.14E-08	4.27E-07	2.40E-09	9.22E-07	4.28E-08	3.24E-08	1.21E-04	0.000116033	Res
582527.7_4129642.38	582527.7	4129642.38	2.44E-05	2.03E-08	1.22E-08	2.03E-08	4.06E-07	2.28E-09	8.76E-07	4.07E-08	3.08E-08	1.15E-04	0.000110216	Res
582584.27_4129642.38	582584.27	4129642.38	2.27E-05	1.92E-08	1.15E-08	1.92E-08	3.84E-07	2.16E-09	8.28E-07	3.85E-08	2.91E-08	1.09E-04	0.000104075	Res

Chronic Calculation, $\sum C_{TAC}$ /REL

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)										Total HI	Receptor Type
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Copper	Mercury	Nickel	Selenium	Chromium VI	Crystalline Silica		
582640.84_4129642.38	582640.84	4129642.38	2.13E-05	1.83E-08	1.10E-08	1.83E-08	3.64E-07	2.05E-09	7.86E-07	3.65E-08	2.76E-08	1.03E-04	9.87378E-05	Res
582697.41_4129642.38	582697.41	4129642.38	2.00E-05	1.74E-08	1.04E-08	1.74E-08	3.46E-07	1.95E-09	7.47E-07	3.47E-08	2.62E-08	9.83E-05	9.38429E-05	Res
582753.98_4129642.38	582753.98	4129642.38	1.87E-05	1.65E-08	9.90E-09	1.65E-08	3.29E-07	1.85E-09	7.10E-07	3.30E-08	2.49E-08	9.34E-05	8.91392E-05	Res
582810.55_4129642.38	582810.55	4129642.38	1.75E-05	1.57E-08	9.44E-09	1.57E-08	3.14E-07	1.77E-09	6.77E-07	3.15E-08	2.38E-08	8.90E-05	8.49018E-05	Res
582867.12_4129642.38	582867.12	4129642.38	1.63E-05	1.49E-08	8.95E-09	1.49E-08	2.97E-07	1.67E-09	6.41E-07	2.98E-08	2.25E-08	8.44E-05	8.03937E-05	Res
582244.85_4129726.29	582244.85	4129726.29	2.94E-05	2.46E-08	1.48E-08	2.46E-08	4.91E-07	2.76E-09	1.06E-06	4.92E-08	3.72E-08	1.39E-04	0.000133212	Res
582301.42_4129726.29	582301.42	4129726.29	2.87E-05	2.39E-08	1.43E-08	2.39E-08	4.77E-07	2.68E-09	1.03E-06	4.78E-08	3.61E-08	1.35E-04	0.000129431	Res
582357.99_4129726.29	582357.99	4129726.29	2.93E-05	2.39E-08	1.43E-08	2.39E-08	4.77E-07	2.68E-09	1.03E-06	4.78E-08	3.61E-08	1.35E-04	0.000129635	Res
582414.56_4129726.29	582414.56	4129726.29	2.81E-05	2.30E-08	1.38E-08	2.30E-08	4.58E-07	2.58E-09	9.88E-07	4.59E-08	3.47E-08	1.30E-04	0.00012445	Res
582471.13_4129726.29	582471.13	4129726.29	2.65E-05	2.19E-08	1.31E-08	2.19E-08	4.36E-07	2.46E-09	9.42E-07	4.37E-08	3.31E-08	1.24E-04	0.000118553	Res
582527.7_4129726.29	582527.7	4129726.29	2.50E-05	2.08E-08	1.25E-08	2.08E-08	4.15E-07	2.34E-09	8.96E-07	4.16E-08	3.15E-08	1.18E-04	0.000112752	Res
582584.27_4129726.29	582584.27	4129726.29	2.35E-05	1.98E-08	1.19E-08	1.98E-08	3.94E-07	2.22E-09	8.51E-07	3.95E-08	2.99E-08	1.12E-04	0.000107032	Res
582640.84_4129726.29	582640.84	4129726.29	2.19E-05	1.88E-08	1.13E-08	1.88E-08	3.74E-07	2.11E-09	8.07E-07	3.75E-08	2.83E-08	1.06E-04	0.00010148	Res
582697.41_4129726.29	582697.41	4129726.29	2.03E-05	1.77E-08	1.06E-08	1.77E-08	3.53E-07	1.99E-09	7.62E-07	3.54E-08	2.68E-08	1.00E-04	9.57355E-05	Res
582753.98_4129726.29	582753.98	4129726.29	1.88E-05	1.67E-08	1.00E-08	1.67E-08	3.33E-07	1.87E-09	7.18E-07	3.34E-08	2.52E-08	9.45E-05	9.01117E-05	Res
582810.55_4129726.29	582810.55	4129726.29	1.71E-05	1.56E-08	9.38E-09	1.56E-08	3.12E-07	1.76E-09	6.73E-07	3.13E-08	2.36E-08	8.85E-05	8.43159E-05	Res
582244.85_4129810.2	582244.85	4129810.2	2.86E-05	2.43E-08	1.46E-08	2.43E-08	4.85E-07	2.73E-09	1.05E-06	4.86E-08	3.68E-08	1.38E-04	0.000131663	Res
582301.42_4129810.2	582301.42	4129810.2	2.91E-05	2.42E-08	1.45E-08	2.42E-08	4.84E-07	2.72E-09	1.04E-06	4.85E-08	3.67E-08	1.37E-04	0.000131377	Res
582357.99_4129810.2	582357.99	4129810.2	2.90E-05	2.39E-08	1.43E-08	2.39E-08	4.77E-07	2.68E-09	1.03E-06	4.78E-08	3.61E-08	1.35E-04	0.000129461	Res
582414.56_4129810.2	582414.56	4129810.2	2.83E-05	2.32E-08	1.39E-08	2.32E-08	4.64E-07	2.61E-09	1.00E-06	4.65E-08	3.51E-08	1.32E-04	0.000125971	Res
582471.13_4129810.2	582471.13	4129810.2	2.71E-05	2.23E-08	1.34E-08	2.23E-08	4.45E-07	2.50E-09	9.61E-07	4.46E-08	3.37E-08	1.26E-04	0.000120932	Res
582527.7_4129810.2	582527.7	4129810.2	2.54E-05	2.12E-08	1.27E-08	2.12E-08	4.23E-07	2.38E-09	9.13E-07	4.24E-08	3.21E-08	1.20E-04	0.000114846	Res
582584.27_4129810.2	582584.27	4129810.2	2.37E-05	2.01E-08	1.20E-08	2.01E-08	4.00E-07	2.25E-09	8.64E-07	4.01E-08	3.03E-08	1.14E-04	0.000108599	Res
582640.84_4129810.2	582640.84	4129810.2	2.18E-05	1.88E-08	1.13E-08	1.88E-08	3.75E-07	2.11E-09	8.09E-07	3.76E-08	2.84E-08	1.06E-04	0.000101601	Res
582697.41_4129810.2	582697.41	4129810.2	2.00E-05	1.76E-08	1.06E-08	1.76E-08	3.52E-07	1.98E-09	7.59E-07	3.53E-08	2.66E-08	9.98E-05	9.52468E-05	Res
581905.43_4129894.11	581905.43	4129894.11	3.79E-05	3.19E-08	1.92E-08	3.19E-08	6.38E-07	3.59E-09	1.38E-06	6.39E-08	4.83E-08	1.81E-04	0.000173032	Res
581962_4129894.11	581962	4129894.11	3.78E-05	3.13E-08	1.88E-08	3.13E-08	6.25E-07	3.51E-09	1.35E-06	6.26E-08	4.74E-08	1.77E-04	0.000169664	Res
582131.71_4129894.11	582131.71	4129894.11	3.28E-05	2.74E-08	1.64E-08	2.74E-08	5.47E-07	3.08E-09	1.18E-06	5.48E-08	4.15E-08	1.55E-04	0.000148499	Res
582188.28_4129894.11	582188.28	4129894.11	3.17E-05	2.64E-08	1.58E-08	2.64E-08	5.27E-07	2.97E-09	1.14E-06	5.28E-08	4.00E-08	1.50E-04	0.000143129	Res
582244.85_4129894.11	582244.85	4129894.11	3.11E-05	2.58E-08	1.55E-08	2.58E-08	5.14E-07	2.89E-09	1.11E-06	5.15E-08	3.90E-08	1.46E-04	0.000139629	Res
582301.42_4129894.11	582301.42	4129894.11	3.01E-05	2.49E-08	1.50E-08	2.49E-08	4.97E-07	2.80E-09	1.07E-06	4.98E-08	3.77E-08	1.41E-04	0.000135058	Res
582357.99_4129894.11	582357.99	4129894.11	2.88E-05	2.39E-08	1.44E-08	2.39E-08	4.77E-07	2.69E-09	1.03E-06	4.78E-08	3.62E-08	1.36E-04	0.000129643	Res
582414.56_4129894.11	582414.56	4129894.11	2.93E-05	2.39E-08	1.43E-08	2.39E-08	4.76E-07	2.68E-09	1.03E-06	4.77E-08	3.61E-08	1.35E-04	0.000129471	Res
582471.13_4129894.11	582471.13	4129894.11	2.75E-05	2.26E-08	1.36E-08	2.26E-08	4.51E-07	2.54E-09	9.74E-07	4.52E-08	3.42E-08	1.28E-04	0.000122649	Res
582527.7_4129894.11	582527.7	4129894.11	2.54E-05	2.12E-08	1.27E-08	2.12E-08	4.24E-07	2.39E-09	9.15E-07	4.25E-08	3.21E-08	1.20E-04	0.000115077	Res
582584.27_4129894.11	582584.27	4129894.11	2.33E-05	1.99E-08	1.19E-08	1.99E-08	3.97E-07	2.23E-09	8.56E-07	3.98E-08	3.01E-08	1.13E-04	0.000107632	Res
582640.84_4129894.11	582640.84	4129894.11	2.13E-05	1.86E-08	1.12E-08	1.86E-08	3.71E-07	2.09E-09	8.01E-07	3.72E-08	2.81E-08	1.05E-04	0.000100553	Res
582697.41_4129894.11	582697.41	4129894.11	1.94E-05	1.74E-08	1.04E-08	1.74E-08	3.47E-07	1.95E-09	7.49E-07	3.48E-08	2.63E-08	9.85E-05	9.3907E-05	Res
581962_4129978.02	581962	4129978.02	3.93E-05	3.23E-08	1.94E-08	3.23E-08	6.46E-07	3.63E-09	1.39E-06	6.47E-08	4.89E-08	1.83E-04	0.000175402	Res
582018.57_4129978.02	582018.57	4129978.02	3.70E-05	3.06E-08	1.84E-08	3.06E-08	6.12E-07	3.44E-09	1.32E-06	6.13E-08	4.64E-08	1.74E-04	0.000166121	Res
582075.14_4129978.02	582075.14	4129978.02	3.82E-05	3.08E-08	1.85E-08	3.08E-08	6.14E-07	3.45E-09	1.33E-06	6.16E-08	4.66E-08	1.74E-04	0.000167067	Res
582131.71_4129978.02	582131.71	4129978.02	3.82E-05	3.04E-08	1.82E-08	3.04E-08	6.06E-07	3.41E-09	1.31E-06	6.07E-08	4.60E-08	1.72E-04	0.000164937	Res
582188.28_4129978.02	582188.28	4129978.02	3.82E-05	3.00E-08	1.80E-08	3.00E-08	5.99E-07	3.37E-09	1.29E-06	6.00E-08	4.54E-08	1.70E-04	0.000163032	Res
582244.85_4129978.02	582244.85	4129978.02	3.46E-05	2.77E-08	1.66E-08	2.77E-08	5.53E-07	3.11E-09	1.19E-06	5.55E-08	4.20E-08	1.57E-04	0.00015055	Res
582301.42_4129978.02	582301.42	4129978.02	3.42E-05	2.72E-08	1.63E-08	2.72E-08	5.42E-07	3.05E-09	1.17E-06	5.43E-08	4.11E-08	1.54E-04	0.000147595	Res
582357.99_4129978.02	582357.99	4129978.02	3.24E-05	2.59E-08	1.55E-08	2.59E-08	5.17E-07	2.90E-09	1.11E-06	5.18E-08	3.92E-08	1.47E-04	0.000140535	Res
582414.56_4129978.02	582414.56	4129978.02	3.00E-05	2.43E-08	1.46E-08	2.43E-08	4.85E-07	2.73E-09	1.05E-06	4.86E-08	3.68E-08	1.38E-04	0.000131899	Res

Chronic Calculation, $\sum C_{TAC}$ /REL

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)										Total HI	Receptor Type
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Copper	Mercury	Nickel	Selenium	Chromium VI	Crystalline Silica		
582471.13_4129978.02	582471.13	4129978.02	2.75E-05	2.27E-08	1.36E-08	2.27E-08	4.53E-07	2.55E-09	9.78E-07	4.54E-08	3.43E-08	1.29E-04	0.000123091	Res
582527.7_4129978.02	582527.7	4129978.02	2.51E-05	2.11E-08	1.27E-08	2.11E-08	4.22E-07	2.37E-09	9.11E-07	4.23E-08	3.20E-08	1.20E-04	0.000114503	Res
582584.27_4129978.02	582584.27	4129978.02	2.29E-05	1.97E-08	1.18E-08	1.97E-08	3.93E-07	2.21E-09	8.48E-07	3.94E-08	2.98E-08	1.12E-04	0.000106517	Res
582640.84_4129978.02	582640.84	4129978.02	2.08E-05	1.84E-08	1.10E-08	1.84E-08	3.66E-07	2.06E-09	7.91E-07	3.67E-08	2.78E-08	1.04E-04	9.92475E-05	Res
582697.41_4129978.02	582697.41	4129978.02	1.90E-05	1.71E-08	1.03E-08	1.71E-08	3.42E-07	1.93E-09	7.38E-07	3.43E-08	2.59E-08	9.71E-05	9.25504E-05	Res
582753.98_4129978.02	582753.98	4129978.02	1.71E-05	1.59E-08	9.57E-09	1.59E-08	3.18E-07	1.79E-09	6.86E-07	3.19E-08	2.41E-08	9.03E-05	8.59462E-05	Res
582810.55_4129978.02	582810.55	4129978.02	1.52E-05	1.47E-08	8.80E-09	1.47E-08	2.92E-07	1.65E-09	6.31E-07	2.93E-08	2.21E-08	8.30E-05	7.88901E-05	Res
581905.43_4130061.93	581905.43	4130061.93	5.64E-05	4.19E-08	2.52E-08	4.19E-08	8.37E-07	4.70E-09	1.81E-06	8.39E-08	6.35E-08	2.38E-04	0.000228575	Res
581962_4130061.93	581962	4130061.93	5.33E-05	3.98E-08	2.39E-08	3.98E-08	7.94E-07	4.46E-09	1.71E-06	7.95E-08	6.02E-08	2.25E-04	0.000216736	Res
582018.57_4130061.93	582018.57	4130061.93	4.54E-05	3.51E-08	2.11E-08	3.51E-08	7.01E-07	3.94E-09	1.51E-06	7.02E-08	5.32E-08	1.99E-04	0.000191076	Res
582075.14_4130061.93	582075.14	4130061.93	4.06E-05	3.21E-08	1.93E-08	3.21E-08	6.41E-07	3.61E-09	1.38E-06	6.43E-08	4.86E-08	1.82E-04	0.000174558	Res
582131.71_4130061.93	582131.71	4130061.93	3.99E-05	3.13E-08	1.88E-08	3.13E-08	6.25E-07	3.52E-09	1.35E-06	6.27E-08	4.74E-08	1.78E-04	0.000170296	Res
582188.28_4130061.93	582188.28	4130061.93	3.90E-05	3.05E-08	1.83E-08	3.05E-08	6.08E-07	3.42E-09	1.31E-06	6.09E-08	4.61E-08	1.73E-04	0.000165639	Res
582244.85_4130061.93	582244.85	4130061.93	3.83E-05	2.97E-08	1.78E-08	2.97E-08	5.92E-07	3.33E-09	1.28E-06	5.94E-08	4.49E-08	1.68E-04	0.000161413	Res
582301.42_4130061.93	582301.42	4130061.93	3.56E-05	2.79E-08	1.67E-08	2.79E-08	5.57E-07	3.13E-09	1.20E-06	5.58E-08	4.22E-08	1.58E-04	0.000151603	Res
582357.99_4130061.93	582357.99	4130061.93	3.30E-05	2.62E-08	1.57E-08	2.62E-08	5.23E-07	2.94E-09	1.13E-06	5.24E-08	3.97E-08	1.49E-04	0.000142366	Res
582414.56_4130061.93	582414.56	4130061.93	3.03E-05	2.44E-08	1.47E-08	2.44E-08	4.88E-07	2.74E-09	1.05E-06	4.89E-08	3.70E-08	1.39E-04	0.000132679	Res
582471.13_4130061.93	582471.13	4130061.93	2.75E-05	2.27E-08	1.36E-08	2.27E-08	4.52E-07	2.54E-09	9.77E-07	4.53E-08	3.43E-08	1.28E-04	0.000122921	Res
582527.7_4130061.93	582527.7	4130061.93	2.49E-05	2.10E-08	1.26E-08	2.10E-08	4.19E-07	2.35E-09	9.03E-07	4.20E-08	3.17E-08	1.19E-04	0.000113596	Res
582584.27_4130061.93	582584.27	4130061.93	2.25E-05	1.95E-08	1.17E-08	1.95E-08	3.88E-07	2.18E-09	8.38E-07	3.89E-08	2.94E-08	1.10E-04	0.000105218	Res
582640.84_4130061.93	582640.84	4130061.93	2.03E-05	1.80E-08	1.08E-08	1.80E-08	3.60E-07	2.02E-09	7.76E-07	3.61E-08	2.73E-08	1.02E-04	9.74066E-05	Res
582697.41_4130061.93	582697.41	4130061.93	1.84E-05	1.68E-08	1.01E-08	1.68E-08	3.35E-07	1.88E-09	7.22E-07	3.35E-08	2.53E-08	9.50E-05	9.05022E-05	Res
582753.98_4130061.93	582753.98	4130061.93	1.68E-05	1.57E-08	9.39E-09	1.57E-08	3.12E-07	1.76E-09	6.74E-07	3.13E-08	2.37E-08	8.86E-05	8.43748E-05	Res
582810.55_4130061.93	582810.55	4130061.93	1.52E-05	1.46E-08	8.78E-09	1.46E-08	2.92E-07	1.64E-09	6.30E-07	2.93E-08	2.21E-08	8.28E-05	7.87547E-05	Res
581962_4130145.84	581962	4130145.84	6.22E-05	4.45E-08	2.67E-08	4.45E-08	8.89E-07	4.99E-09	1.92E-06	8.90E-08	6.74E-08	2.52E-04	0.000243073	Res
582018.57_4130145.84	582018.57	4130145.84	5.77E-05	4.16E-08	2.50E-08	4.16E-08	8.31E-07	4.67E-09	1.79E-06	8.32E-08	6.30E-08	2.36E-04	0.000227196	Res
582075.14_4130145.84	582075.14	4130145.84	4.91E-05	3.66E-08	2.20E-08	3.66E-08	7.31E-07	4.11E-09	1.58E-06	7.32E-08	5.55E-08	2.08E-04	0.000199597	Res
582131.71_4130145.84	582131.71	4130145.84	4.56E-05	3.43E-08	2.06E-08	3.43E-08	6.85E-07	3.85E-09	1.48E-06	6.86E-08	5.19E-08	1.94E-04	0.00018681	Res
582188.28_4130145.84	582188.28	4130145.84	4.41E-05	3.31E-08	1.98E-08	3.31E-08	6.60E-07	3.71E-09	1.42E-06	6.61E-08	5.01E-08	1.87E-04	0.000180112	Res
582244.85_4130145.84	582244.85	4130145.84	4.03E-05	3.06E-08	1.84E-08	3.06E-08	6.12E-07	3.44E-09	1.32E-06	6.13E-08	4.64E-08	1.74E-04	0.000166789	Res
582301.42_4130145.84	582301.42	4130145.84	3.66E-05	2.83E-08	1.70E-08	2.83E-08	5.65E-07	3.18E-09	1.22E-06	5.66E-08	4.28E-08	1.60E-04	0.000153966	Res
582357.99_4130145.84	582357.99	4130145.84	3.33E-05	2.62E-08	1.57E-08	2.62E-08	5.24E-07	2.95E-09	1.13E-06	5.25E-08	3.97E-08	1.49E-04	0.00014265	Res
582414.56_4130145.84	582414.56	4130145.84	3.03E-05	2.43E-08	1.46E-08	2.43E-08	4.85E-07	2.73E-09	1.05E-06	4.86E-08	3.68E-08	1.38E-04	0.000131987	Res
582471.13_4130145.84	582471.13	4130145.84	2.73E-05	2.24E-08	1.35E-08	2.24E-08	4.47E-07	2.52E-09	9.66E-07	4.48E-08	3.39E-08	1.27E-04	0.000121579	Res
582527.7_4130145.84	582527.7	4130145.84	2.44E-05	2.06E-08	1.24E-08	2.06E-08	4.11E-07	2.31E-09	8.87E-07	4.12E-08	3.11E-08	1.17E-04	0.000111514	Res
582584.27_4130145.84	582584.27	4130145.84	2.18E-05	1.89E-08	1.14E-08	1.89E-08	3.78E-07	2.13E-09	8.15E-07	3.79E-08	2.86E-08	1.07E-04	0.000102366	Res
582640.84_4130145.84	582640.84	4130145.84	1.95E-05	1.75E-08	1.05E-08	1.75E-08	3.48E-07	1.96E-09	7.52E-07	3.49E-08	2.64E-08	9.89E-05	9.4344E-05	Res
582697.41_4130145.84	582697.41	4130145.84	1.76E-05	1.62E-08	9.73E-09	1.62E-08	3.23E-07	1.82E-09	6.98E-07	3.24E-08	2.45E-08	9.18E-05	8.74299E-05	Res
582753.98_4130145.84	582753.98	4130145.84	1.60E-05	1.51E-08	9.09E-09	1.51E-08	3.02E-07	1.70E-09	6.52E-07	3.03E-08	2.29E-08	8.57E-05	8.15613E-05	Res
582810.55_4130145.84	582810.55	4130145.84	1.47E-05	1.42E-08	8.53E-09	1.42E-08	2.83E-07	1.60E-09	6.12E-07	2.84E-08	2.15E-08	8.05E-05	7.64903E-05	Res
582867.12_4130145.84	582867.12	4130145.84	1.30E-05	1.31E-08	7.85E-09	1.31E-08	2.61E-07	1.47E-09	5.63E-07	2.62E-08	1.97E-08	7.40E-05	7.02559E-05	Res
581962_4130229.75	581962	4130229.75	6.36E-05	4.51E-08	2.71E-08	4.51E-08	9.01E-07	5.06E-09	1.95E-06	9.03E-08	6.84E-08	2.56E-04	0.000246649	Res
582018.57_4130229.75	582018.57	4130229.75	6.07E-05	4.31E-08	2.58E-08	4.31E-08	8.60E-07	4.83E-09	1.86E-06	8.62E-08	6.53E-08	2.44E-04	0.000235475	Res
582075.14_4130229.75	582075.14	4130229.75	5.65E-05	4.04E-08	2.42E-08	4.04E-08	8.06E-07	4.53E-09	1.74E-06	8.07E-08	6.12E-08	2.29E-04	0.00022052	Res
582131.71_4130229.75	582131.71	4130229.75	5.09E-05	3.69E-08	2.22E-08	3.69E-08	7.38E-07	4.14E-09	1.59E-06	7.39E-08	5.60E-08	2.09E-04	0.000201636	Res
582188.28_4130229.75	582188.28	4130229.75	4.54E-05	3.36E-08	2.02E-08	3.36E-08	6.71E-07	3.77E-09	1.45E-06	6.72E-08	5.09E-08	1.91E-04	0.000183307	Res
582244.85_4130229.75	582244.85	4130229.75	4.07E-05	3.07E-08	1.84E-08	3.07E-08	6.13E-07	3.44E-09	1.32E-06	6.14E-08	4.65E-08	1.74E-04	0.000167227	Res

Chronic Calculation, $\sum C_{TAC}$ /REL

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)										Total HI	Receptor Type
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Copper	Mercury	Nickel	Selenium	Chromium VI	Crystalline Silica		
582301.42_4130229.75	582301.42	4130229.75	3.67E-05	2.82E-08	1.69E-08	2.82E-08	5.63E-07	3.16E-09	1.22E-06	5.64E-08	4.27E-08	1.60E-04	0.000153432	Res
582357.99_4130229.75	582357.99	4130229.75	3.31E-05	2.60E-08	1.56E-08	2.60E-08	5.18E-07	2.91E-09	1.12E-06	5.19E-08	3.93E-08	1.47E-04	0.000141184	Res
582414.56_4130229.75	582414.56	4130229.75	2.96E-05	2.38E-08	1.43E-08	2.38E-08	4.75E-07	2.67E-09	1.02E-06	4.76E-08	3.60E-08	1.35E-04	0.000129146	Res
582471.13_4130229.75	582471.13	4130229.75	2.62E-05	2.17E-08	1.30E-08	2.17E-08	4.32E-07	2.43E-09	9.33E-07	4.33E-08	3.28E-08	1.23E-04	0.000117477	Res
582527.7_4130229.75	582527.7	4130229.75	2.32E-05	1.98E-08	1.19E-08	1.98E-08	3.95E-07	2.22E-09	8.52E-07	3.96E-08	2.99E-08	1.12E-04	0.000107095	Res
582584.27_4130229.75	582584.27	4130229.75	2.07E-05	1.82E-08	1.09E-08	1.82E-08	3.62E-07	2.04E-09	7.82E-07	3.63E-08	2.74E-08	1.03E-04	9.81441E-05	Res
582640.84_4130229.75	582640.84	4130229.75	1.85E-05	1.68E-08	1.01E-08	1.68E-08	3.34E-07	1.88E-09	7.22E-07	3.35E-08	2.53E-08	9.50E-05	9.05051E-05	Res
582697.41_4130229.75	582697.41	4130229.75	1.68E-05	1.56E-08	9.38E-09	1.56E-08	3.12E-07	1.76E-09	6.73E-07	3.13E-08	2.36E-08	8.85E-05	8.42247E-05	Res
582753.98_4130229.75	582753.98	4130229.75	1.53E-05	1.46E-08	8.78E-09	1.46E-08	2.92E-07	1.64E-09	6.29E-07	2.93E-08	2.21E-08	8.28E-05	7.87367E-05	Res
582810.55_4130229.75	582810.55	4130229.75	1.41E-05	1.38E-08	8.27E-09	1.38E-08	2.75E-07	1.55E-09	5.93E-07	2.76E-08	2.08E-08	7.80E-05	7.41126E-05	Res
582867.12_4130229.75	582867.12	4130229.75	1.31E-05	1.30E-08	7.83E-09	1.30E-08	2.60E-07	1.47E-09	5.61E-07	2.61E-08	1.97E-08	7.38E-05	7.01205E-05	Res
582018.57_4130313.66	582018.57	4130313.66	6.54E-05	4.54E-08	2.72E-08	4.54E-08	9.06E-07	5.09E-09	1.96E-06	9.08E-08	6.88E-08	2.57E-04	0.000248325	Res
582075.14_4130313.66	582075.14	4130313.66	6.06E-05	4.24E-08	2.54E-08	4.24E-08	8.46E-07	4.75E-09	1.83E-06	8.47E-08	6.42E-08	2.40E-04	0.00023171	Res
582131.71_4130313.66	582131.71	4130313.66	5.31E-05	3.79E-08	2.28E-08	3.79E-08	7.57E-07	4.25E-09	1.64E-06	7.59E-08	5.75E-08	2.15E-04	0.000207203	Res
582188.28_4130313.66	582188.28	4130313.66	4.65E-05	3.40E-08	2.04E-08	3.40E-08	6.79E-07	3.81E-09	1.47E-06	6.80E-08	5.15E-08	1.93E-04	0.000185469	Res
582244.85_4130313.66	582244.85	4130313.66	4.11E-05	3.07E-08	1.84E-08	3.07E-08	6.14E-07	3.45E-09	1.32E-06	6.15E-08	4.65E-08	1.74E-04	0.000167488	Res
582301.42_4130313.66	582301.42	4130313.66	3.66E-05	2.80E-08	1.68E-08	2.80E-08	5.58E-07	3.14E-09	1.21E-06	5.59E-08	4.23E-08	1.58E-04	0.000152198	Res
582357.99_4130313.66	582357.99	4130313.66	3.22E-05	2.53E-08	1.52E-08	2.53E-08	5.05E-07	2.84E-09	1.09E-06	5.06E-08	3.83E-08	1.43E-04	0.000137549	Res
582414.56_4130313.66	582414.56	4130313.66	2.81E-05	2.28E-08	1.37E-08	2.28E-08	4.56E-07	2.56E-09	9.84E-07	4.57E-08	3.45E-08	1.29E-04	0.000123885	Res
582471.13_4130313.66	582471.13	4130313.66	2.47E-05	2.07E-08	1.24E-08	2.07E-08	4.13E-07	2.32E-09	8.91E-07	4.14E-08	3.13E-08	1.17E-04	0.000112006	Res
582527.7_4130313.66	582527.7	4130313.66	2.18E-05	1.89E-08	1.13E-08	1.89E-08	3.77E-07	2.12E-09	8.13E-07	3.78E-08	2.85E-08	1.07E-04	0.000102131	Res
582584.27_4130313.66	582584.27	4130313.66	1.94E-05	1.74E-08	1.04E-08	1.74E-08	3.47E-07	1.95E-09	7.48E-07	3.47E-08	2.63E-08	9.84E-05	9.38084E-05	Res
582640.84_4130313.66	582640.84	4130313.66	1.75E-05	1.61E-08	9.67E-09	1.61E-08	3.22E-07	1.81E-09	6.94E-07	3.22E-08	2.44E-08	9.13E-05	8.69477E-05	Res
582697.41_4130313.66	582697.41	4130313.66	1.60E-05	1.51E-08	9.03E-09	1.51E-08	3.00E-07	1.69E-09	6.48E-07	3.01E-08	2.27E-08	8.52E-05	8.10997E-05	Res
582753.98_4130313.66	582753.98	4130313.66	1.46E-05	1.41E-08	8.48E-09	1.41E-08	2.82E-07	1.59E-09	6.08E-07	2.83E-08	2.13E-08	8.00E-05	7.60508E-05	Res
582810.55_4130313.66	582810.55	4130313.66	1.34E-05	1.33E-08	7.98E-09	1.33E-08	2.65E-07	1.49E-09	5.72E-07	2.66E-08	2.01E-08	7.53E-05	7.15057E-05	Res
582867.12_4130313.66	582867.12	4130313.66	1.24E-05	1.26E-08	7.54E-09	1.26E-08	2.50E-07	1.41E-09	5.40E-07	2.51E-08	1.90E-08	7.11E-05	6.74717E-05	Res
581848.86_4130397.57	581848.86	4130397.57	8.94E-05	5.95E-08	3.57E-08	5.95E-08	1.19E-06	6.68E-09	2.57E-06	1.19E-07	9.03E-08	3.38E-04	0.000326638	Res
581905.43_4130397.57	581905.43	4130397.57	8.67E-05	5.76E-08	3.45E-08	5.76E-08	1.15E-06	6.45E-09	2.48E-06	1.15E-07	8.73E-08	3.27E-04	0.000315881	Res
581962_4130397.57	581962	4130397.57	8.20E-05	5.45E-08	3.27E-08	5.45E-08	1.09E-06	6.12E-09	2.35E-06	1.09E-07	8.27E-08	3.09E-04	0.000299249	Res
582018.57_4130397.57	582018.57	4130397.57	7.35E-05	4.95E-08	2.97E-08	4.95E-08	9.90E-07	5.56E-09	2.14E-06	9.91E-08	7.51E-08	2.81E-04	0.000271632	Res
582075.14_4130397.57	582075.14	4130397.57	6.45E-05	4.42E-08	2.65E-08	4.42E-08	8.83E-07	4.96E-09	1.91E-06	8.85E-08	6.70E-08	2.51E-04	0.000242201	Res
582131.71_4130397.57	582131.71	4130397.57	5.52E-05	3.88E-08	2.33E-08	3.88E-08	7.76E-07	4.36E-09	1.67E-06	7.77E-08	5.89E-08	2.20E-04	0.000212399	Res
582188.28_4130397.57	582188.28	4130397.57	4.80E-05	3.46E-08	2.07E-08	3.46E-08	6.91E-07	3.88E-09	1.49E-06	6.92E-08	5.24E-08	1.96E-04	0.00018883	Res
582244.85_4130397.57	582244.85	4130397.57	4.14E-05	3.07E-08	1.84E-08	3.07E-08	6.13E-07	3.45E-09	1.32E-06	6.14E-08	4.65E-08	1.74E-04	0.000167412	Res
582301.42_4130397.57	582301.42	4130397.57	3.57E-05	2.73E-08	1.64E-08	2.73E-08	5.45E-07	3.07E-09	1.18E-06	5.46E-08	4.14E-08	1.55E-04	0.000148692	Res
582357.99_4130397.57	582357.99	4130397.57	3.06E-05	2.43E-08	1.46E-08	2.43E-08	4.84E-07	2.72E-09	1.05E-06	4.85E-08	3.67E-08	1.38E-04	0.000131852	Res
582414.56_4130397.57	582414.56	4130397.57	2.65E-05	2.18E-08	1.31E-08	2.18E-08	4.35E-07	2.45E-09	9.39E-07	4.36E-08	3.30E-08	1.23E-04	0.000118151	Res
582471.13_4130397.57	582471.13	4130397.57	2.32E-05	1.98E-08	1.19E-08	1.98E-08	3.95E-07	2.22E-09	8.52E-07	3.96E-08	2.99E-08	1.12E-04	0.000107076	Res
582527.7_4130397.57	582527.7	4130397.57	2.06E-05	1.81E-08	1.09E-08	1.81E-08	3.61E-07	2.03E-09	7.80E-07	3.62E-08	2.74E-08	1.03E-04	9.79241E-05	Res
582584.27_4130397.57	582584.27	4130397.57	1.84E-05	1.67E-08	1.00E-08	1.67E-08	3.34E-07	1.88E-09	7.20E-07	3.35E-08	2.53E-08	9.47E-05	9.02625E-05	Res
582640.84_4130397.57	582640.84	4130397.57	1.66E-05	1.55E-08	9.33E-09	1.55E-08	3.10E-07	1.75E-09	6.69E-07	3.11E-08	2.35E-08	8.80E-05	8.37589E-05	Res
582697.41_4130397.57	582697.41	4130397.57	1.50E-05	1.45E-08	8.69E-09	1.45E-08	2.89E-07	1.63E-09	6.23E-07	2.90E-08	2.19E-08	8.19E-05	7.79079E-05	Res
582753.98_4130397.57	582753.98	4130397.57	1.37E-05	1.36E-08	8.14E-09	1.36E-08	2.70E-07	1.52E-09	5.84E-07	2.71E-08	2.05E-08	7.68E-05	7.29236E-05	Res
582810.55_4130397.57	582810.55	4130397.57	1.26E-05	1.28E-08	7.66E-09	1.28E-08	2.54E-07	1.43E-09	5.49E-07	2.55E-08	1.93E-08	7.22E-05	6.8544E-05	Res
582867.12_4130397.57	582867.12	4130397.57	1.16E-05	1.21E-08	7.23E-09	1.21E-08	2.40E-07	1.35E-09	5.19E-07	2.41E-08	1.82E-08	6.82E-05	6.46659E-05	Res
581848.86_4130481.48	581848.86	4130481.48	1.16E-04	7.33E-08	4.40E-08	7.33E-08	1.46E-06	8.21E-09	3.16E-06	1.47E-07	1.11E-07	4.16E-04	0.000403261	Res
581905.43_4130481.48	581905.43	4130481.48	1.07E-04	6.82E-08	4.09E-08	6.82E-08	1.36E-06	7.65E-09	2.94E-06	1.36E-07	1.04E-07	3.87E-04	0.000375403	Res
581962_4130481.48	581962	4130481.48	9.12E-05	5.93E-08	3.56E-08	5.93E-08	1.18E-06	6.64E-09	2.56E-06	1.19E-07	8.99E-08	3.36E-04	0.000325596	Res

Chronic Calculation, $\sum C_{TAC}$ /REL

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)										Total HI	Receptor Type
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Copper	Mercury	Nickel	Selenium	Chromium VI	Crystalline Silica		
582018.57_4130481.48	582018.57	4130481.48	8.03E-05	5.29E-08	3.18E-08	5.29E-08	1.06E-06	5.94E-09	2.28E-06	1.06E-07	8.03E-08	3.00E-04	0.000290583	Res
582075.14_4130481.48	582075.14	4130481.48	6.79E-05	4.58E-08	2.75E-08	4.58E-08	9.15E-07	5.14E-09	1.98E-06	9.16E-08	6.94E-08	2.60E-04	0.000251116	Res
582131.71_4130481.48	582131.71	4130481.48	5.76E-05	3.99E-08	2.39E-08	3.99E-08	7.97E-07	4.47E-09	1.72E-06	7.98E-08	6.04E-08	2.26E-04	0.000218288	Res
582188.28_4130481.48	582188.28	4130481.48	4.86E-05	3.47E-08	2.08E-08	3.47E-08	6.93E-07	3.89E-09	1.50E-06	6.94E-08	5.26E-08	1.97E-04	0.00018968	Res
582244.85_4130481.48	582244.85	4130481.48	4.05E-05	3.00E-08	1.80E-08	3.00E-08	5.99E-07	3.37E-09	1.29E-06	6.00E-08	4.54E-08	1.70E-04	0.000163629	Res
582301.42_4130481.48	582301.42	4130481.48	3.39E-05	2.62E-08	1.57E-08	2.62E-08	5.23E-07	2.94E-09	1.13E-06	5.24E-08	3.96E-08	1.48E-04	0.00014241	Res
582357.99_4130481.48	582357.99	4130481.48	2.89E-05	2.32E-08	1.39E-08	2.32E-08	4.63E-07	2.60E-09	9.99E-07	4.64E-08	3.51E-08	1.31E-04	0.000125848	Res
582414.56_4130481.48	582414.56	4130481.48	2.51E-05	2.09E-08	1.25E-08	2.09E-08	4.16E-07	2.34E-09	8.99E-07	4.17E-08	3.16E-08	1.18E-04	0.000113056	Res
582471.13_4130481.48	582471.13	4130481.48	2.20E-05	1.90E-08	1.14E-08	1.90E-08	3.78E-07	2.13E-09	8.17E-07	3.79E-08	2.87E-08	1.07E-04	0.000102592	Res
582527.7_4130481.48	582527.7	4130481.48	1.94E-05	1.74E-08	1.04E-08	1.74E-08	3.46E-07	1.95E-09	7.47E-07	3.47E-08	2.62E-08	9.83E-05	9.37071E-05	Res
582584.27_4130481.48	582584.27	4130481.48	1.73E-05	1.60E-08	9.60E-09	1.60E-08	3.19E-07	1.80E-09	6.89E-07	3.20E-08	2.42E-08	9.06E-05	8.62967E-05	Res
582640.84_4130481.48	582640.84	4130481.48	1.55E-05	1.48E-08	8.90E-09	1.48E-08	2.96E-07	1.67E-09	6.38E-07	2.97E-08	2.24E-08	8.39E-05	7.98233E-05	Res
582697.41_4130481.48	582697.41	4130481.48	1.40E-05	1.38E-08	8.29E-09	1.38E-08	2.76E-07	1.55E-09	5.95E-07	2.76E-08	2.09E-08	7.82E-05	7.43005E-05	Res
582753.98_4130481.48	582753.98	4130481.48	1.28E-05	1.30E-08	7.78E-09	1.30E-08	2.59E-07	1.46E-09	5.58E-07	2.59E-08	1.96E-08	7.34E-05	6.96508E-05	Res
582810.55_4130481.48	582810.55	4130481.48	1.17E-05	1.22E-08	7.34E-09	1.22E-08	2.44E-07	1.38E-09	5.26E-07	2.45E-08	1.85E-08	6.92E-05	6.5638E-05	Res
582867.12_4130481.48	582867.12	4130481.48	1.08E-05	1.16E-08	6.95E-09	1.16E-08	2.31E-07	1.30E-09	4.98E-07	2.32E-08	1.75E-08	6.56E-05	6.20819E-05	Res
581735.72_4130565.39	581735.72	4130565.39	1.41E-04	8.74E-08	5.24E-08	8.74E-08	1.75E-06	9.80E-09	3.77E-06	1.75E-07	1.33E-07	4.96E-04	0.000481637	Res
581792.29_4130565.39	581792.29	4130565.39	1.39E-04	8.58E-08	5.15E-08	8.58E-08	1.71E-06	9.61E-09	3.70E-06	1.72E-07	1.30E-07	4.87E-04	0.000472668	Res
581848.86_4130565.39	581848.86	4130565.39	1.32E-04	8.16E-08	4.90E-08	8.16E-08	1.63E-06	9.15E-09	3.52E-06	1.63E-07	1.24E-07	4.63E-04	0.00044994	Res
581905.43_4130565.39	581905.43	4130565.39	1.26E-04	7.80E-08	4.68E-08	7.80E-08	1.56E-06	8.74E-09	3.37E-06	1.56E-07	1.18E-07	4.43E-04	0.000429755	Res
581962_4130565.39	581962	4130565.39	1.09E-04	6.82E-08	4.09E-08	6.82E-08	1.36E-06	7.65E-09	2.94E-06	1.36E-07	1.03E-07	3.87E-04	0.000375557	Res
582018.57_4130565.39	582018.57	4130565.39	8.78E-05	5.66E-08	3.40E-08	5.66E-08	1.13E-06	6.34E-09	2.44E-06	1.13E-07	8.58E-08	3.21E-04	0.000311077	Res
582075.14_4130565.39	582075.14	4130565.39	7.12E-05	4.73E-08	2.84E-08	4.73E-08	9.45E-07	5.30E-09	2.04E-06	9.46E-08	7.17E-08	2.68E-04	0.000259449	Res
582131.71_4130565.39	582131.71	4130565.39	5.84E-05	4.00E-08	2.40E-08	4.00E-08	7.99E-07	4.49E-09	1.73E-06	8.00E-08	6.06E-08	2.27E-04	0.0002191	Res
582188.28_4130565.39	582188.28	4130565.39	4.69E-05	3.35E-08	2.01E-08	3.35E-08	6.69E-07	3.76E-09	1.44E-06	6.70E-08	5.07E-08	1.90E-04	0.000182957	Res
582244.85_4130565.39	582244.85	4130565.39	3.81E-05	2.84E-08	1.71E-08	2.84E-08	5.68E-07	3.19E-09	1.23E-06	5.69E-08	4.31E-08	1.61E-04	0.000154975	Res
582301.42_4130565.39	582301.42	4130565.39	3.21E-05	2.49E-08	1.49E-08	2.49E-08	4.97E-07	2.80E-09	1.07E-06	4.98E-08	3.77E-08	1.41E-04	0.000135442	Res
582357.99_4130565.39	582357.99	4130565.39	2.71E-05	2.20E-08	1.32E-08	2.20E-08	4.39E-07	2.47E-09	9.48E-07	4.40E-08	3.33E-08	1.25E-04	0.000119379	Res
582414.56_4130565.39	582414.56	4130565.39	2.33E-05	1.97E-08	1.18E-08	1.97E-08	3.93E-07	2.21E-09	8.49E-07	3.94E-08	2.98E-08	1.12E-04	0.000106721	Res
582471.13_4130565.39	582471.13	4130565.39	2.04E-05	1.79E-08	1.07E-08	1.79E-08	3.56E-07	2.01E-09	7.69E-07	3.57E-08	2.70E-08	1.01E-04	9.65514E-05	Res
582527.7_4130565.39	582527.7	4130565.39	1.79E-05	1.64E-08	9.81E-09	1.64E-08	3.26E-07	1.84E-09	7.04E-07	3.27E-08	2.47E-08	9.26E-05	8.82229E-05	Res
582584.27_4130565.39	582584.27	4130565.39	1.60E-05	1.51E-08	9.07E-09	1.51E-08	3.01E-07	1.70E-09	6.50E-07	3.02E-08	2.28E-08	8.56E-05	8.14188E-05	Res
582640.84_4130565.39	582640.84	4130565.39	1.43E-05	1.40E-08	8.41E-09	1.40E-08	2.79E-07	1.57E-09	6.03E-07	2.80E-08	2.12E-08	7.93E-05	7.53944E-05	Res
582697.41_4130565.39	582697.41	4130565.39	1.30E-05	1.31E-08	7.87E-09	1.31E-08	2.62E-07	1.47E-09	5.64E-07	2.62E-08	1.98E-08	7.43E-05	7.04794E-05	Res
582753.98_4130565.39	582753.98	4130565.39	1.19E-05	1.24E-08	7.42E-09	1.24E-08	2.46E-07	1.39E-09	5.32E-07	2.47E-08	1.86E-08	6.99E-05	6.63077E-05	Res
582810.55_4130565.39	582810.55	4130565.39	1.10E-05	1.17E-08	7.03E-09	1.17E-08	2.33E-07	1.32E-09	5.04E-07	2.34E-08	1.77E-08	6.63E-05	6.27597E-05	Res
582867.12_4130565.39	582867.12	4130565.39	1.03E-05	1.11E-08	6.69E-09	1.11E-08	2.22E-07	1.25E-09	4.79E-07	2.23E-08	1.68E-08	6.31E-05	5.96813E-05	Res
581735.72_4130649.3	581735.72	4130649.3	1.52E-04	9.32E-08	5.59E-08	9.32E-08	1.86E-06	1.04E-08	4.02E-06	1.86E-07	1.41E-07	5.29E-04	0.000514103	Res
581792.29_4130649.3	581792.29	4130649.3	1.48E-04	9.01E-08	5.41E-08	9.01E-08	1.80E-06	1.01E-08	3.89E-06	1.80E-07	1.37E-07	5.11E-04	0.000497027	Res
581905.43_4130649.3	581905.43	4130649.3	1.48E-04	8.92E-08	5.35E-08	8.92E-08	1.78E-06	1.00E-08	3.85E-06	1.78E-07	1.35E-07	5.07E-04	0.00049259	Res
581962_4130649.3	581962	4130649.3	1.22E-04	7.53E-08	4.52E-08	7.53E-08	1.50E-06	8.44E-09	3.25E-06	1.51E-07	1.14E-07	4.27E-04	0.000414976	Res
582018.57_4130649.3	582018.57	4130649.3	9.30E-05	5.89E-08	3.54E-08	5.89E-08	1.18E-06	6.61E-09	2.54E-06	1.18E-07	8.94E-08	3.34E-04	0.00032431	Res
582075.14_4130649.3	582075.14	4130649.3	7.22E-05	4.73E-08	2.84E-08	4.73E-08	9.46E-07	5.31E-09	2.04E-06	9.47E-08	7.18E-08	2.69E-04	0.000259923	Res
582131.71_4130649.3	582131.71	4130649.3	5.60E-05	3.83E-08	2.30E-08	3.83E-08	7.65E-07	4.30E-09	1.65E-06	7.66E-08	5.81E-08	2.17E-04	0.000209775	Res
582188.28_4130649.3	582188.28	4130649.3	4.40E-05	3.15E-08	1.89E-08	3.15E-08	6.30E-07	3.54E-09	1.36E-06	6.31E-08	4.78E-08	1.79E-04	0.000172237	Res
582244.85_4130649.3	582244.85	4130649.3	3.54E-05	2.66E-08	1.60E-08	2.66E-08	5.31E-07	2.98E-09	1.15E-06	5.32E-08	4.03E-08	1.51E-04	0.000144834	Res
582301.42_4130649.3	582301.42	4130649.3	2.92E-05	2.30E-08	1.38E-08	2.30E-08	4.59E-07	2.58E-09	9.91E-07	4.60E-08	3.48E-08	1.30E-04	0.000124935	Res
582357.99_4130649.3	582357.99	4130649.3	2.47E-05	2.03E-08	1.22E-08	2.03E-08	4.05E-07	2.28E-09	8.75E-07	4.06E-08	3.07E-08	1.15E-04	0.000110162	Res
582414.56_4130649.3	582414.56	4130649.3	2.13E-05	1.83E-08	1.10E-08	1.83E-08	3.65E-07	2.05E-09	7.87E-07	3.66E-08	2.76E-08	1.04E-04	9.88835E-05	Res

Chronic Calculation, $\sum C_{TAC}$ /REL

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)										Total HI	Receptor Type
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Copper	Mercury	Nickel	Selenium	Chromium VI	Crystalline Silica		
582471.13_4130649.3	582471.13	4130649.3	1.86E-05	1.66E-08	9.95E-09	1.66E-08	3.31E-07	1.86E-09	7.14E-07	3.32E-08	2.51E-08	9.39E-05	8.95909E-05	Res
582527.7_4130649.3	582527.7	4130649.3	1.64E-05	1.52E-08	9.14E-09	1.52E-08	3.04E-07	1.71E-09	6.56E-07	3.05E-08	2.30E-08	8.63E-05	8.21534E-05	Res
582584.27_4130649.3	582584.27	4130649.3	1.48E-05	1.41E-08	8.49E-09	1.41E-08	2.82E-07	1.59E-09	6.09E-07	2.83E-08	2.14E-08	8.01E-05	7.6144E-05	Res
582640.84_4130649.3	582640.84	4130649.3	1.34E-05	1.32E-08	7.95E-09	1.32E-08	2.64E-07	1.49E-09	5.70E-07	2.65E-08	2.00E-08	7.50E-05	7.1202E-05	Res
582697.41_4130649.3	582697.41	4130649.3	1.23E-05	1.25E-08	7.49E-09	1.25E-08	2.49E-07	1.40E-09	5.37E-07	2.50E-08	1.88E-08	7.06E-05	6.7011E-05	Res
582753.98_4130649.3	582753.98	4130649.3	1.14E-05	1.18E-08	7.11E-09	1.18E-08	2.36E-07	1.33E-09	5.09E-07	2.37E-08	1.79E-08	6.70E-05	6.35516E-05	Res
582810.55_4130649.3	582810.55	4130649.3	1.07E-05	1.13E-08	6.78E-09	1.13E-08	2.25E-07	1.27E-09	4.86E-07	2.26E-08	1.70E-08	6.39E-05	6.05828E-05	Res
582867.12_4130649.3	582867.12	4130649.3	1.01E-05	1.08E-08	6.49E-09	1.08E-08	2.15E-07	1.22E-09	4.65E-07	2.16E-08	1.63E-08	6.12E-05	5.79145E-05	Res
581848.86_4130733.21	581848.86	4130733.21	2.19E-04	1.28E-07	7.68E-08	1.28E-07	2.56E-06	1.43E-08	5.52E-06	2.56E-07	1.94E-07	7.26E-04	0.000707799	Res
581905.43_4130733.21	581905.43	4130733.21	1.87E-04	1.10E-07	6.61E-08	1.10E-07	2.20E-06	1.23E-08	4.75E-06	2.20E-07	1.67E-07	6.25E-04	0.00060899	Res
581962_4130733.21	581962	4130733.21	1.38E-04	8.29E-08	4.97E-08	8.29E-08	1.66E-06	9.29E-09	3.58E-06	1.66E-07	1.26E-07	4.70E-04	0.000457642	Res
582018.57_4130733.21	582018.57	4130733.21	9.65E-05	6.03E-08	3.62E-08	6.03E-08	1.20E-06	6.76E-09	2.60E-06	1.21E-07	9.15E-08	3.42E-04	0.000332112	Res
582075.14_4130733.21	582075.14	4130733.21	6.82E-05	4.47E-08	2.68E-08	4.47E-08	8.92E-07	5.01E-09	1.93E-06	8.93E-08	6.77E-08	2.53E-04	0.000245211	Res
582131.71_4130733.21	582131.71	4130733.21	4.99E-05	3.44E-08	2.07E-08	3.44E-08	6.88E-07	3.86E-09	1.48E-06	6.89E-08	5.22E-08	1.95E-04	0.000188461	Res
582188.28_4130733.21	582188.28	4130733.21	3.86E-05	2.81E-08	1.68E-08	2.81E-08	5.61E-07	3.15E-09	1.21E-06	5.62E-08	4.25E-08	1.59E-04	0.000153237	Res
582244.85_4130733.21	582244.85	4130733.21	3.10E-05	2.37E-08	1.42E-08	2.37E-08	4.73E-07	2.66E-09	1.02E-06	4.74E-08	3.59E-08	1.34E-04	0.000129081	Res
582301.42_4130733.21	582301.42	4130733.21	2.57E-05	2.06E-08	1.24E-08	2.06E-08	4.12E-07	2.32E-09	8.89E-07	4.13E-08	3.12E-08	1.17E-04	0.000112072	Res
582357.99_4130733.21	582357.99	4130733.21	2.19E-05	1.84E-08	1.10E-08	1.84E-08	3.67E-07	2.06E-09	7.92E-07	3.68E-08	2.78E-08	1.04E-04	9.95904E-05	Res
582414.56_4130733.21	582414.56	4130733.21	1.91E-05	1.67E-08	1.00E-08	1.67E-08	3.32E-07	1.87E-09	7.17E-07	3.33E-08	2.52E-08	9.43E-05	9.00681E-05	Res
582471.13_4130733.21	582471.13	4130733.21	1.70E-05	1.53E-08	9.20E-09	1.53E-08	3.06E-07	1.72E-09	6.60E-07	3.07E-08	2.32E-08	8.68E-05	8.27309E-05	Res
582527.7_4130733.21	582527.7	4130733.21	1.54E-05	1.43E-08	8.56E-09	1.43E-08	2.84E-07	1.60E-09	6.14E-07	2.85E-08	2.15E-08	8.08E-05	7.68886E-05	Res
582584.27_4130733.21	582584.27	4130733.21	1.41E-05	1.34E-08	8.04E-09	1.34E-08	2.67E-07	1.50E-09	5.77E-07	2.68E-08	2.02E-08	7.58E-05	7.21416E-05	Res
582640.84_4130733.21	582640.84	4130733.21	1.30E-05	1.27E-08	7.60E-09	1.27E-08	2.53E-07	1.42E-09	5.45E-07	2.53E-08	1.91E-08	7.17E-05	6.81389E-05	Res
582697.41_4130733.21	582697.41	4130733.21	1.21E-05	1.20E-08	7.22E-09	1.20E-08	2.40E-07	1.35E-09	5.18E-07	2.41E-08	1.82E-08	6.81E-05	6.47154E-05	Res
582753.98_4130733.21	582753.98	4130733.21	1.14E-05	1.15E-08	6.89E-09	1.15E-08	2.29E-07	1.29E-09	4.94E-07	2.30E-08	1.73E-08	6.50E-05	6.16613E-05	Res
582810.55_4130733.21	582810.55	4130733.21	1.07E-05	1.10E-08	6.60E-09	1.10E-08	2.19E-07	1.24E-09	4.73E-07	2.20E-08	1.66E-08	6.23E-05	5.90435E-05	Res
582867.12_4130733.21	582867.12	4130733.21	1.01E-05	1.05E-08	6.33E-09	1.05E-08	2.10E-07	1.19E-09	4.54E-07	2.11E-08	1.59E-08	5.97E-05	5.65815E-05	Res
581735.72_4130817.12	581735.72	4130817.12	3.22E-04	1.84E-07	1.10E-07	1.84E-07	3.68E-06	2.06E-08	7.94E-06	3.68E-07	2.79E-07	1.04E-03	0.001018719	Res
581792.29_4130817.12	581792.29	4130817.12	3.64E-04	2.06E-07	1.24E-07	2.06E-07	4.12E-06	2.31E-08	8.89E-06	4.12E-07	3.13E-07	1.17E-03	0.001141606	Res
581848.86_4130817.12	581848.86	4130817.12	3.26E-04	1.85E-07	1.11E-07	1.85E-07	3.70E-06	2.08E-08	8.00E-06	3.71E-07	2.81E-07	1.05E-03	0.001026976	Res
581905.43_4130817.12	581905.43	4130817.12	2.47E-04	1.42E-07	8.51E-08	1.42E-07	2.84E-06	1.59E-08	6.12E-06	2.84E-07	2.15E-07	8.05E-04	0.000785365	Res
581962_4130817.12	581962	4130817.12	1.50E-04	8.89E-08	5.33E-08	8.89E-08	1.78E-06	9.96E-09	3.84E-06	1.78E-07	1.35E-07	5.04E-04	0.000491093	Res
582018.57_4130817.12	582018.57	4130817.12	8.98E-05	5.61E-08	3.36E-08	5.61E-08	1.12E-06	6.28E-09	2.42E-06	1.12E-07	8.50E-08	3.18E-04	0.00030873	Res
582075.14_4130817.12	582075.14	4130817.12	5.82E-05	3.87E-08	2.32E-08	3.87E-08	7.72E-07	4.34E-09	1.67E-06	7.73E-08	5.86E-08	2.19E-04	0.000212117	Res
582131.71_4130817.12	582131.71	4130817.12	4.20E-05	2.96E-08	1.78E-08	2.96E-08	5.92E-07	3.32E-09	1.28E-06	5.92E-08	4.49E-08	1.68E-04	0.000161941	Res
582188.28_4130817.12	582188.28	4130817.12	3.26E-05	2.43E-08	1.46E-08	2.43E-08	4.86E-07	2.73E-09	1.05E-06	4.86E-08	3.68E-08	1.38E-04	0.000132552	Res
582244.85_4130817.12	582244.85	4130817.12	2.67E-05	2.09E-08	1.25E-08	2.09E-08	4.17E-07	2.35E-09	9.01E-07	4.18E-08	3.17E-08	1.19E-04	0.000113689	Res
582301.42_4130817.12	582301.42	4130817.12	2.28E-05	1.86E-08	1.12E-08	1.86E-08	3.71E-07	2.09E-09	8.01E-07	3.72E-08	2.81E-08	1.05E-04	0.000100855	Res
582357.99_4130817.12	582357.99	4130817.12	2.01E-05	1.69E-08	1.01E-08	1.69E-08	3.37E-07	1.90E-09	7.28E-07	3.38E-08	2.56E-08	9.57E-05	9.15085E-05	Res
582414.56_4130817.12	582414.56	4130817.12	1.79E-05	1.56E-08	9.34E-09	1.56E-08	3.11E-07	1.75E-09	6.71E-07	3.11E-08	2.35E-08	8.82E-05	8.42133E-05	Res
582471.13_4130817.12	582471.13	4130817.12	1.63E-05	1.45E-08	8.72E-09	1.45E-08	2.90E-07	1.63E-09	6.25E-07	2.91E-08	2.20E-08	8.23E-05	7.84696E-05	Res
582527.7_4130817.12	582527.7	4130817.12	1.50E-05	1.36E-08	8.18E-09	1.36E-08	2.72E-07	1.53E-09	5.87E-07	2.73E-08	2.06E-08	7.72E-05	7.35284E-05	Res
582584.27_4130817.12	582584.27	4130817.12	1.39E-05	1.29E-08	7.72E-09	1.29E-08	2.57E-07	1.45E-09	5.54E-07	2.57E-08	1.94E-08	7.29E-05	6.93879E-05	Res
582640.84_4130817.12	582640.84	4130817.12	1.29E-05	1.22E-08	7.33E-09	1.22E-08	2.43E-07	1.37E-09	5.25E-07	2.44E-08	1.84E-08	6.91E-05	6.57474E-05	Res
582697.41_4130817.12	582697.41	4130817.12	1.21E-05	1.16E-08	6.97E-09	1.16E-08	2.32E-07	1.31E-09	5.00E-07	2.32E-08	1.75E-08	6.58E-05	6.25219E-05	Res
582753.98_4130817.12	582753.98	4130817.12	1.13E-05	1.11E-08	6.64E-09	1.11E-08	2.21E-07	1.24E-09	4.76E-07	2.21E-08	1.67E-08	6.27E-05	5.95262E-05	Res
582810.55_4130817.12	582810.55	4130817.12	1.06E-05	1.06E-08	6.35E-09	1.06E-08	2.11E-07	1.19E-09	4.55E-07	2.12E-08	1.60E-08	5.99E-05	5.68927E-05	Res
582867.12_4130817.12	582867.12	4130817.12	1.00E-05	1.01E-08	6.09E-09	1.01E-08	2.02E-07	1.14E-09	4.36E-07	2.03E-08	1.53E-08	5.74E-05	5.44808E-05	Res
581735.72_4130901.03	581735.72	4130901.03	6.40E-04	3.56E-07	2.13E-07	3.56E-07	7.12E-06	3.99E-08	1.54E-05	7.12E-07	5.41E-07	2.02E-03	0.001975425	Res

Chronic Calculation, $\sum C_{TAC}$ /REL

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)										Total HI	Receptor Type
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Copper	Mercury	Nickel	Selenium	Chromium VI	Crystalline Silica		
581792.29_4130901.03	581792.29	4130901.03	6.84E-04	3.79E-07	2.27E-07	3.79E-07	7.58E-06	4.25E-08	1.64E-05	7.58E-07	5.76E-07	2.15E-03	0.002104844	Res
581848.86_4130901.03	581848.86	4130901.03	6.09E-04	3.38E-07	2.03E-07	3.38E-07	6.77E-06	3.79E-08	1.46E-05	6.77E-07	5.14E-07	1.92E-03	0.001878919	Res
581905.43_4130901.03	581905.43	4130901.03	3.20E-04	1.81E-07	1.09E-07	1.81E-07	3.62E-06	2.03E-08	7.82E-06	3.62E-07	2.75E-07	1.03E-03	0.001004195	Res
581962_4130901.03	581962	4130901.03	1.30E-04	7.77E-08	4.66E-08	7.77E-08	1.55E-06	8.71E-09	3.35E-06	1.55E-07	1.18E-07	4.41E-04	0.000429236	Res
582018.57_4130901.03	582018.57	4130901.03	6.99E-05	4.48E-08	2.69E-08	4.48E-08	8.95E-07	5.02E-09	1.93E-06	8.96E-08	6.79E-08	2.54E-04	0.000246296	Res
582075.14_4130901.03	582075.14	4130901.03	4.69E-05	3.21E-08	1.93E-08	3.21E-08	6.42E-07	3.60E-09	1.39E-06	6.42E-08	4.87E-08	1.82E-04	0.000175926	Res
582131.71_4130901.03	582131.71	4130901.03	3.60E-05	2.59E-08	1.56E-08	2.59E-08	5.18E-07	2.91E-09	1.12E-06	5.19E-08	3.93E-08	1.47E-04	0.000141689	Res
582188.28_4130901.03	582188.28	4130901.03	2.95E-05	2.22E-08	1.33E-08	2.22E-08	4.44E-07	2.49E-09	9.58E-07	4.45E-08	3.37E-08	1.26E-04	0.000121086	Res
582244.85_4130901.03	582244.85	4130901.03	2.51E-05	1.96E-08	1.18E-08	1.96E-08	3.92E-07	2.20E-09	8.46E-07	3.93E-08	2.97E-08	1.11E-04	0.000106764	Res
582301.42_4130901.03	582301.42	4130901.03	2.19E-05	1.77E-08	1.06E-08	1.77E-08	3.53E-07	1.98E-09	7.62E-07	3.54E-08	2.67E-08	1.00E-04	9.59336E-05	Res
582357.99_4130901.03	582357.99	4130901.03	1.94E-05	1.61E-08	9.69E-09	1.61E-08	3.22E-07	1.81E-09	6.95E-07	3.23E-08	2.44E-08	9.15E-05	8.74989E-05	Res
582414.56_4130901.03	582414.56	4130901.03	1.74E-05	1.49E-08	8.93E-09	1.49E-08	2.97E-07	1.67E-09	6.41E-07	2.98E-08	2.25E-08	8.43E-05	8.05608E-05	Res
582471.13_4130901.03	582471.13	4130901.03	1.58E-05	1.39E-08	8.31E-09	1.39E-08	2.76E-07	1.56E-09	5.96E-07	2.77E-08	2.09E-08	7.84E-05	7.4845E-05	Res
582527.7_4130901.03	582527.7	4130901.03	1.44E-05	1.30E-08	7.78E-09	1.30E-08	2.59E-07	1.46E-09	5.58E-07	2.59E-08	1.96E-08	7.34E-05	6.99682E-05	Res
582584.27_4130901.03	582584.27	4130901.03	1.33E-05	1.22E-08	7.33E-09	1.22E-08	2.44E-07	1.37E-09	5.26E-07	2.44E-08	1.85E-08	6.92E-05	6.58923E-05	Res
582640.84_4130901.03	582640.84	4130901.03	1.24E-05	1.16E-08	6.94E-09	1.16E-08	2.31E-07	1.30E-09	4.98E-07	2.31E-08	1.75E-08	6.55E-05	6.23501E-05	Res
582697.41_4130901.03	582697.41	4130901.03	1.15E-05	1.10E-08	6.60E-09	1.10E-08	2.19E-07	1.24E-09	4.73E-07	2.20E-08	1.66E-08	6.23E-05	5.92421E-05	Res
582753.98_4130901.03	582753.98	4130901.03	1.08E-05	1.05E-08	6.30E-09	1.05E-08	2.09E-07	1.18E-09	4.51E-07	2.10E-08	1.58E-08	5.94E-05	5.64415E-05	Res
582810.55_4130901.03	582810.55	4130901.03	1.02E-05	1.00E-08	6.01E-09	1.00E-08	2.00E-07	1.13E-09	4.31E-07	2.00E-08	1.51E-08	5.67E-05	5.38787E-05	Res
582867.12_4130901.03	582867.12	4130901.03	9.61E-06	9.60E-09	5.76E-09	9.60E-09	1.91E-07	1.08E-09	4.13E-07	1.92E-08	1.45E-08	5.43E-05	5.15992E-05	Res
581735.72_4130984.94	581735.72	4130984.94	1.71E-03	9.34E-07	5.60E-07	9.34E-07	1.87E-05	1.05E-07	4.03E-05	1.87E-06	1.42E-06	5.30E-03	0.00519049	Res
581792.29_4130984.94	581792.29	4130984.94	2.24E-03	1.22E-06	7.34E-07	1.22E-06	2.45E-05	1.37E-07	5.28E-05	2.45E-06	1.86E-06	6.95E-03	0.006799704	Res
581848.86_4130984.94	581848.86	4130984.94	2.61E-03	1.42E-06	8.53E-07	1.42E-06	2.84E-05	1.59E-07	6.14E-05	2.84E-06	2.16E-06	8.07E-03	0.007902599	Res
581905.43_4130984.94	581905.43	4130984.94	2.08E-04	1.20E-07	7.19E-08	1.20E-07	2.39E-06	1.34E-08	5.17E-06	2.40E-07	1.82E-07	6.80E-04	0.000663245	Res
581962_4130984.94	581962	4130984.94	8.92E-05	5.53E-08	3.32E-08	5.53E-08	1.10E-06	6.20E-09	2.39E-06	1.11E-07	8.39E-08	3.14E-04	0.000304606	Res
582018.57_4130984.94	582018.57	4130984.94	5.75E-05	3.78E-08	2.27E-08	3.78E-08	7.55E-07	4.24E-09	1.63E-06	7.56E-08	5.73E-08	2.15E-04	0.000207618	Res
582075.14_4130984.94	582075.14	4130984.94	4.24E-05	2.94E-08	1.76E-08	2.94E-08	5.87E-07	3.30E-09	1.27E-06	5.88E-08	4.46E-08	1.67E-04	0.000160892	Res
582131.71_4130984.94	582131.71	4130984.94	3.36E-05	2.44E-08	1.46E-08	2.44E-08	4.87E-07	2.73E-09	1.05E-06	4.87E-08	3.69E-08	1.38E-04	0.000133026	Res
582188.28_4130984.94	582188.28	4130984.94	2.77E-05	2.10E-08	1.26E-08	2.10E-08	4.18E-07	2.35E-09	9.03E-07	4.19E-08	3.17E-08	1.19E-04	0.000114153	Res
582244.85_4130984.94	582244.85	4130984.94	2.35E-05	1.85E-08	1.11E-08	1.85E-08	3.69E-07	2.08E-09	7.97E-07	3.70E-08	2.80E-08	1.05E-04	0.000100493	Res
582301.42_4130984.94	582301.42	4130984.94	2.04E-05	1.66E-08	9.97E-09	1.66E-08	3.32E-07	1.87E-09	7.16E-07	3.32E-08	2.51E-08	9.42E-05	9.01431E-05	Res
582357.99_4130984.94	582357.99	4130984.94	1.80E-05	1.52E-08	9.09E-09	1.52E-08	3.02E-07	1.70E-09	6.53E-07	3.03E-08	2.29E-08	8.58E-05	8.2073E-05	Res
582414.56_4130984.94	582414.56	4130984.94	1.61E-05	1.40E-08	8.38E-09	1.40E-08	2.79E-07	1.57E-09	6.01E-07	2.79E-08	2.11E-08	7.91E-05	7.55065E-05	Res
582471.13_4130984.94	582471.13	4130984.94	1.46E-05	1.30E-08	7.78E-09	1.30E-08	2.59E-07	1.46E-09	5.59E-07	2.59E-08	1.96E-08	7.35E-05	7.00784E-05	Res
582527.7_4130984.94	582527.7	4130984.94	1.33E-05	1.21E-08	7.28E-09	1.21E-08	2.42E-07	1.36E-09	5.22E-07	2.43E-08	1.83E-08	6.87E-05	6.54766E-05	Res
582584.27_4130984.94	582584.27	4130984.94	1.23E-05	1.14E-08	6.86E-09	1.14E-08	2.28E-07	1.29E-09	4.92E-07	2.29E-08	1.73E-08	6.48E-05	6.16611E-05	Res
582640.84_4130984.94	582640.84	4130984.94	1.15E-05	1.09E-08	6.51E-09	1.09E-08	2.16E-07	1.22E-09	4.67E-07	2.17E-08	1.64E-08	6.14E-05	5.84504E-05	Res
582697.41_4130984.94	582697.41	4130984.94	1.07E-05	1.03E-08	6.19E-09	1.03E-08	2.06E-07	1.16E-09	4.44E-07	2.06E-08	1.56E-08	5.84E-05	5.55112E-05	Res
582753.98_4130984.94	582753.98	4130984.94	1.01E-05	9.85E-09	5.91E-09	9.85E-09	1.96E-07	1.11E-09	4.24E-07	1.97E-08	1.49E-08	5.58E-05	5.29906E-05	Res
582810.55_4130984.94	582810.55	4130984.94	9.53E-06	9.43E-09	5.66E-09	9.43E-09	1.88E-07	1.06E-09	4.06E-07	1.89E-08	1.42E-08	5.34E-05	5.06738E-05	Res
582867.12_4130984.94	582867.12	4130984.94	9.01E-06	9.04E-09	5.43E-09	9.04E-09	1.80E-07	1.02E-09	3.89E-07	1.81E-08	1.36E-08	5.12E-05	4.8571E-05	Res
581735.72_4131068.85	581735.72	4131068.85	2.79E-04	1.59E-07	9.54E-08	1.59E-07	3.18E-06	1.78E-08	6.87E-06	3.18E-07	2.42E-07	9.03E-04	0.000881549	Res
581792.29_4131068.85	581792.29	4131068.85	2.23E-04	1.28E-07	7.69E-08	1.28E-07	2.56E-06	1.44E-08	5.54E-06	2.56E-07	1.95E-07	7.28E-04	0.000709901	Res
581848.86_4131068.85	581848.86	4131068.85	1.20E-04	7.22E-08	4.33E-08	7.22E-08	1.44E-06	8.09E-09	3.12E-06	1.44E-07	1.10E-07	4.10E-04	0.000398731	Res
581905.43_4131068.85	581905.43	4131068.85	7.65E-05	4.84E-08	2.90E-08	4.84E-08	9.67E-07	5.42E-09	2.09E-06	9.68E-08	7.34E-08	2.75E-04	0.000266322	Res
581962_4131068.85	581962	4131068.85	5.54E-05	3.68E-08	2.21E-08	3.68E-08	7.34E-07	4.12E-09	1.59E-06	7.35E-08	5.57E-08	2.08E-04	0.000201673	Res
582018.57_4131068.85	582018.57	4131068.85	4.21E-05	2.93E-08	1.76E-08	2.93E-08	5.84E-07	3.28E-09	1.26E-06	5.85E-08	4.43E-08	1.66E-04	0.000160119	Res
582075.14_4131068.85	582075.14	4131068.85	3.34E-05	2.43E-08	1.46E-08	2.43E-08	4.86E-07	2.73E-09	1.05E-06	4.87E-08	3.69E-08	1.38E-04	0.000132837	Res
582131.71_4131068.85	582131.71	4131068.85	2.75E-05	2.10E-08	1.26E-08	2.10E-08	4.18E-07	2.35E-09	9.03E-07	4.19E-08	3.17E-08	1.19E-04	0.000114125	Res

Chronic Calculation, $\sum C_{TAC}$ /REL

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)										Total HI	Receptor Type
	UTM X	UTM Y	DPM	Arsenic	Beryllium	Cadmium	Copper	Mercury	Nickel	Selenium	Chromium VI	Crystalline Silica		
582188.28_4131068.85	582188.28	4131068.85	2.33E-05	1.85E-08	1.11E-08	1.85E-08	3.68E-07	2.07E-09	7.95E-07	3.69E-08	2.79E-08	1.05E-04	0.000100239	Res
582244.85_4131068.85	582244.85	4131068.85	2.01E-05	1.66E-08	9.93E-09	1.66E-08	3.30E-07	1.86E-09	7.13E-07	3.31E-08	2.50E-08	9.38E-05	8.97462E-05	Res
582301.42_4131068.85	582301.42	4131068.85	1.77E-05	1.51E-08	9.03E-09	1.51E-08	3.00E-07	1.69E-09	6.48E-07	3.01E-08	2.28E-08	8.52E-05	8.14668E-05	Res
582357.99_4131068.85	582357.99	4131068.85	1.58E-05	1.38E-08	8.29E-09	1.38E-08	2.76E-07	1.55E-09	5.95E-07	2.76E-08	2.09E-08	7.83E-05	7.47246E-05	Res
582414.56_4131068.85	582414.56	4131068.85	1.42E-05	1.28E-08	7.70E-09	1.28E-08	2.56E-07	1.44E-09	5.52E-07	2.57E-08	1.94E-08	7.26E-05	6.92494E-05	Res
582471.13_4131068.85	582471.13	4131068.85	1.30E-05	1.20E-08	7.19E-09	1.20E-08	2.39E-07	1.35E-09	5.16E-07	2.40E-08	1.81E-08	6.78E-05	6.45846E-05	Res
582527.7_4131068.85	582527.7	4131068.85	1.19E-05	1.13E-08	6.75E-09	1.13E-08	2.24E-07	1.26E-09	4.84E-07	2.25E-08	1.70E-08	6.37E-05	6.05999E-05	Res
582584.27_4131068.85	582584.27	4131068.85	1.10E-05	1.06E-08	6.36E-09	1.06E-08	2.12E-07	1.19E-09	4.56E-07	2.12E-08	1.60E-08	6.00E-05	5.70847E-05	Res
582640.84_4131068.85	582640.84	4131068.85	1.03E-05	1.01E-08	6.06E-09	1.01E-08	2.01E-07	1.14E-09	4.35E-07	2.02E-08	1.53E-08	5.72E-05	5.43289E-05	Res
582697.41_4131068.85	582697.41	4131068.85	9.70E-06	9.63E-09	5.78E-09	9.63E-09	1.92E-07	1.08E-09	4.14E-07	1.93E-08	1.45E-08	5.45E-05	5.17644E-05	Res
582753.98_4131068.85	582753.98	4131068.85	9.20E-06	9.24E-09	5.54E-09	9.24E-09	1.84E-07	1.04E-09	3.97E-07	1.85E-08	1.39E-08	5.23E-05	4.96277E-05	Res
582810.55_4131068.85	582810.55	4131068.85	8.74E-06	8.88E-09	5.33E-09	8.88E-09	1.77E-07	9.98E-10	3.82E-07	1.78E-08	1.34E-08	5.02E-05	4.76681E-05	Res
582867.12_4131068.85	582867.12	4131068.85	8.27E-06	8.51E-09	5.10E-09	8.51E-09	1.70E-07	9.56E-10	3.66E-07	1.70E-08	1.28E-08	4.81E-05	4.56454E-05	Res
582018.57_4131152.76	582018.57	4131152.76	2.82E-05	2.16E-08	1.30E-08	2.16E-08	4.32E-07	2.43E-09	9.32E-07	4.33E-08	3.28E-08	1.23E-04	0.000117738	Res
582244.85_4131152.76	582244.85	4131152.76	1.70E-05	1.48E-08	8.90E-09	1.48E-08	2.96E-07	1.66E-09	6.38E-07	2.97E-08	2.24E-08	8.40E-05	8.0164E-05	Res
582301.42_4131152.76	582301.42	4131152.76	1.53E-05	1.37E-08	8.24E-09	1.37E-08	2.74E-07	1.54E-09	5.91E-07	2.75E-08	2.08E-08	7.78E-05	7.41523E-05	Res
582357.99_4131152.76	582357.99	4131152.76	1.39E-05	1.28E-08	7.66E-09	1.28E-08	2.54E-07	1.43E-09	5.49E-07	2.55E-08	1.93E-08	7.22E-05	6.88084E-05	Res
582414.56_4131152.76	582414.56	4131152.76	1.26E-05	1.19E-08	7.16E-09	1.19E-08	2.38E-07	1.34E-09	5.13E-07	2.39E-08	1.80E-08	6.76E-05	6.42716E-05	Res
582471.13_4131152.76	582471.13	4131152.76	1.15E-05	1.11E-08	6.69E-09	1.11E-08	2.22E-07	1.25E-09	4.80E-07	2.23E-08	1.68E-08	6.31E-05	5.99568E-05	Res
582527.7_4131152.76	582527.7	4131152.76	1.06E-05	1.05E-08	6.30E-09	1.05E-08	2.09E-07	1.18E-09	4.51E-07	2.10E-08	1.58E-08	5.94E-05	5.63913E-05	Res
582584.27_4131152.76	582584.27	4131152.76	9.77E-06	9.91E-09	5.95E-09	9.91E-09	1.98E-07	1.11E-09	4.26E-07	1.98E-08	1.50E-08	5.61E-05	5.32392E-05	Res
582640.84_4131152.76	582640.84	4131152.76	9.13E-06	9.43E-09	5.66E-09	9.43E-09	1.88E-07	1.06E-09	4.06E-07	1.89E-08	1.42E-08	5.34E-05	5.06034E-05	Res
582697.41_4131152.76	582697.41	4131152.76	8.58E-06	9.00E-09	5.40E-09	9.00E-09	1.79E-07	1.01E-09	3.87E-07	1.80E-08	1.36E-08	5.09E-05	4.82653E-05	Res
582753.98_4131152.76	582753.98	4131152.76	8.17E-06	8.65E-09	5.19E-09	8.65E-09	1.72E-07	9.72E-10	3.72E-07	1.73E-08	1.31E-08	4.89E-05	4.6373E-05	Res
582810.55_4131152.76	582810.55	4131152.76	7.79E-06	8.33E-09	5.00E-09	8.33E-09	1.66E-07	9.36E-10	3.58E-07	1.67E-08	1.26E-08	4.71E-05	4.46252E-05	Res
582867.12_4131152.76	582867.12	4131152.76	7.39E-06	7.99E-09	4.79E-09	7.99E-09	1.59E-07	8.98E-10	3.44E-07	1.60E-08	1.20E-08	4.52E-05	4.27875E-05	Res

B-5 Acute Hazard Index Calculations

HRA Permanente Creek Restoration Project

Construction Year 2024

Emissions Inputs

Construction Activity	Construction Year & Source	DPM Exhaust (tons/year)	PM10 Dust for speciation (tons/year)	Arsenic (tons/year)	Beryllium (tons/year)	Cadmium (tons/year)	Cobalt (tons/year)	Copper (tons/year)	Lead (tons/year)	Mercury (tons/year)	Nickel (tons/year)	Selenium (tons/year)	Chromium VI (tons/year)	Crystalline Silica (tons/year)	Vanadium (tons/year)
Concrete Channel 2024	2024_CONCRTE	0.000	0.00	2.91E-12	1.74E-12	2.91E-12	1.49E-11	3.26E-11	2.91E-12	4.65E-13	5.35E-11	5.81E-12	2.33E-13	8.63E-09	4.42E-11
Paved road	2024_PAVED	2.07E-04	0.08	1.04E-07	6.26E-08	1.04E-07	6.68E-08	2.09E-06	1.92E-07	1.17E-08	4.51E-06	2.09E-07	1.59E-07	5.93E-04	1.59E-06
Unpaved road	2024_CCP_UNPV	6.27E-05	0.20	2.56E-07	1.54E-07	2.56E-07	1.64E-07	5.12E-06	4.71E-07	2.87E-08	1.11E-05	5.12E-07	3.89E-07	1.46E-03	3.89E-06
Channel Widening 2024	2024_CHAN_RCK	0.002	0.16	2.05E-07	1.23E-07	2.05E-07	1.05E-06	2.29E-06	2.05E-07	3.28E-08	3.77E-06	4.09E-07	1.64E-08	6.08E-04	3.11E-06
Paved road	2024_PAVED	1.80E-03	2.39	2.99E-06	1.79E-06	2.99E-06	1.91E-06	5.98E-05	5.50E-06	3.35E-07	1.29E-04	5.98E-06	4.54E-06	1.70E-02	4.54E-05
Rock Pile Area 2025	2025_CHAN_RCK	0.006	0.25	3.16E-07	1.89E-07	3.16E-07	1.62E-06	3.54E-06	3.16E-07	5.05E-08	5.81E-06	6.31E-07	2.53E-08	9.37E-04	4.80E-06
Paved road	2025_PAVED	5.95E-03	2.44	3.05E-06	1.83E-06	3.05E-06	1.95E-06	6.10E-05	5.61E-06	3.41E-07	1.32E-04	6.10E-06	4.63E-06	1.73E-02	4.63E-05
Rock Pile Area 2026	2026_CHAN_RCK	0.006	0.25	3.16E-07	1.89E-07	3.16E-07	1.62E-06	3.54E-06	3.16E-07	5.05E-08	5.81E-06	6.31E-07	2.53E-08	9.37E-04	4.80E-06
Paved road	2026_PAVED	5.84E-03	2.44	3.05E-06	1.83E-06	3.05E-06	1.95E-06	6.10E-05	5.61E-06	3.41E-07	1.32E-04	6.10E-06	4.63E-06	1.73E-02	4.63E-05
Channel Widening 2027	2027_CHAN_RCK	0.002	0.98	1.23E-06	7.36E-07	1.23E-06	6.28E-06	1.37E-05	1.23E-06	1.96E-07	2.26E-05	2.45E-06	9.82E-08	3.64E-03	1.87E-05
Paved road	2027_PAVED	5.61E-03	2.39	2.99E-06	1.79E-06	2.99E-06	1.91E-06	5.98E-05	5.50E-06	3.35E-07	1.29E-04	5.98E-06	4.54E-06	1.70E-02	4.54E-05
Material Removal 2028	2028_MATRMVL	0.001	0.25	3.15E-07	1.89E-07	3.15E-07	1.62E-06	3.53E-06	3.15E-07	5.05E-08	5.80E-06	6.31E-07	2.52E-08	9.37E-04	4.80E-06
Paved road	2028_PAVED	5.57E-03	2.39	2.99E-06	1.80E-06	2.99E-06	1.92E-06	5.98E-05	5.51E-06	3.35E-07	1.29E-04	5.98E-06	4.55E-06	1.70E-02	4.55E-05
Unpaved road	2028_UNPAVED	3.40E-03	11.84	1.48E-05	8.88E-06	1.48E-05	9.47E-06	2.96E-04	2.72E-05	1.66E-06	6.40E-04	2.96E-05	2.25E-05	8.41E-02	2.25E-04
Material Removal 2029	2029_MATRMVL	0.001	0.25	3.15E-07	1.89E-07	3.15E-07	1.62E-06	3.53E-06	3.15E-07	5.05E-08	5.80E-06	6.31E-07	2.52E-08	9.37E-04	4.80E-06
Paved road	2029_PAVED	5.56E-03	2.41	3.01E-06	1.81E-06	3.01E-06	1.93E-06	6.03E-05	5.55E-06	3.38E-07	1.30E-04	6.03E-06	4.58E-06	1.71E-02	4.58E-05
Unpaved road	2029_UNPAVED	3.39E-03	11.93	1.49E-05	8.95E-06	1.49E-05	9.55E-06	2.98E-04	2.74E-05	1.67E-06	6.44E-04	2.98E-05	2.27E-05	8.47E-02	2.27E-04

Construction Activity	Construction Year	DPM (g/s)	Arsenic (g/s)	Beryllium (g/s)	Cadmium (g/s)	Cobalt (g/s)	Copper (g/s)	Lead (g/s)	Mercury (g/s)	Nickel (g/s)	Selenium (g/s)	Chromium VI (g/s)	Crystalline Silica (g/s)	Vanadium (g/s)	No. of Workdays (days)
Concrete Channel 2024	2024_CONCRTE	8.077E-07	2.35E-13	1.41E-13	2.35E-13	1.20E-12	2.63E-12	2.35E-13	3.76E-14	4.32E-12	4.70E-13	1.88E-14	6.97E-10	3.57E-12	130.00
Paved road	2024_PAVED	1.670E-05	8.43E-09	5.06E-09	8.43E-09	5.40E-09	1.69E-07	1.55E-08	9.44E-10	3.64E-07	1.69E-08	1.28E-08	4.79E-05	1.28E-07	130.00
Unpaved road	2024_CCP_UNPV	5.060E-06	2.07E-08	1.24E-08	2.07E-08	1.32E-08	4.14E-07	3.81E-08	2.32E-09	8.94E-07	4.14E-08	3.15E-08	1.18E-04	3.15E-07	130.00
Channel Widening 2024	2024_CHAN_RCK	1.563E-04	1.653E-08	9.920E-09	1.653E-08	8.465E-08	1.852E-07	1.653E-08	2.645E-09	3.042E-07	3.307E-08	1.323E-09	4.911E-05	2.513E-07	130.00
Paved road	2024_PAVED	1.452E-04	2.414E-07	1.448E-07	2.414E-07	1.545E-07	4.828E-06	4.442E-07	2.704E-08	1.043E-05	4.828E-07	3.669E-07	1.371E-03	3.669E-06	130.00
Rock Pile Area 2025	2025_CHAN_RCK	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	130.00
Paved road	2025_PAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	130.00
Rock Pile Area 2026	2026_CHAN_RCK	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	130.00
Paved road	2026_PAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	130.00
Channel Widening 2027	2027_CHAN_RCK	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	130.00
Paved road	2027_PAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	130.00
Material Removal 2028	2028_MATRMVL	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	130.00
Paved road	2028_PAVED	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	130.00
Unpaved road	2028_UNPAVED	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	130.00
Material Removal 2029	2029_MATRMVL	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	130.00
Paved road	2029_PAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	130.00
Unpaved road	2029_UNPAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	130.00

N/A = not including PM10 on-site dust in HRA calculation; it is only for speciating metals.

Acute REL

TAC	UOM	
Arsenic	µg/m^3	0.2
Mercury	µg/m^3	0.61
Nickel	µg/m^3	0.2
Vanadium	µg/m^3	31

	Max
CT House	0.019
Res	0.041
Acute	0.016

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} (µg/m^3)				Acute Calculation, $\sum C_{TAC}$ /REL	
	UTM X	UTM Y	Arsenic	Mercury	Nickel	Vanadium	Total HI	Receptor Type
			0.2	0.61	0.2	31		
581336.22_4131207.48	581336.22	4131207.48	8.63E-05	9.72E-06	3.70E-03	1.31E-03	0.019	CT House
581554.22_4130688.06	581554.22	4130688.06	2.09E-05	2.48E-06	8.31E-04	3.18E-04	0.004	Res
579793.36_4131503.29	579793.36	4131503.29	2.89E-06	3.41E-07	1.16E-04	4.39E-05	0.001	Acute
580488.37_4131517.71	580488.37	4131517.71	7.37E-06	8.64E-07	2.98E-04	1.12E-04	0.002	Acute
581678.43_4131040.03	581678.43	4131040.03	1.03E-04	1.16E-05	4.40E-03	1.56E-03	0.023	Res
581635.43_4130978.54	581635.43	4130978.54	1.31E-04	1.48E-05	5.64E-03	2.00E-03	0.029	Res
581830.06_4131027.55	581830.06	4131027.55	1.35E-04	1.52E-05	5.82E-03	2.06E-03	0.030	Res
581727.48_4130976.54	581727.48	4130976.54	1.51E-04	1.70E-05	6.50E-03	2.30E-03	0.033	Res
581789.11_4130419.65	581789.11	4130419.65	3.02E-05	3.51E-06	1.24E-03	4.59E-04	0.006	Res
581700.32_4130781.89	581700.32	4130781.89	4.85E-05	5.53E-06	2.05E-03	7.37E-04	0.011	Res
581426.07_4131299.01	581426.07	4131299.01	7.15E-05	8.07E-06	3.06E-03	1.09E-03	0.016	Acute
582301.42_4129474.56	582301.42	4129474.56	1.62E-05	1.89E-06	6.57E-04	2.46E-04	0.003	Res
582357.99_4129474.56	582357.99	4129474.56	1.60E-05	1.87E-06	6.51E-04	2.43E-04	0.003	Res
582414.56_4129474.56	582414.56	4129474.56	1.65E-05	1.93E-06	6.77E-04	2.51E-04	0.003	Res
582471.13_4129474.56	582471.13	4129474.56	1.60E-05	1.86E-06	6.54E-04	2.43E-04	0.003	Res
582527.7_4129474.56	582527.7	4129474.56	1.62E-05	1.88E-06	6.65E-04	2.46E-04	0.003	Res
582584.27_4129474.56	582584.27	4129474.56	1.54E-05	1.79E-06	6.33E-04	2.34E-04	0.003	Res
582640.84_4129474.56	582640.84	4129474.56	1.53E-05	1.77E-06	6.29E-04	2.32E-04	0.003	Res
582244.85_4129558.47	582244.85	4129558.47	2.00E-05	2.34E-06	8.19E-04	3.05E-04	0.004	Res
582301.42_4129558.47	582301.42	4129558.47	2.08E-05	2.41E-06	8.56E-04	3.16E-04	0.004	Res
582357.99_4129558.47	582357.99	4129558.47	1.96E-05	2.27E-06	8.05E-04	2.97E-04	0.004	Res
582414.56_4129558.47	582414.56	4129558.47	1.88E-05	2.18E-06	7.74E-04	2.86E-04	0.004	Res
582471.13_4129558.47	582471.13	4129558.47	1.76E-05	2.04E-06	7.24E-04	2.68E-04	0.004	Res
582527.7_4129558.47	582527.7	4129558.47	1.66E-05	1.93E-06	6.82E-04	2.53E-04	0.004	Res
582584.27_4129558.47	582584.27	4129558.47	1.60E-05	1.86E-06	6.56E-04	2.43E-04	0.003	Res
582640.84_4129558.47	582640.84	4129558.47	1.53E-05	1.77E-06	6.25E-04	2.32E-04	0.003	Res
582697.41_4129558.47	582697.41	4129558.47	1.45E-05	1.68E-06	5.93E-04	2.20E-04	0.003	Res
582244.85_4129642.38	582244.85	4129642.38	2.03E-05	2.38E-06	8.20E-04	3.08E-04	0.004	Res
582301.42_4129642.38	582301.42	4129642.38	2.11E-05	2.45E-06	8.63E-04	3.20E-04	0.004	Res
582357.99_4129642.38	582357.99	4129642.38	1.90E-05	2.21E-06	7.79E-04	2.89E-04	0.004	Res
582414.56_4129642.38	582414.56	4129642.38	1.80E-05	2.09E-06	7.39E-04	2.74E-04	0.004	Res
582471.13_4129642.38	582471.13	4129642.38	1.74E-05	2.02E-06	7.14E-04	2.65E-04	0.004	Res
582527.7_4129642.38	582527.7	4129642.38	1.72E-05	2.00E-06	7.07E-04	2.62E-04	0.004	Res
582584.27_4129642.38	582584.27	4129642.38	1.63E-05	1.89E-06	6.69E-04	2.48E-04	0.003	Res
582640.84_4129642.38	582640.84	4129642.38	1.57E-05	1.82E-06	6.45E-04	2.39E-04	0.003	Res
582697.41_4129642.38	582697.41	4129642.38	1.58E-05	1.83E-06	6.51E-04	2.40E-04	0.003	Res
582753.98_4129642.38	582753.98	4129642.38	1.57E-05	1.82E-06	6.47E-04	2.39E-04	0.003	Res
582810.55_4129642.38	582810.55	4129642.38	1.54E-05	1.78E-06	6.33E-04	2.33E-04	0.003	Res
582867.12_4129642.38	582867.12	4129642.38	1.60E-05	1.84E-06	6.60E-04	2.43E-04	0.003	Res
582244.85_4129726.29	582244.85	4129726.29	2.12E-05	2.48E-06	8.63E-04	3.22E-04	0.004	Res

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)				Acute Calculation, $\sum C_{TAC}$ /REL	
	UTM X	UTM Y	Arsenic	Mercury	Nickel	Vanadium	Total HI	Receptor Type
582301.42_4129726.29	582301.42	4129726.29	2.23E-05	2.59E-06	9.15E-04	3.39E-04	0.005	Res
582357.99_4129726.29	582357.99	4129726.29	2.17E-05	2.51E-06	8.95E-04	3.29E-04	0.005	Res
582414.56_4129726.29	582414.56	4129726.29	2.05E-05	2.37E-06	8.46E-04	3.11E-04	0.004	Res
582471.13_4129726.29	582471.13	4129726.29	1.91E-05	2.21E-06	7.90E-04	2.90E-04	0.004	Res
582527.7_4129726.29	582527.7	4129726.29	1.75E-05	2.03E-06	7.23E-04	2.66E-04	0.004	Res
582584.27_4129726.29	582584.27	4129726.29	1.73E-05	2.00E-06	7.14E-04	2.63E-04	0.004	Res
582640.84_4129726.29	582640.84	4129726.29	1.79E-05	2.06E-06	7.44E-04	2.72E-04	0.004	Res
582697.41_4129726.29	582697.41	4129726.29	1.73E-05	2.00E-06	7.20E-04	2.64E-04	0.004	Res
582753.98_4129726.29	582753.98	4129726.29	1.65E-05	1.91E-06	6.87E-04	2.51E-04	0.004	Res
582810.55_4129726.29	582810.55	4129726.29	1.65E-05	1.89E-06	6.84E-04	2.50E-04	0.004	Res
582244.85_4129810.2	582244.85	4129810.2	2.19E-05	2.55E-06	8.98E-04	3.33E-04	0.005	Res
582301.42_4129810.2	582301.42	4129810.2	2.30E-05	2.67E-06	9.51E-04	3.50E-04	0.005	Res
582357.99_4129810.2	582357.99	4129810.2	2.34E-05	2.70E-06	9.72E-04	3.56E-04	0.005	Res
582414.56_4129810.2	582414.56	4129810.2	2.08E-05	2.40E-06	8.61E-04	3.16E-04	0.004	Res
582471.13_4129810.2	582471.13	4129810.2	1.84E-05	2.13E-06	7.62E-04	2.80E-04	0.004	Res
582527.7_4129810.2	582527.7	4129810.2	1.90E-05	2.19E-06	7.87E-04	2.88E-04	0.004	Res
582584.27_4129810.2	582584.27	4129810.2	1.91E-05	2.20E-06	7.94E-04	2.90E-04	0.004	Res
582640.84_4129810.2	582640.84	4129810.2	1.82E-05	2.10E-06	7.57E-04	2.77E-04	0.004	Res
582697.41_4129810.2	582697.41	4129810.2	1.79E-05	2.06E-06	7.42E-04	2.71E-04	0.004	Res
581905.43_4129894.11	581905.43	4129894.11	1.38E-05	1.61E-06	5.64E-04	2.10E-04	0.003	Res
581962_4129894.11	581962	4129894.11	1.77E-05	2.14E-06	6.88E-04	2.70E-04	0.004	Res
582131.71_4129894.11	582131.71	4129894.11	1.95E-05	2.30E-06	7.82E-04	2.97E-04	0.004	Res
582188.28_4129894.11	582188.28	4129894.11	1.96E-05	2.31E-06	7.92E-04	2.99E-04	0.004	Res
582244.85_4129894.11	582244.85	4129894.11	1.96E-05	2.29E-06	7.95E-04	2.98E-04	0.004	Res
582301.42_4129894.11	582301.42	4129894.11	2.09E-05	2.43E-06	8.57E-04	3.18E-04	0.004	Res
582357.99_4129894.11	582357.99	4129894.11	2.02E-05	2.35E-06	8.30E-04	3.07E-04	0.004	Res
582414.56_4129894.11	582414.56	4129894.11	1.97E-05	2.28E-06	8.10E-04	2.99E-04	0.004	Res
582471.13_4129894.11	582471.13	4129894.11	2.05E-05	2.36E-06	8.47E-04	3.11E-04	0.004	Res
582527.7_4129894.11	582527.7	4129894.11	2.01E-05	2.32E-06	8.32E-04	3.06E-04	0.004	Res
582584.27_4129894.11	582584.27	4129894.11	1.88E-05	2.17E-06	7.77E-04	2.86E-04	0.004	Res
582640.84_4129894.11	582640.84	4129894.11	1.89E-05	2.18E-06	7.81E-04	2.87E-04	0.004	Res
582697.41_4129894.11	582697.41	4129894.11	1.85E-05	2.14E-06	7.66E-04	2.81E-04	0.004	Res
581962_4129978.02	581962	4129978.02	1.98E-05	2.41E-06	7.57E-04	3.01E-04	0.004	Res
582018.57_4129978.02	582018.57	4129978.02	2.02E-05	2.46E-06	7.69E-04	3.07E-04	0.004	Res
582075.14_4129978.02	582075.14	4129978.02	2.31E-05	2.72E-06	9.33E-04	3.52E-04	0.005	Res
582131.71_4129978.02	582131.71	4129978.02	2.23E-05	2.60E-06	9.04E-04	3.38E-04	0.005	Res
582188.28_4129978.02	582188.28	4129978.02	2.48E-05	2.88E-06	1.02E-03	3.77E-04	0.005	Res
582244.85_4129978.02	582244.85	4129978.02	2.30E-05	2.68E-06	9.47E-04	3.50E-04	0.005	Res
582301.42_4129978.02	582301.42	4129978.02	2.10E-05	2.44E-06	8.64E-04	3.19E-04	0.004	Res
582357.99_4129978.02	582357.99	4129978.02	2.12E-05	2.45E-06	8.73E-04	3.22E-04	0.004	Res
582414.56_4129978.02	582414.56	4129978.02	2.21E-05	2.55E-06	9.14E-04	3.36E-04	0.005	Res
582471.13_4129978.02	582471.13	4129978.02	2.09E-05	2.41E-06	8.64E-04	3.17E-04	0.004	Res
582527.7_4129978.02	582527.7	4129978.02	2.00E-05	2.31E-06	8.28E-04	3.04E-04	0.004	Res
582584.27_4129978.02	582584.27	4129978.02	2.05E-05	2.37E-06	8.51E-04	3.12E-04	0.004	Res
582640.84_4129978.02	582640.84	4129978.02	2.01E-05	2.31E-06	8.32E-04	3.05E-04	0.004	Res
582697.41_4129978.02	582697.41	4129978.02	2.06E-05	2.37E-06	8.55E-04	3.13E-04	0.004	Res
582753.98_4129978.02	582753.98	4129978.02	1.90E-05	2.20E-06	7.91E-04	2.90E-04	0.004	Res

Acute Calculation, $\sum C_{TAC}$ /REL

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)				Total HI	Receptor Type
	UTM X	UTM Y	Arsenic	Mercury	Nickel	Vanadium		
582810.55_4129978.02	582810.55	4129978.02	1.61E-05	1.86E-06	6.63E-04	2.44E-04	0.003	Res
581905.43_4130061.93	581905.43	4130061.93	2.81E-05	3.27E-06	1.15E-03	4.27E-04	0.006	Res
581962_4130061.93	581962	4130061.93	2.77E-05	3.22E-06	1.14E-03	4.21E-04	0.006	Res
582018.57_4130061.93	582018.57	4130061.93	2.65E-05	3.09E-06	1.08E-03	4.04E-04	0.006	Res
582075.14_4130061.93	582075.14	4130061.93	2.55E-05	2.98E-06	1.04E-03	3.88E-04	0.005	Res
582131.71_4130061.93	582131.71	4130061.93	2.53E-05	2.94E-06	1.04E-03	3.85E-04	0.005	Res
582188.28_4130061.93	582188.28	4130061.93	2.66E-05	3.07E-06	1.10E-03	4.04E-04	0.006	Res
582244.85_4130061.93	582244.85	4130061.93	2.44E-05	2.81E-06	1.01E-03	3.70E-04	0.005	Res
582301.42_4130061.93	582301.42	4130061.93	2.31E-05	2.67E-06	9.56E-04	3.51E-04	0.005	Res
582357.99_4130061.93	582357.99	4130061.93	2.32E-05	2.68E-06	9.62E-04	3.53E-04	0.005	Res
582414.56_4130061.93	582414.56	4130061.93	2.16E-05	2.49E-06	8.94E-04	3.28E-04	0.005	Res
582471.13_4130061.93	582471.13	4130061.93	2.26E-05	2.60E-06	9.38E-04	3.43E-04	0.005	Res
582527.7_4130061.93	582527.7	4130061.93	2.22E-05	2.55E-06	9.21E-04	3.37E-04	0.005	Res
582584.27_4130061.93	582584.27	4130061.93	2.24E-05	2.57E-06	9.31E-04	3.40E-04	0.005	Res
582640.84_4130061.93	582640.84	4130061.93	2.15E-05	2.47E-06	8.95E-04	3.27E-04	0.005	Res
582697.41_4130061.93	582697.41	4130061.93	1.96E-05	2.25E-06	8.12E-04	2.97E-04	0.004	Res
582753.98_4130061.93	582753.98	4130061.93	1.85E-05	2.13E-06	7.68E-04	2.81E-04	0.004	Res
582810.55_4130061.93	582810.55	4130061.93	1.83E-05	2.11E-06	7.61E-04	2.79E-04	0.004	Res
581962_4130145.84	581962	4130145.84	3.13E-05	3.59E-06	1.31E-03	4.75E-04	0.007	Res
582018.57_4130145.84	582018.57	4130145.84	2.90E-05	3.33E-06	1.21E-03	4.41E-04	0.006	Res
582075.14_4130145.84	582075.14	4130145.84	2.81E-05	3.23E-06	1.17E-03	4.27E-04	0.006	Res
582131.71_4130145.84	582131.71	4130145.84	2.76E-05	3.17E-06	1.15E-03	4.19E-04	0.006	Res
582188.28_4130145.84	582188.28	4130145.84	2.46E-05	2.83E-06	1.02E-03	3.74E-04	0.005	Res
582244.85_4130145.84	582244.85	4130145.84	2.45E-05	2.82E-06	1.02E-03	3.73E-04	0.005	Res
582301.42_4130145.84	582301.42	4130145.84	2.44E-05	2.80E-06	1.02E-03	3.71E-04	0.005	Res
582357.99_4130145.84	582357.99	4130145.84	2.39E-05	2.74E-06	9.96E-04	3.63E-04	0.005	Res
582414.56_4130145.84	582414.56	4130145.84	2.42E-05	2.77E-06	1.01E-03	3.67E-04	0.005	Res
582471.13_4130145.84	582471.13	4130145.84	2.36E-05	2.71E-06	9.89E-04	3.59E-04	0.005	Res
582527.7_4130145.84	582527.7	4130145.84	2.35E-05	2.69E-06	9.84E-04	3.57E-04	0.005	Res
582584.27_4130145.84	582584.27	4130145.84	2.17E-05	2.48E-06	9.05E-04	3.29E-04	0.005	Res
582640.84_4130145.84	582640.84	4130145.84	2.01E-05	2.31E-06	8.39E-04	3.06E-04	0.004	Res
582697.41_4130145.84	582697.41	4130145.84	2.01E-05	2.31E-06	8.39E-04	3.05E-04	0.004	Res
582753.98_4130145.84	582753.98	4130145.84	2.09E-05	2.39E-06	8.74E-04	3.18E-04	0.004	Res
582810.55_4130145.84	582810.55	4130145.84	2.00E-05	2.30E-06	8.38E-04	3.04E-04	0.004	Res
582867.12_4130145.84	582867.12	4130145.84	1.62E-05	1.86E-06	6.72E-04	2.46E-04	0.003	Res
581962_4130229.75	581962	4130229.75	2.72E-05	3.15E-06	1.12E-03	4.14E-04	0.006	Res
582018.57_4130229.75	582018.57	4130229.75	2.68E-05	3.09E-06	1.11E-03	4.07E-04	0.006	Res
582075.14_4130229.75	582075.14	4130229.75	2.62E-05	3.02E-06	1.09E-03	3.98E-04	0.006	Res
582131.71_4130229.75	582131.71	4130229.75	2.54E-05	2.93E-06	1.06E-03	3.86E-04	0.005	Res
582188.28_4130229.75	582188.28	4130229.75	2.70E-05	3.10E-06	1.13E-03	4.10E-04	0.006	Res
582244.85_4130229.75	582244.85	4130229.75	2.60E-05	2.98E-06	1.09E-03	3.95E-04	0.006	Res
582301.42_4130229.75	582301.42	4130229.75	2.62E-05	3.00E-06	1.10E-03	3.98E-04	0.006	Res
582357.99_4130229.75	582357.99	4130229.75	2.48E-05	2.83E-06	1.04E-03	3.77E-04	0.005	Res
582414.56_4130229.75	582414.56	4130229.75	2.53E-05	2.89E-06	1.06E-03	3.84E-04	0.005	Res
582471.13_4130229.75	582471.13	4130229.75	2.38E-05	2.72E-06	1.00E-03	3.62E-04	0.005	Res
582527.7_4130229.75	582527.7	4130229.75	2.21E-05	2.53E-06	9.31E-04	3.37E-04	0.005	Res
582584.27_4130229.75	582584.27	4130229.75	2.22E-05	2.53E-06	9.34E-04	3.37E-04	0.005	Res
582640.84_4130229.75	582640.84	4130229.75	2.30E-05	2.63E-06	9.70E-04	3.50E-04	0.005	Res

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)				Acute Calculation, $\sum C_{TAC}$ /REL	
	UTM X	UTM Y	Arsenic	Mercury	Nickel	Vanadium	Total HI	Receptor Type
582697.41_4130229.75	582697.41	4130229.75	2.22E-05	2.54E-06	9.37E-04	3.38E-04	0.005	Res
582753.98_4130229.75	582753.98	4130229.75	1.99E-05	2.28E-06	8.38E-04	3.03E-04	0.004	Res
582810.55_4130229.75	582810.55	4130229.75	2.01E-05	2.29E-06	8.43E-04	3.05E-04	0.004	Res
582867.12_4130229.75	582867.12	4130229.75	2.11E-05	2.41E-06	8.89E-04	3.21E-04	0.005	Res
582018.57_4130313.66	582018.57	4130313.66	2.66E-05	3.08E-06	1.10E-03	4.04E-04	0.006	Res
582075.14_4130313.66	582075.14	4130313.66	2.82E-05	3.25E-06	1.17E-03	4.28E-04	0.006	Res
582131.71_4130313.66	582131.71	4130313.66	2.95E-05	3.39E-06	1.23E-03	4.48E-04	0.006	Res
582188.28_4130313.66	582188.28	4130313.66	2.76E-05	3.17E-06	1.15E-03	4.19E-04	0.006	Res
582244.85_4130313.66	582244.85	4130313.66	2.78E-05	3.20E-06	1.16E-03	4.23E-04	0.006	Res
582301.42_4130313.66	582301.42	4130313.66	2.77E-05	3.18E-06	1.16E-03	4.21E-04	0.006	Res
582357.99_4130313.66	582357.99	4130313.66	2.72E-05	3.12E-06	1.14E-03	4.13E-04	0.006	Res
582414.56_4130313.66	582414.56	4130313.66	2.50E-05	2.87E-06	1.05E-03	3.80E-04	0.005	Res
582471.13_4130313.66	582471.13	4130313.66	2.49E-05	2.85E-06	1.04E-03	3.78E-04	0.005	Res
582527.7_4130313.66	582527.7	4130313.66	2.62E-05	3.00E-06	1.10E-03	3.99E-04	0.006	Res
582584.27_4130313.66	582584.27	4130313.66	2.49E-05	2.85E-06	1.05E-03	3.79E-04	0.005	Res
582640.84_4130313.66	582640.84	4130313.66	2.23E-05	2.55E-06	9.34E-04	3.39E-04	0.005	Res
582697.41_4130313.66	582697.41	4130313.66	2.31E-05	2.63E-06	9.69E-04	3.50E-04	0.005	Res
582753.98_4130313.66	582753.98	4130313.66	2.34E-05	2.68E-06	9.87E-04	3.56E-04	0.005	Res
582810.55_4130313.66	582810.55	4130313.66	2.19E-05	2.50E-06	9.22E-04	3.33E-04	0.005	Res
582867.12_4130313.66	582867.12	4130313.66	1.95E-05	2.23E-06	8.21E-04	2.97E-04	0.004	Res
581848.86_4130397.57	581848.86	4130397.57	3.11E-05	3.60E-06	1.28E-03	4.73E-04	0.007	Res
581905.43_4130397.57	581905.43	4130397.57	3.19E-05	3.68E-06	1.32E-03	4.85E-04	0.007	Res
581962_4130397.57	581962	4130397.57	3.03E-05	3.49E-06	1.25E-03	4.60E-04	0.006	Res
582018.57_4130397.57	582018.57	4130397.57	3.11E-05	3.58E-06	1.29E-03	4.72E-04	0.007	Res
582075.14_4130397.57	582075.14	4130397.57	3.12E-05	3.59E-06	1.30E-03	4.74E-04	0.007	Res
582131.71_4130397.57	582131.71	4130397.57	3.03E-05	3.48E-06	1.26E-03	4.60E-04	0.006	Res
582188.28_4130397.57	582188.28	4130397.57	2.97E-05	3.41E-06	1.24E-03	4.52E-04	0.006	Res
582244.85_4130397.57	582244.85	4130397.57	3.06E-05	3.50E-06	1.28E-03	4.64E-04	0.007	Res
582301.42_4130397.57	582301.42	4130397.57	2.81E-05	3.22E-06	1.18E-03	4.27E-04	0.006	Res
582357.99_4130397.57	582357.99	4130397.57	2.74E-05	3.14E-06	1.15E-03	4.17E-04	0.006	Res
582414.56_4130397.57	582414.56	4130397.57	2.90E-05	3.32E-06	1.22E-03	4.41E-04	0.006	Res
582471.13_4130397.57	582471.13	4130397.57	2.78E-05	3.19E-06	1.17E-03	4.23E-04	0.006	Res
582527.7_4130397.57	582527.7	4130397.57	2.48E-05	2.84E-06	1.04E-03	3.76E-04	0.005	Res
582584.27_4130397.57	582584.27	4130397.57	2.66E-05	3.04E-06	1.12E-03	4.05E-04	0.006	Res
582640.84_4130397.57	582640.84	4130397.57	2.67E-05	3.05E-06	1.12E-03	4.06E-04	0.006	Res
582697.41_4130397.57	582697.41	4130397.57	2.44E-05	2.79E-06	1.02E-03	3.71E-04	0.005	Res
582753.98_4130397.57	582753.98	4130397.57	2.12E-05	2.43E-06	8.86E-04	3.22E-04	0.005	Res
582810.55_4130397.57	582810.55	4130397.57	1.84E-05	2.11E-06	7.66E-04	2.79E-04	0.004	Res
582867.12_4130397.57	582867.12	4130397.57	1.87E-05	2.15E-06	7.81E-04	2.84E-04	0.004	Res
581848.86_4130481.48	581848.86	4130481.48	3.40E-05	3.91E-06	1.41E-03	5.16E-04	0.007	Res
581905.43_4130481.48	581905.43	4130481.48	3.30E-05	3.80E-06	1.37E-03	5.01E-04	0.007	Res
581962_4130481.48	581962	4130481.48	3.32E-05	3.82E-06	1.38E-03	5.04E-04	0.007	Res
582018.57_4130481.48	582018.57	4130481.48	3.28E-05	3.77E-06	1.37E-03	4.99E-04	0.007	Res
582075.14_4130481.48	582075.14	4130481.48	3.36E-05	3.85E-06	1.40E-03	5.11E-04	0.007	Res
582131.71_4130481.48	582131.71	4130481.48	3.45E-05	3.94E-06	1.44E-03	5.24E-04	0.007	Res
582188.28_4130481.48	582188.28	4130481.48	3.24E-05	3.71E-06	1.36E-03	4.92E-04	0.007	Res
582244.85_4130481.48	582244.85	4130481.48	3.06E-05	3.51E-06	1.28E-03	4.65E-04	0.007	Res
582301.42_4130481.48	582301.42	4130481.48	3.20E-05	3.66E-06	1.34E-03	4.86E-04	0.007	Res
582357.99_4130481.48	582357.99	4130481.48	3.06E-05	3.50E-06	1.28E-03	4.65E-04	0.007	Res

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)				Acute Calculation, $\sum C_{TAC}$ /REL	
	UTM X	UTM Y	Arsenic	Mercury	Nickel	Vanadium	Total HI	Receptor Type
582414.56_4130481.48	582414.56	4130481.48	2.94E-05	3.36E-06	1.23E-03	4.46E-04	0.006	Res
582471.13_4130481.48	582471.13	4130481.48	3.19E-05	3.65E-06	1.34E-03	4.86E-04	0.007	Res
582527.7_4130481.48	582527.7	4130481.48	3.05E-05	3.48E-06	1.28E-03	4.63E-04	0.007	Res
582584.27_4130481.48	582584.27	4130481.48	2.71E-05	3.10E-06	1.14E-03	4.12E-04	0.006	Res
582640.84_4130481.48	582640.84	4130481.48	2.25E-05	2.58E-06	9.44E-04	3.43E-04	0.005	Res
582697.41_4130481.48	582697.41	4130481.48	2.17E-05	2.48E-06	9.06E-04	3.29E-04	0.005	Res
582753.98_4130481.48	582753.98	4130481.48	2.13E-05	2.45E-06	8.94E-04	3.24E-04	0.005	Res
582810.55_4130481.48	582810.55	4130481.48	2.02E-05	2.32E-06	8.45E-04	3.07E-04	0.004	Res
582867.12_4130481.48	582867.12	4130481.48	1.98E-05	2.28E-06	8.30E-04	3.02E-04	0.004	Res
581735.72_4130565.39	581735.72	4130565.39	3.44E-05	3.94E-06	1.45E-03	5.23E-04	0.007	Res
581792.29_4130565.39	581792.29	4130565.39	3.25E-05	3.73E-06	1.36E-03	4.94E-04	0.007	Res
581848.86_4130565.39	581848.86	4130565.39	3.29E-05	3.78E-06	1.38E-03	5.01E-04	0.007	Res
581905.43_4130565.39	581905.43	4130565.39	3.78E-05	4.33E-06	1.59E-03	5.75E-04	0.008	Res
581962_4130565.39	581962	4130565.39	3.70E-05	4.23E-06	1.55E-03	5.62E-04	0.008	Res
582018.57_4130565.39	582018.57	4130565.39	3.76E-05	4.30E-06	1.58E-03	5.71E-04	0.008	Res
582075.14_4130565.39	582075.14	4130565.39	3.74E-05	4.28E-06	1.57E-03	5.69E-04	0.008	Res
582131.71_4130565.39	582131.71	4130565.39	3.44E-05	3.94E-06	1.44E-03	5.24E-04	0.007	Res
582188.28_4130565.39	582188.28	4130565.39	3.71E-05	4.23E-06	1.56E-03	5.63E-04	0.008	Res
582244.85_4130565.39	582244.85	4130565.39	3.52E-05	4.03E-06	1.48E-03	5.36E-04	0.008	Res
582301.42_4130565.39	582301.42	4130565.39	3.59E-05	4.10E-06	1.51E-03	5.46E-04	0.008	Res
582357.99_4130565.39	582357.99	4130565.39	3.68E-05	4.20E-06	1.55E-03	5.60E-04	0.008	Res
582414.56_4130565.39	582414.56	4130565.39	3.39E-05	3.87E-06	1.43E-03	5.15E-04	0.007	Res
582471.13_4130565.39	582471.13	4130565.39	2.91E-05	3.33E-06	1.22E-03	4.43E-04	0.006	Res
582527.7_4130565.39	582527.7	4130565.39	2.57E-05	2.95E-06	1.08E-03	3.91E-04	0.006	Res
582584.27_4130565.39	582584.27	4130565.39	2.55E-05	2.92E-06	1.07E-03	3.87E-04	0.005	Res
582640.84_4130565.39	582640.84	4130565.39	2.39E-05	2.74E-06	1.00E-03	3.63E-04	0.005	Res
582697.41_4130565.39	582697.41	4130565.39	2.32E-05	2.67E-06	9.72E-04	3.53E-04	0.005	Res
582753.98_4130565.39	582753.98	4130565.39	2.16E-05	2.48E-06	9.03E-04	3.29E-04	0.005	Res
582810.55_4130565.39	582810.55	4130565.39	1.94E-05	2.23E-06	8.09E-04	2.95E-04	0.004	Res
582867.12_4130565.39	582867.12	4130565.39	1.69E-05	1.95E-06	7.02E-04	2.57E-04	0.004	Res
581735.72_4130649.3	581735.72	4130649.3	2.67E-05	3.06E-06	1.12E-03	4.06E-04	0.006	Res
581792.29_4130649.3	581792.29	4130649.3	2.74E-05	3.12E-06	1.16E-03	4.17E-04	0.006	Res
581905.43_4130649.3	581905.43	4130649.3	4.23E-05	4.80E-06	1.79E-03	6.43E-04	0.009	Res
581962_4130649.3	581962	4130649.3	4.40E-05	5.00E-06	1.87E-03	6.69E-04	0.010	Res
582018.57_4130649.3	582018.57	4130649.3	4.08E-05	4.64E-06	1.72E-03	6.20E-04	0.009	Res
582075.14_4130649.3	582075.14	4130649.3	4.32E-05	4.92E-06	1.83E-03	6.57E-04	0.009	Res
582131.71_4130649.3	582131.71	4130649.3	4.09E-05	4.66E-06	1.73E-03	6.22E-04	0.009	Res
582188.28_4130649.3	582188.28	4130649.3	4.31E-05	4.91E-06	1.82E-03	6.55E-04	0.009	Res
582244.85_4130649.3	582244.85	4130649.3	4.24E-05	4.82E-06	1.79E-03	6.44E-04	0.009	Res
582301.42_4130649.3	582301.42	4130649.3	3.75E-05	4.28E-06	1.58E-03	5.70E-04	0.008	Res
582357.99_4130649.3	582357.99	4130649.3	3.16E-05	3.61E-06	1.33E-03	4.80E-04	0.007	Res
582414.56_4130649.3	582414.56	4130649.3	3.15E-05	3.60E-06	1.32E-03	4.79E-04	0.007	Res
582471.13_4130649.3	582471.13	4130649.3	2.96E-05	3.38E-06	1.24E-03	4.50E-04	0.006	Res
582527.7_4130649.3	582527.7	4130649.3	2.80E-05	3.20E-06	1.18E-03	4.26E-04	0.006	Res
582584.27_4130649.3	582584.27	4130649.3	2.53E-05	2.89E-06	1.06E-03	3.84E-04	0.005	Res
582640.84_4130649.3	582640.84	4130649.3	2.18E-05	2.50E-06	9.09E-04	3.31E-04	0.005	Res
582697.41_4130649.3	582697.41	4130649.3	1.98E-05	2.28E-06	8.25E-04	3.01E-04	0.004	Res
582753.98_4130649.3	582753.98	4130649.3	2.06E-05	2.37E-06	8.61E-04	3.14E-04	0.004	Res
582810.55_4130649.3	582810.55	4130649.3	2.13E-05	2.44E-06	8.89E-04	3.23E-04	0.005	Res

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)				Acute Calculation, $\sum C_{TAC}$ /REL	
	UTM X	UTM Y	Arsenic	Mercury	Nickel	Vanadium	Total HI	Receptor Type
582867.12_4130649.3	582867.12	4130649.3	2.15E-05	2.46E-06	8.98E-04	3.26E-04	0.005	Res
581848.86_4130733.21	581848.86	4130733.21	5.18E-05	5.86E-06	2.21E-03	7.88E-04	0.011	Res
581905.43_4130733.21	581905.43	4130733.21	4.91E-05	5.55E-06	2.10E-03	7.47E-04	0.011	Res
581962_4130733.21	581962	4130733.21	5.10E-05	5.76E-06	2.18E-03	7.76E-04	0.011	Res
582018.57_4130733.21	582018.57	4130733.21	4.84E-05	5.47E-06	2.07E-03	7.36E-04	0.011	Res
582075.14_4130733.21	582075.14	4130733.21	5.30E-05	5.98E-06	2.26E-03	8.05E-04	0.012	Res
582131.71_4130733.21	582131.71	4130733.21	4.79E-05	5.42E-06	2.04E-03	7.28E-04	0.010	Res
582188.28_4130733.21	582188.28	4130733.21	4.23E-05	4.80E-06	1.80E-03	6.44E-04	0.009	Res
582244.85_4130733.21	582244.85	4130733.21	3.96E-05	4.50E-06	1.68E-03	6.02E-04	0.009	Res
582301.42_4130733.21	582301.42	4130733.21	3.76E-05	4.28E-06	1.59E-03	5.72E-04	0.008	Res
582357.99_4130733.21	582357.99	4130733.21	3.48E-05	3.97E-06	1.47E-03	5.29E-04	0.008	Res
582414.56_4130733.21	582414.56	4130733.21	2.99E-05	3.41E-06	1.26E-03	4.54E-04	0.006	Res
582471.13_4130733.21	582471.13	4130733.21	2.53E-05	2.90E-06	1.06E-03	3.85E-04	0.005	Res
582527.7_4130733.21	582527.7	4130733.21	2.64E-05	3.02E-06	1.11E-03	4.01E-04	0.006	Res
582584.27_4130733.21	582584.27	4130733.21	2.69E-05	3.07E-06	1.13E-03	4.09E-04	0.006	Res
582640.84_4130733.21	582640.84	4130733.21	2.68E-05	3.06E-06	1.12E-03	4.07E-04	0.006	Res
582697.41_4130733.21	582697.41	4130733.21	2.61E-05	2.99E-06	1.10E-03	3.97E-04	0.006	Res
582753.98_4130733.21	582753.98	4130733.21	2.49E-05	2.85E-06	1.04E-03	3.78E-04	0.005	Res
582810.55_4130733.21	582810.55	4130733.21	2.35E-05	2.69E-06	9.86E-04	3.57E-04	0.005	Res
582867.12_4130733.21	582867.12	4130733.21	2.18E-05	2.49E-06	9.12E-04	3.31E-04	0.005	Res
581735.72_4130817.12	581735.72	4130817.12	5.44E-05	6.18E-06	2.31E-03	8.27E-04	0.012	Res
581792.29_4130817.12	581792.29	4130817.12	6.30E-05	7.13E-06	2.68E-03	9.57E-04	0.014	Res
581848.86_4130817.12	581848.86	4130817.12	6.64E-05	7.52E-06	2.83E-03	1.01E-03	0.015	Res
581905.43_4130817.12	581905.43	4130817.12	6.49E-05	7.34E-06	2.77E-03	9.86E-04	0.014	Res
581962_4130817.12	581962	4130817.12	6.41E-05	7.23E-06	2.74E-03	9.74E-04	0.014	Res
582018.57_4130817.12	582018.57	4130817.12	5.62E-05	6.35E-06	2.40E-03	8.54E-04	0.012	Res
582075.14_4130817.12	582075.14	4130817.12	5.27E-05	5.94E-06	2.25E-03	8.01E-04	0.012	Res
582131.71_4130817.12	582131.71	4130817.12	5.04E-05	5.68E-06	2.16E-03	7.66E-04	0.011	Res
582188.28_4130817.12	582188.28	4130817.12	4.46E-05	5.04E-06	1.91E-03	6.78E-04	0.010	Res
582244.85_4130817.12	582244.85	4130817.12	3.59E-05	4.06E-06	1.53E-03	5.45E-04	0.008	Res
582301.42_4130817.12	582301.42	4130817.12	3.79E-05	4.29E-06	1.62E-03	5.77E-04	0.008	Res
582357.99_4130817.12	582357.99	4130817.12	3.82E-05	4.32E-06	1.62E-03	5.80E-04	0.008	Res
582414.56_4130817.12	582414.56	4130817.12	3.65E-05	4.14E-06	1.55E-03	5.55E-04	0.008	Res
582471.13_4130817.12	582471.13	4130817.12	3.40E-05	3.86E-06	1.44E-03	5.16E-04	0.007	Res
582527.7_4130817.12	582527.7	4130817.12	3.05E-05	3.47E-06	1.29E-03	4.63E-04	0.007	Res
582584.27_4130817.12	582584.27	4130817.12	2.92E-05	3.33E-06	1.23E-03	4.44E-04	0.006	Res
582640.84_4130817.12	582640.84	4130817.12	2.86E-05	3.26E-06	1.20E-03	4.34E-04	0.006	Res
582697.41_4130817.12	582697.41	4130817.12	2.76E-05	3.15E-06	1.16E-03	4.19E-04	0.006	Res
582753.98_4130817.12	582753.98	4130817.12	2.62E-05	2.99E-06	1.10E-03	3.98E-04	0.006	Res
582810.55_4130817.12	582810.55	4130817.12	2.50E-05	2.85E-06	1.05E-03	3.80E-04	0.005	Res
582867.12_4130817.12	582867.12	4130817.12	2.44E-05	2.79E-06	1.03E-03	3.71E-04	0.005	Res
581735.72_4130901.03	581735.72	4130901.03	9.02E-05	1.02E-05	3.86E-03	1.37E-03	0.020	Res
581792.29_4130901.03	581792.29	4130901.03	1.00E-04	1.13E-05	4.28E-03	1.52E-03	0.022	Res
581848.86_4130901.03	581848.86	4130901.03	8.67E-05	9.79E-06	3.70E-03	1.32E-03	0.019	Res
581905.43_4130901.03	581905.43	4130901.03	7.87E-05	8.89E-06	3.36E-03	1.20E-03	0.017	Res
581962_4130901.03	581962	4130901.03	7.66E-05	8.64E-06	3.27E-03	1.16E-03	0.017	Res
582018.57_4130901.03	582018.57	4130901.03	6.53E-05	7.37E-06	2.79E-03	9.92E-04	0.014	Res
582075.14_4130901.03	582075.14	4130901.03	6.72E-05	7.58E-06	2.87E-03	1.02E-03	0.015	Res
582131.71_4130901.03	582131.71	4130901.03	6.34E-05	7.15E-06	2.71E-03	9.64E-04	0.014	Res

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)				Acute Calculation, $\sum C_{TAC}$ /REL	
	UTM X	UTM Y	Arsenic	Mercury	Nickel	Vanadium	Total HI	Receptor Type
582188.28_4130901.03	582188.28	4130901.03	5.53E-05	6.24E-06	2.37E-03	8.41E-04	0.012	Res
582244.85_4130901.03	582244.85	4130901.03	4.92E-05	5.54E-06	2.11E-03	7.47E-04	0.011	Res
582301.42_4130901.03	582301.42	4130901.03	4.54E-05	5.12E-06	1.95E-03	6.91E-04	0.010	Res
582357.99_4130901.03	582357.99	4130901.03	4.14E-05	4.67E-06	1.77E-03	6.29E-04	0.009	Res
582414.56_4130901.03	582414.56	4130901.03	3.81E-05	4.30E-06	1.63E-03	5.78E-04	0.008	Res
582471.13_4130901.03	582471.13	4130901.03	3.56E-05	4.02E-06	1.52E-03	5.41E-04	0.008	Res
582527.7_4130901.03	582527.7	4130901.03	3.30E-05	3.74E-06	1.40E-03	5.01E-04	0.007	Res
582584.27_4130901.03	582584.27	4130901.03	3.07E-05	3.48E-06	1.30E-03	4.66E-04	0.007	Res
582640.84_4130901.03	582640.84	4130901.03	2.85E-05	3.23E-06	1.21E-03	4.33E-04	0.006	Res
582697.41_4130901.03	582697.41	4130901.03	2.63E-05	3.00E-06	1.11E-03	4.00E-04	0.006	Res
582753.98_4130901.03	582753.98	4130901.03	2.45E-05	2.80E-06	1.03E-03	3.73E-04	0.005	Res
582810.55_4130901.03	582810.55	4130901.03	2.37E-05	2.71E-06	9.99E-04	3.61E-04	0.005	Res
582867.12_4130901.03	582867.12	4130901.03	2.30E-05	2.63E-06	9.69E-04	3.50E-04	0.005	Res
581735.72_4130984.94	581735.72	4130984.94	1.75E-04	1.97E-05	7.54E-03	2.66E-03	0.039	Res
581792.29_4130984.94	581792.29	4130984.94	1.82E-04	2.05E-05	7.85E-03	2.77E-03	0.040	Res
581848.86_4130984.94	581848.86	4130984.94	1.86E-04	2.10E-05	8.02E-03	2.83E-03	0.041	Res
581905.43_4130984.94	581905.43	4130984.94	1.69E-04	1.89E-05	7.24E-03	2.56E-03	0.037	Res
581962_4130984.94	581962	4130984.94	1.21E-04	1.36E-05	5.19E-03	1.84E-03	0.027	Res
582018.57_4130984.94	582018.57	4130984.94	8.93E-05	1.01E-05	3.82E-03	1.36E-03	0.020	Res
582075.14_4130984.94	582075.14	4130984.94	7.03E-05	7.94E-06	3.00E-03	1.07E-03	0.015	Res
582131.71_4130984.94	582131.71	4130984.94	5.91E-05	6.67E-06	2.52E-03	8.98E-04	0.013	Res
582188.28_4130984.94	582188.28	4130984.94	5.27E-05	5.96E-06	2.25E-03	8.01E-04	0.012	Res
582244.85_4130984.94	582244.85	4130984.94	4.76E-05	5.38E-06	2.03E-03	7.23E-04	0.010	Res
582301.42_4130984.94	582301.42	4130984.94	4.34E-05	4.90E-06	1.85E-03	6.60E-04	0.010	Res
582357.99_4130984.94	582357.99	4130984.94	4.00E-05	4.51E-06	1.71E-03	6.08E-04	0.009	Res
582414.56_4130984.94	582414.56	4130984.94	3.70E-05	4.18E-06	1.58E-03	5.63E-04	0.008	Res
582471.13_4130984.94	582471.13	4130984.94	3.45E-05	3.89E-06	1.48E-03	5.24E-04	0.008	Res
582527.7_4130984.94	582527.7	4130984.94	3.24E-05	3.65E-06	1.38E-03	4.92E-04	0.007	Res
582584.27_4130984.94	582584.27	4130984.94	3.07E-05	3.47E-06	1.31E-03	4.67E-04	0.007	Res
582640.84_4130984.94	582640.84	4130984.94	2.95E-05	3.34E-06	1.26E-03	4.49E-04	0.006	Res
582697.41_4130984.94	582697.41	4130984.94	2.82E-05	3.19E-06	1.20E-03	4.28E-04	0.006	Res
582753.98_4130984.94	582753.98	4130984.94	2.72E-05	3.09E-06	1.16E-03	4.14E-04	0.006	Res
582810.55_4130984.94	582810.55	4130984.94	2.62E-05	2.98E-06	1.11E-03	3.98E-04	0.006	Res
582867.12_4130984.94	582867.12	4130984.94	2.52E-05	2.87E-06	1.07E-03	3.84E-04	0.005	Res
581735.72_4131068.85	581735.72	4131068.85	6.95E-05	7.84E-06	2.97E-03	1.06E-03	0.015	Res
581792.29_4131068.85	581792.29	4131068.85	6.95E-05	7.84E-06	2.98E-03	1.06E-03	0.015	Res
581848.86_4131068.85	581848.86	4131068.85	7.38E-05	8.33E-06	3.16E-03	1.12E-03	0.016	Res
581905.43_4131068.85	581905.43	4131068.85	7.19E-05	8.11E-06	3.07E-03	1.09E-03	0.016	Res
581962_4131068.85	581962	4131068.85	7.36E-05	8.31E-06	3.15E-03	1.12E-03	0.016	Res
582018.57_4131068.85	582018.57	4131068.85	6.47E-05	7.31E-06	2.76E-03	9.84E-04	0.014	Res
582075.14_4131068.85	582075.14	4131068.85	5.60E-05	6.33E-06	2.38E-03	8.50E-04	0.012	Res
582131.71_4131068.85	582131.71	4131068.85	5.06E-05	5.73E-06	2.15E-03	7.70E-04	0.011	Res
582188.28_4131068.85	582188.28	4131068.85	4.71E-05	5.34E-06	2.01E-03	7.16E-04	0.010	Res
582244.85_4131068.85	582244.85	4131068.85	4.43E-05	5.02E-06	1.89E-03	6.74E-04	0.010	Res
582301.42_4131068.85	582301.42	4131068.85	4.16E-05	4.71E-06	1.77E-03	6.33E-04	0.009	Res
582357.99_4131068.85	582357.99	4131068.85	3.90E-05	4.41E-06	1.66E-03	5.93E-04	0.009	Res
582414.56_4131068.85	582414.56	4131068.85	3.66E-05	4.14E-06	1.56E-03	5.56E-04	0.008	Res
582471.13_4131068.85	582471.13	4131068.85	3.43E-05	3.87E-06	1.46E-03	5.21E-04	0.008	Res
582527.7_4131068.85	582527.7	4131068.85	3.20E-05	3.62E-06	1.37E-03	4.87E-04	0.007	Res

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)				Acute Calculation, $\sum C_{TAC}$ /REL	
	UTM X	UTM Y	Arsenic	Mercury	Nickel	Vanadium	Total HI	Receptor Type
582584.27_4131068.85	582584.27	4131068.85	2.98E-05	3.37E-06	1.28E-03	4.53E-04	0.007	Res
582640.84_4131068.85	582640.84	4131068.85	2.88E-05	3.24E-06	1.23E-03	4.37E-04	0.006	Res
582697.41_4131068.85	582697.41	4131068.85	2.76E-05	3.12E-06	1.18E-03	4.20E-04	0.006	Res
582753.98_4131068.85	582753.98	4131068.85	2.69E-05	3.04E-06	1.15E-03	4.09E-04	0.006	Res
582810.55_4131068.85	582810.55	4131068.85	2.61E-05	2.96E-06	1.11E-03	3.97E-04	0.006	Res
582867.12_4131068.85	582867.12	4131068.85	2.49E-05	2.82E-06	1.06E-03	3.78E-04	0.005	Res
582018.57_4131152.76	582018.57	4131152.76	4.60E-05	5.20E-06	1.96E-03	6.98E-04	0.010	Res
582244.85_4131152.76	582244.85	4131152.76	3.89E-05	4.42E-06	1.65E-03	5.92E-04	0.008	Res
582301.42_4131152.76	582301.42	4131152.76	3.70E-05	4.19E-06	1.57E-03	5.62E-04	0.008	Res
582357.99_4131152.76	582357.99	4131152.76	3.46E-05	3.92E-06	1.47E-03	5.26E-04	0.008	Res
582414.56_4131152.76	582414.56	4131152.76	3.22E-05	3.66E-06	1.37E-03	4.90E-04	0.007	Res
582471.13_4131152.76	582471.13	4131152.76	2.91E-05	3.30E-06	1.23E-03	4.42E-04	0.006	Res
582527.7_4131152.76	582527.7	4131152.76	2.64E-05	3.00E-06	1.12E-03	4.02E-04	0.006	Res
582584.27_4131152.76	582584.27	4131152.76	2.46E-05	2.78E-06	1.04E-03	3.73E-04	0.005	Res
582640.84_4131152.76	582640.84	4131152.76	2.38E-05	2.70E-06	1.01E-03	3.62E-04	0.005	Res
582697.41_4131152.76	582697.41	4131152.76	2.31E-05	2.61E-06	9.83E-04	3.51E-04	0.005	Res
582753.98_4131152.76	582753.98	4131152.76	2.28E-05	2.57E-06	9.73E-04	3.46E-04	0.005	Res
582810.55_4131152.76	582810.55	4131152.76	2.23E-05	2.52E-06	9.54E-04	3.39E-04	0.005	Res
582867.12_4131152.76	582867.12	4131152.76	2.13E-05	2.41E-06	9.12E-04	3.24E-04	0.005	Res

HRA Permanente Creek Restoration Project

Construction Year 2025

Emissions Inputs

Construction Activity	Construction Year & Source	DPM Exhaust (tons/year)	PM10 Dust for speciation (tons/year)	Arsenic (tons/year)	Beryllium (tons/year)	Cadmium (tons/year)	Cobalt (tons/year)	Copper (tons/year)	Lead (tons/year)	Mercury (tons/year)	Nickel (tons/year)	Selenium (tons/year)	Chromium VI (tons/year)	Crystalline Silica (tons/year)	Vanadium (tons/year)
Concrete Channel 2024	2024_CONCRTE	0.000	0.00	2.91E-12	1.74E-12	2.91E-12	1.49E-11	3.26E-11	2.91E-12	4.65E-13	5.35E-11	5.81E-12	2.33E-13	8.63E-09	4.42E-11
Paved road	2024_PAVED	2.07E-04	0.08	1.04E-07	6.26E-08	1.04E-07	6.68E-08	2.09E-06	1.92E-07	1.17E-08	4.51E-06	2.09E-07	1.59E-07	5.93E-04	1.59E-06
Unpaved road	2024_CCP_UNPV	6.27E-05	0.20	2.56E-07	1.54E-07	2.56E-07	1.64E-07	5.12E-06	4.71E-07	2.87E-08	1.11E-05	5.12E-07	3.89E-07	1.46E-03	3.89E-06
Channel Widening 2024	2024_CHAN_RCK	0.002	0.16	2.05E-07	1.23E-07	2.05E-07	1.05E-06	2.29E-06	2.05E-07	3.28E-08	3.77E-06	4.09E-07	1.64E-08	6.08E-04	3.11E-06
Paved road	2024_PAVED	1.80E-03	2.39	2.99E-06	1.79E-06	2.99E-06	1.91E-06	5.98E-05	5.50E-06	3.35E-07	1.29E-04	5.98E-06	4.54E-06	1.70E-02	4.54E-05
Rock Pile Area 2025	2025_CHAN_RCK	0.006	0.25	3.16E-07	1.89E-07	3.16E-07	1.62E-06	3.54E-06	3.16E-07	5.05E-08	5.81E-06	6.31E-07	2.53E-08	9.37E-04	4.80E-06
Paved road	2025_PAVED	5.95E-03	2.44	3.05E-06	1.83E-06	3.05E-06	1.95E-06	6.10E-05	5.61E-06	3.41E-07	1.32E-04	6.10E-06	4.63E-06	1.73E-02	4.63E-05
Rock Pile Area 2026	2026_CHAN_RCK	0.006	0.25	3.16E-07	1.89E-07	3.16E-07	1.62E-06	3.54E-06	3.16E-07	5.05E-08	5.81E-06	6.31E-07	2.53E-08	9.37E-04	4.80E-06
Paved road	2026_PAVED	5.84E-03	2.44	3.05E-06	1.83E-06	3.05E-06	1.95E-06	6.10E-05	5.61E-06	3.41E-07	1.32E-04	6.10E-06	4.63E-06	1.73E-02	4.63E-05
Channel Widening 2027	2027_CHAN_RCK	0.002	0.98	1.23E-06	7.36E-07	1.23E-06	6.28E-06	1.37E-05	1.23E-06	1.96E-07	2.26E-05	2.45E-06	9.82E-08	3.64E-03	1.87E-05
Paved road	2027_PAVED	5.61E-03	2.39	2.99E-06	1.79E-06	2.99E-06	1.91E-06	5.98E-05	5.50E-06	3.35E-07	1.29E-04	5.98E-06	4.54E-06	1.70E-02	4.54E-05
Material Removal 2028	2028_MATRMVL	0.001	0.25	3.15E-07	1.89E-07	3.15E-07	1.62E-06	3.53E-06	3.15E-07	5.05E-08	5.80E-06	6.31E-07	2.52E-08	9.37E-04	4.80E-06
Paved road	2028_PAVED	5.57E-03	2.39	2.99E-06	1.80E-06	2.99E-06	1.92E-06	5.98E-05	5.51E-06	3.35E-07	1.29E-04	5.98E-06	4.55E-06	1.70E-02	4.55E-05
Unpaved road	2028_UNPAVED	3.40E-03	11.84	1.48E-05	8.88E-06	1.48E-05	9.47E-06	2.96E-04	2.72E-05	1.66E-06	6.40E-04	2.96E-05	2.25E-05	8.41E-02	2.25E-04
Material Removal 2029	2029_MATRMVL	0.001	0.25	3.15E-07	1.89E-07	3.15E-07	1.62E-06	3.53E-06	3.15E-07	5.05E-08	5.80E-06	6.31E-07	2.52E-08	9.37E-04	4.80E-06
Paved road	2029_PAVED	5.56E-03	2.41	3.01E-06	1.81E-06	3.01E-06	1.93E-06	6.03E-05	5.55E-06	3.38E-07	1.30E-04	6.03E-06	4.58E-06	1.71E-02	4.58E-05
Unpaved road	2029_UNPAVED	3.39E-03	11.93	1.49E-05	8.95E-06	1.49E-05	9.55E-06	2.98E-04	2.74E-05	1.67E-06	6.44E-04	2.98E-05	2.27E-05	8.47E-02	2.27E-04

Construction Activity	Construction Year	DPM (g/s)	Arsenic (g/s)	Beryllium (g/s)	Cadmium (g/s)	Cobalt (g/s)	Copper (g/s)	Lead (g/s)	Mercury (g/s)	Nickel (g/s)	Selenium (g/s)	Chromium VI (g/s)	Crystalline Silica (g/s)	Vanadium (g/s)	No. of Workdays (days)
Concrete Channel 2024	2024_CONCRTE	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	130.00
Paved road	2024_PAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	130.00
Unpaved road	2024_CCP_UNPV	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	130.00
Channel Widening 2024	2024_CHAN_RCK	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	130.00
Paved road	2024_PAVED	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	130.00
Rock Pile Area 2025	2025_CHAN_RCK	4.767E-04	2.55E-08	1.53E-08	2.55E-08	1.31E-07	2.86E-07	2.55E-08	4.08E-09	4.69E-07	5.10E-08	2.04E-09	7.57E-05	3.87E-07	130.00
Paved road	2025_PAVED	4.805E-04	2.46E-07	1.48E-07	2.46E-07	1.58E-07	4.92E-06	4.53E-07	2.76E-08	1.06E-05	4.92E-07	3.74E-07	1.40E-03	3.74E-06	130.00
Rock Pile Area 2026	2026_CHAN_RCK	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	130.00
Paved road	2026_PAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	130.00
Channel Widening 2027	2027_CHAN_RCK	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	130.00
Paved road	2027_PAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	130.00
Material Removal 2028	2028_MATRMVL	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	130.00
Paved road	2028_PAVED	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	130.00
Unpaved road	2028_UNPAVED	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	130.00
Material Removal 2029	2029_MATRMVL	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	130.00
Paved road	2029_PAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	130.00
Unpaved road	2029_UNPAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	130.00

N/A = not including PM10 on-site dust in HRA calculation; it is only for speciating metals.

Acute REL

TAC	UOM	
Arsenic	µg/m^3	0.2
Mercury	µg/m^3	0.61
Nickel	µg/m^3	0.2
Vanadium	µg/m^3	31

	Max
CT House	0.016
Res	0.039
Acute	0.013

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} (µg/m^3)				Acute Calculation, $\sum C_{TAC}$ /REL	
	UTM X	UTM Y	Arsenic	Mercury	Nickel	Vanadium	Total HI	Receptor Type
			0.2	0.61	0.2	31		
581336.22_4131207.48	581336.22	4131207.48	7.36E-05	8.33E-06	3.13E-03	1.12E-03	0.016	CT House
581554.22_4130688.06	581554.22	4130688.06	2.02E-05	2.48E-06	7.63E-04	3.08E-04	0.004	Res
579793.36_4131503.29	579793.36	4131503.29	2.44E-06	3.00E-07	9.17E-05	3.71E-05	0.000	Acute
580488.37_4131517.71	580488.37	4131517.71	6.73E-06	8.14E-07	2.59E-04	1.02E-04	0.001	Acute
581678.43_4131040.03	581678.43	4131040.03	9.18E-05	1.04E-05	3.91E-03	1.40E-03	0.020	Res
581635.43_4130978.54	581635.43	4130978.54	1.19E-04	1.34E-05	5.08E-03	1.81E-03	0.026	Res
581830.06_4131027.55	581830.06	4131027.55	1.27E-04	1.43E-05	5.42E-03	1.92E-03	0.028	Res
581727.48_4130976.54	581727.48	4130976.54	1.41E-04	1.59E-05	6.06E-03	2.15E-03	0.031	Res
581789.11_4130419.65	581789.11	4130419.65	2.60E-05	3.11E-06	1.02E-03	3.95E-04	0.005	Res
581700.32_4130781.89	581700.32	4130781.89	3.85E-05	4.45E-06	1.59E-03	5.85E-04	0.008	Res
581426.07_4131299.01	581426.07	4131299.01	6.13E-05	6.95E-06	2.60E-03	9.32E-04	0.013	Acute
582301.42_4129474.56	582301.42	4129474.56	1.24E-05	1.51E-06	4.71E-04	1.88E-04	0.002	Res
582357.99_4129474.56	582357.99	4129474.56	1.21E-05	1.48E-06	4.62E-04	1.84E-04	0.002	Res
582414.56_4129474.56	582414.56	4129474.56	1.30E-05	1.57E-06	5.03E-04	1.98E-04	0.003	Res
582471.13_4129474.56	582471.13	4129474.56	1.30E-05	1.56E-06	5.05E-04	1.97E-04	0.003	Res
582527.7_4129474.56	582527.7	4129474.56	1.30E-05	1.56E-06	5.10E-04	1.98E-04	0.003	Res
582584.27_4129474.56	582584.27	4129474.56	1.25E-05	1.49E-06	4.90E-04	1.90E-04	0.003	Res
582640.84_4129474.56	582640.84	4129474.56	1.25E-05	1.49E-06	4.93E-04	1.90E-04	0.003	Res
582244.85_4129558.47	582244.85	4129558.47	1.65E-05	1.99E-06	6.43E-04	2.51E-04	0.003	Res
582301.42_4129558.47	582301.42	4129558.47	1.60E-05	1.92E-06	6.27E-04	2.43E-04	0.003	Res
582357.99_4129558.47	582357.99	4129558.47	1.55E-05	1.85E-06	6.08E-04	2.35E-04	0.003	Res
582414.56_4129558.47	582414.56	4129558.47	1.51E-05	1.81E-06	5.94E-04	2.30E-04	0.003	Res
582471.13_4129558.47	582471.13	4129558.47	1.44E-05	1.72E-06	5.64E-04	2.18E-04	0.003	Res
582527.7_4129558.47	582527.7	4129558.47	1.37E-05	1.64E-06	5.37E-04	2.08E-04	0.003	Res
582584.27_4129558.47	582584.27	4129558.47	1.30E-05	1.56E-06	5.07E-04	1.97E-04	0.003	Res
582640.84_4129558.47	582640.84	4129558.47	1.23E-05	1.48E-06	4.79E-04	1.87E-04	0.002	Res
582697.41_4129558.47	582697.41	4129558.47	1.18E-05	1.42E-06	4.60E-04	1.79E-04	0.002	Res
582244.85_4129642.38	582244.85	4129642.38	1.92E-05	2.32E-06	7.44E-04	2.92E-04	0.004	Res
582301.42_4129642.38	582301.42	4129642.38	1.67E-05	2.02E-06	6.51E-04	2.54E-04	0.003	Res
582357.99_4129642.38	582357.99	4129642.38	1.45E-05	1.75E-06	5.64E-04	2.21E-04	0.003	Res
582414.56_4129642.38	582414.56	4129642.38	1.42E-05	1.71E-06	5.53E-04	2.16E-04	0.003	Res
582471.13_4129642.38	582471.13	4129642.38	1.40E-05	1.68E-06	5.45E-04	2.12E-04	0.003	Res
582527.7_4129642.38	582527.7	4129642.38	1.38E-05	1.66E-06	5.42E-04	2.10E-04	0.003	Res
582584.27_4129642.38	582584.27	4129642.38	1.33E-05	1.59E-06	5.18E-04	2.01E-04	0.003	Res
582640.84_4129642.38	582640.84	4129642.38	1.31E-05	1.57E-06	5.16E-04	2.00E-04	0.003	Res
582697.41_4129642.38	582697.41	4129642.38	1.35E-05	1.61E-06	5.32E-04	2.05E-04	0.003	Res
582753.98_4129642.38	582753.98	4129642.38	1.32E-05	1.58E-06	5.24E-04	2.01E-04	0.003	Res
582810.55_4129642.38	582810.55	4129642.38	1.27E-05	1.51E-06	5.02E-04	1.93E-04	0.003	Res
582867.12_4129642.38	582867.12	4129642.38	1.33E-05	1.58E-06	5.29E-04	2.02E-04	0.003	Res
582244.85_4129726.29	582244.85	4129726.29	1.93E-05	2.32E-06	7.50E-04	2.93E-04	0.004	Res

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)				Acute Calculation, $\sum C_{TAC}$ /REL	
	UTM X	UTM Y	Arsenic	Mercury	Nickel	Vanadium	Total HI	Receptor Type
582301.42_4129726.29	582301.42	4129726.29	1.87E-05	2.23E-06	7.32E-04	2.84E-04	0.004	Res
582357.99_4129726.29	582357.99	4129726.29	1.70E-05	2.02E-06	6.71E-04	2.58E-04	0.003	Res
582414.56_4129726.29	582414.56	4129726.29	1.59E-05	1.89E-06	6.29E-04	2.42E-04	0.003	Res
582471.13_4129726.29	582471.13	4129726.29	1.50E-05	1.79E-06	5.95E-04	2.29E-04	0.003	Res
582527.7_4129726.29	582527.7	4129726.29	1.43E-05	1.70E-06	5.64E-04	2.17E-04	0.003	Res
582584.27_4129726.29	582584.27	4129726.29	1.45E-05	1.72E-06	5.77E-04	2.20E-04	0.003	Res
582640.84_4129726.29	582640.84	4129726.29	1.50E-05	1.77E-06	6.02E-04	2.28E-04	0.003	Res
582697.41_4129726.29	582697.41	4129726.29	1.43E-05	1.69E-06	5.73E-04	2.17E-04	0.003	Res
582753.98_4129726.29	582753.98	4129726.29	1.36E-05	1.60E-06	5.43E-04	2.06E-04	0.003	Res
582810.55_4129726.29	582810.55	4129726.29	1.37E-05	1.62E-06	5.51E-04	2.09E-04	0.003	Res
582244.85_4129810.2	582244.85	4129810.2	2.03E-05	2.42E-06	8.00E-04	3.08E-04	0.004	Res
582301.42_4129810.2	582301.42	4129810.2	1.89E-05	2.25E-06	7.49E-04	2.88E-04	0.004	Res
582357.99_4129810.2	582357.99	4129810.2	1.76E-05	2.09E-06	6.97E-04	2.67E-04	0.004	Res
582414.56_4129810.2	582414.56	4129810.2	1.62E-05	1.92E-06	6.44E-04	2.46E-04	0.003	Res
582471.13_4129810.2	582471.13	4129810.2	1.51E-05	1.79E-06	5.98E-04	2.29E-04	0.003	Res
582527.7_4129810.2	582527.7	4129810.2	1.56E-05	1.84E-06	6.23E-04	2.37E-04	0.003	Res
582584.27_4129810.2	582584.27	4129810.2	1.57E-05	1.85E-06	6.28E-04	2.38E-04	0.003	Res
582640.84_4129810.2	582640.84	4129810.2	1.49E-05	1.76E-06	5.99E-04	2.27E-04	0.003	Res
582697.41_4129810.2	582697.41	4129810.2	1.49E-05	1.75E-06	5.97E-04	2.26E-04	0.003	Res
581905.43_4129894.11	581905.43	4129894.11	1.32E-05	1.58E-06	5.20E-04	2.01E-04	0.003	Res
581962_4129894.11	581962	4129894.11	1.79E-05	2.24E-06	6.52E-04	2.72E-04	0.003	Res
582131.71_4129894.11	582131.71	4129894.11	1.87E-05	2.27E-06	7.13E-04	2.84E-04	0.004	Res
582188.28_4129894.11	582188.28	4129894.11	1.82E-05	2.21E-06	7.00E-04	2.77E-04	0.004	Res
582244.85_4129894.11	582244.85	4129894.11	1.66E-05	2.01E-06	6.39E-04	2.52E-04	0.003	Res
582301.42_4129894.11	582301.42	4129894.11	1.60E-05	1.93E-06	6.20E-04	2.43E-04	0.003	Res
582357.99_4129894.11	582357.99	4129894.11	1.54E-05	1.86E-06	5.99E-04	2.34E-04	0.003	Res
582414.56_4129894.11	582414.56	4129894.11	1.58E-05	1.89E-06	6.22E-04	2.40E-04	0.003	Res
582471.13_4129894.11	582471.13	4129894.11	1.68E-05	2.00E-06	6.69E-04	2.56E-04	0.003	Res
582527.7_4129894.11	582527.7	4129894.11	1.66E-05	1.97E-06	6.61E-04	2.52E-04	0.003	Res
582584.27_4129894.11	582584.27	4129894.11	1.56E-05	1.85E-06	6.21E-04	2.38E-04	0.003	Res
582640.84_4129894.11	582640.84	4129894.11	1.62E-05	1.91E-06	6.46E-04	2.46E-04	0.003	Res
582697.41_4129894.11	582697.41	4129894.11	1.56E-05	1.85E-06	6.24E-04	2.37E-04	0.003	Res
581962_4129978.02	581962	4129978.02	2.04E-05	2.57E-06	7.27E-04	3.09E-04	0.004	Res
582018.57_4129978.02	582018.57	4129978.02	2.09E-05	2.65E-06	7.43E-04	3.18E-04	0.004	Res
582075.14_4129978.02	582075.14	4129978.02	2.21E-05	2.67E-06	8.52E-04	3.35E-04	0.004	Res
582131.71_4129978.02	582131.71	4129978.02	1.97E-05	2.38E-06	7.62E-04	3.00E-04	0.004	Res
582188.28_4129978.02	582188.28	4129978.02	1.84E-05	2.22E-06	7.19E-04	2.80E-04	0.004	Res
582244.85_4129978.02	582244.85	4129978.02	1.77E-05	2.13E-06	6.91E-04	2.69E-04	0.004	Res
582301.42_4129978.02	582301.42	4129978.02	1.64E-05	1.97E-06	6.41E-04	2.49E-04	0.003	Res
582357.99_4129978.02	582357.99	4129978.02	1.69E-05	2.02E-06	6.68E-04	2.57E-04	0.003	Res
582414.56_4129978.02	582414.56	4129978.02	1.81E-05	2.15E-06	7.22E-04	2.76E-04	0.004	Res
582471.13_4129978.02	582471.13	4129978.02	1.74E-05	2.06E-06	6.93E-04	2.65E-04	0.004	Res
582527.7_4129978.02	582527.7	4129978.02	1.70E-05	2.01E-06	6.76E-04	2.58E-04	0.003	Res
582584.27_4129978.02	582584.27	4129978.02	1.72E-05	2.03E-06	6.89E-04	2.62E-04	0.004	Res
582640.84_4129978.02	582640.84	4129978.02	1.67E-05	1.97E-06	6.69E-04	2.54E-04	0.003	Res
582697.41_4129978.02	582697.41	4129978.02	1.73E-05	2.04E-06	6.98E-04	2.64E-04	0.004	Res
582753.98_4129978.02	582753.98	4129978.02	1.62E-05	1.91E-06	6.49E-04	2.46E-04	0.003	Res

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)				Acute Calculation, $\sum C_{TAC}$ /REL	
	UTM X	UTM Y	Arsenic	Mercury	Nickel	Vanadium	Total HI	Receptor Type
582810.55_4129978.02	582810.55	4129978.02	1.37E-05	1.62E-06	5.42E-04	2.08E-04	0.003	Res
581905.43_4130061.93	581905.43	4130061.93	2.57E-05	3.07E-06	1.01E-03	3.90E-04	0.005	Res
581962_4130061.93	581962	4130061.93	2.47E-05	2.95E-06	9.74E-04	3.76E-04	0.005	Res
582018.57_4130061.93	582018.57	4130061.93	2.50E-05	2.98E-06	9.82E-04	3.79E-04	0.005	Res
582075.14_4130061.93	582075.14	4130061.93	2.43E-05	2.90E-06	9.55E-04	3.69E-04	0.005	Res
582131.71_4130061.93	582131.71	4130061.93	2.21E-05	2.64E-06	8.73E-04	3.36E-04	0.004	Res
582188.28_4130061.93	582188.28	4130061.93	2.07E-05	2.46E-06	8.18E-04	3.14E-04	0.004	Res
582244.85_4130061.93	582244.85	4130061.93	1.88E-05	2.24E-06	7.46E-04	2.86E-04	0.004	Res
582301.42_4130061.93	582301.42	4130061.93	1.81E-05	2.16E-06	7.19E-04	2.76E-04	0.004	Res
582357.99_4130061.93	582357.99	4130061.93	1.91E-05	2.25E-06	7.61E-04	2.90E-04	0.004	Res
582414.56_4130061.93	582414.56	4130061.93	1.79E-05	2.12E-06	7.13E-04	2.72E-04	0.004	Res
582471.13_4130061.93	582471.13	4130061.93	1.87E-05	2.21E-06	7.52E-04	2.85E-04	0.004	Res
582527.7_4130061.93	582527.7	4130061.93	1.84E-05	2.17E-06	7.40E-04	2.80E-04	0.004	Res
582584.27_4130061.93	582584.27	4130061.93	1.89E-05	2.22E-06	7.62E-04	2.87E-04	0.004	Res
582640.84_4130061.93	582640.84	4130061.93	1.84E-05	2.17E-06	7.44E-04	2.80E-04	0.004	Res
582697.41_4130061.93	582697.41	4130061.93	1.70E-05	2.01E-06	6.85E-04	2.59E-04	0.004	Res
582753.98_4130061.93	582753.98	4130061.93	1.64E-05	1.93E-06	6.59E-04	2.49E-04	0.003	Res
582810.55_4130061.93	582810.55	4130061.93	1.63E-05	1.92E-06	6.57E-04	2.48E-04	0.003	Res
581962_4130145.84	581962	4130145.84	2.27E-05	2.67E-06	9.10E-04	3.45E-04	0.005	Res
582018.57_4130145.84	582018.57	4130145.84	2.16E-05	2.55E-06	8.66E-04	3.28E-04	0.004	Res
582075.14_4130145.84	582075.14	4130145.84	2.17E-05	2.57E-06	8.71E-04	3.30E-04	0.004	Res
582131.71_4130145.84	582131.71	4130145.84	2.06E-05	2.43E-06	8.27E-04	3.14E-04	0.004	Res
582188.28_4130145.84	582188.28	4130145.84	1.88E-05	2.22E-06	7.52E-04	2.85E-04	0.004	Res
582244.85_4130145.84	582244.85	4130145.84	1.97E-05	2.32E-06	7.95E-04	3.00E-04	0.004	Res
582301.42_4130145.84	582301.42	4130145.84	1.97E-05	2.32E-06	7.98E-04	3.00E-04	0.004	Res
582357.99_4130145.84	582357.99	4130145.84	1.92E-05	2.26E-06	7.78E-04	2.92E-04	0.004	Res
582414.56_4130145.84	582414.56	4130145.84	1.98E-05	2.32E-06	8.05E-04	3.01E-04	0.004	Res
582471.13_4130145.84	582471.13	4130145.84	1.98E-05	2.31E-06	8.04E-04	3.01E-04	0.004	Res
582527.7_4130145.84	582527.7	4130145.84	2.02E-05	2.36E-06	8.26E-04	3.08E-04	0.004	Res
582584.27_4130145.84	582584.27	4130145.84	1.91E-05	2.23E-06	7.76E-04	2.90E-04	0.004	Res
582640.84_4130145.84	582640.84	4130145.84	1.77E-05	2.07E-06	7.17E-04	2.68E-04	0.004	Res
582697.41_4130145.84	582697.41	4130145.84	1.76E-05	2.06E-06	7.18E-04	2.68E-04	0.004	Res
582753.98_4130145.84	582753.98	4130145.84	1.85E-05	2.16E-06	7.56E-04	2.81E-04	0.004	Res
582810.55_4130145.84	582810.55	4130145.84	1.78E-05	2.07E-06	7.25E-04	2.70E-04	0.004	Res
582867.12_4130145.84	582867.12	4130145.84	1.42E-05	1.67E-06	5.72E-04	2.16E-04	0.003	Res
581962_4130229.75	581962	4130229.75	2.06E-05	2.47E-06	8.09E-04	3.14E-04	0.004	Res
582018.57_4130229.75	582018.57	4130229.75	1.94E-05	2.31E-06	7.63E-04	2.95E-04	0.004	Res
582075.14_4130229.75	582075.14	4130229.75	1.94E-05	2.31E-06	7.72E-04	2.96E-04	0.004	Res
582131.71_4130229.75	582131.71	4130229.75	1.98E-05	2.34E-06	7.93E-04	3.01E-04	0.004	Res
582188.28_4130229.75	582188.28	4130229.75	2.14E-05	2.51E-06	8.67E-04	3.26E-04	0.004	Res
582244.85_4130229.75	582244.85	4130229.75	2.06E-05	2.42E-06	8.37E-04	3.14E-04	0.004	Res
582301.42_4130229.75	582301.42	4130229.75	2.13E-05	2.48E-06	8.68E-04	3.23E-04	0.004	Res
582357.99_4130229.75	582357.99	4130229.75	2.05E-05	2.39E-06	8.40E-04	3.12E-04	0.004	Res
582414.56_4130229.75	582414.56	4130229.75	2.18E-05	2.53E-06	8.99E-04	3.32E-04	0.005	Res
582471.13_4130229.75	582471.13	4130229.75	2.07E-05	2.39E-06	8.52E-04	3.14E-04	0.004	Res
582527.7_4130229.75	582527.7	4130229.75	1.91E-05	2.21E-06	7.85E-04	2.90E-04	0.004	Res
582584.27_4130229.75	582584.27	4130229.75	1.93E-05	2.23E-06	7.94E-04	2.93E-04	0.004	Res
582640.84_4130229.75	582640.84	4130229.75	2.03E-05	2.34E-06	8.38E-04	3.08E-04	0.004	Res

Acute Calculation, $\sum C_{TAC}$ /REL

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)				Total HI	Receptor Type
	UTM X	UTM Y	Arsenic	Mercury	Nickel	Vanadium		
582697.41_4130229.75	582697.41	4130229.75	1.96E-05	2.27E-06	8.09E-04	2.98E-04	0.004	Res
582753.98_4130229.75	582753.98	4130229.75	1.75E-05	2.03E-06	7.17E-04	2.65E-04	0.004	Res
582810.55_4130229.75	582810.55	4130229.75	1.78E-05	2.06E-06	7.31E-04	2.70E-04	0.004	Res
582867.12_4130229.75	582867.12	4130229.75	1.90E-05	2.19E-06	7.84E-04	2.88E-04	0.004	Res
582018.57_4130313.66	582018.57	4130313.66	1.95E-05	2.34E-06	7.67E-04	2.97E-04	0.004	Res
582075.14_4130313.66	582075.14	4130313.66	2.20E-05	2.60E-06	8.77E-04	3.34E-04	0.005	Res
582131.71_4130313.66	582131.71	4130313.66	2.37E-05	2.79E-06	9.55E-04	3.60E-04	0.005	Res
582188.28_4130313.66	582188.28	4130313.66	2.25E-05	2.65E-06	9.04E-04	3.42E-04	0.005	Res
582244.85_4130313.66	582244.85	4130313.66	2.36E-05	2.76E-06	9.56E-04	3.59E-04	0.005	Res
582301.42_4130313.66	582301.42	4130313.66	2.41E-05	2.82E-06	9.83E-04	3.67E-04	0.005	Res
582357.99_4130313.66	582357.99	4130313.66	2.37E-05	2.76E-06	9.66E-04	3.60E-04	0.005	Res
582414.56_4130313.66	582414.56	4130313.66	2.17E-05	2.54E-06	8.84E-04	3.30E-04	0.005	Res
582471.13_4130313.66	582471.13	4130313.66	2.18E-05	2.54E-06	8.88E-04	3.31E-04	0.005	Res
582527.7_4130313.66	582527.7	4130313.66	2.32E-05	2.70E-06	9.55E-04	3.53E-04	0.005	Res
582584.27_4130313.66	582584.27	4130313.66	2.21E-05	2.57E-06	9.10E-04	3.36E-04	0.005	Res
582640.84_4130313.66	582640.84	4130313.66	1.97E-05	2.30E-06	8.09E-04	3.00E-04	0.004	Res
582697.41_4130313.66	582697.41	4130313.66	2.08E-05	2.41E-06	8.56E-04	3.16E-04	0.004	Res
582753.98_4130313.66	582753.98	4130313.66	2.14E-05	2.48E-06	8.86E-04	3.26E-04	0.005	Res
582810.55_4130313.66	582810.55	4130313.66	2.02E-05	2.33E-06	8.34E-04	3.06E-04	0.004	Res
582867.12_4130313.66	582867.12	4130313.66	1.78E-05	2.06E-06	7.32E-04	2.70E-04	0.004	Res
581848.86_4130397.57	581848.86	4130397.57	2.44E-05	2.91E-06	9.59E-04	3.70E-04	0.005	Res
581905.43_4130397.57	581905.43	4130397.57	2.31E-05	2.76E-06	9.09E-04	3.51E-04	0.005	Res
581962_4130397.57	581962	4130397.57	2.23E-05	2.66E-06	8.82E-04	3.39E-04	0.005	Res
582018.57_4130397.57	582018.57	4130397.57	2.44E-05	2.89E-06	9.77E-04	3.71E-04	0.005	Res
582075.14_4130397.57	582075.14	4130397.57	2.59E-05	3.05E-06	1.05E-03	3.94E-04	0.005	Res
582131.71_4130397.57	582131.71	4130397.57	2.60E-05	3.05E-06	1.06E-03	3.96E-04	0.005	Res
582188.28_4130397.57	582188.28	4130397.57	2.56E-05	3.00E-06	1.04E-03	3.89E-04	0.005	Res
582244.85_4130397.57	582244.85	4130397.57	2.66E-05	3.10E-06	1.09E-03	4.04E-04	0.006	Res
582301.42_4130397.57	582301.42	4130397.57	2.44E-05	2.84E-06	9.95E-04	3.70E-04	0.005	Res
582357.99_4130397.57	582357.99	4130397.57	2.39E-05	2.79E-06	9.77E-04	3.64E-04	0.005	Res
582414.56_4130397.57	582414.56	4130397.57	2.58E-05	3.00E-06	1.06E-03	3.93E-04	0.005	Res
582471.13_4130397.57	582471.13	4130397.57	2.50E-05	2.91E-06	1.03E-03	3.81E-04	0.005	Res
582527.7_4130397.57	582527.7	4130397.57	2.24E-05	2.61E-06	9.15E-04	3.40E-04	0.005	Res
582584.27_4130397.57	582584.27	4130397.57	2.45E-05	2.84E-06	1.01E-03	3.73E-04	0.005	Res
582640.84_4130397.57	582640.84	4130397.57	2.45E-05	2.84E-06	1.01E-03	3.72E-04	0.005	Res
582697.41_4130397.57	582697.41	4130397.57	2.21E-05	2.57E-06	9.09E-04	3.36E-04	0.005	Res
582753.98_4130397.57	582753.98	4130397.57	1.89E-05	2.20E-06	7.72E-04	2.87E-04	0.004	Res
582810.55_4130397.57	582810.55	4130397.57	1.61E-05	1.89E-06	6.53E-04	2.45E-04	0.003	Res
582867.12_4130397.57	582867.12	4130397.57	1.64E-05	1.92E-06	6.68E-04	2.50E-04	0.003	Res
581848.86_4130481.48	581848.86	4130481.48	2.53E-05	3.00E-06	1.01E-03	3.84E-04	0.005	Res
581905.43_4130481.48	581905.43	4130481.48	2.58E-05	3.05E-06	1.03E-03	3.92E-04	0.005	Res
581962_4130481.48	581962	4130481.48	2.68E-05	3.16E-06	1.08E-03	4.08E-04	0.006	Res
582018.57_4130481.48	582018.57	4130481.48	2.77E-05	3.25E-06	1.12E-03	4.21E-04	0.006	Res
582075.14_4130481.48	582075.14	4130481.48	2.90E-05	3.39E-06	1.18E-03	4.41E-04	0.006	Res
582131.71_4130481.48	582131.71	4130481.48	3.01E-05	3.51E-06	1.23E-03	4.58E-04	0.006	Res
582188.28_4130481.48	582188.28	4130481.48	2.84E-05	3.32E-06	1.16E-03	4.32E-04	0.006	Res
582244.85_4130481.48	582244.85	4130481.48	2.71E-05	3.16E-06	1.10E-03	4.12E-04	0.006	Res
582301.42_4130481.48	582301.42	4130481.48	2.89E-05	3.36E-06	1.19E-03	4.40E-04	0.006	Res
582357.99_4130481.48	582357.99	4130481.48	2.78E-05	3.23E-06	1.14E-03	4.22E-04	0.006	Res

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)				Acute Calculation, $\sum C_{TAC}$ /REL	
	UTM X	UTM Y	Arsenic	Mercury	Nickel	Vanadium	Total HI	Receptor Type
582414.56_4130481.48	582414.56	4130481.48	2.65E-05	3.08E-06	1.09E-03	4.02E-04	0.006	Res
582471.13_4130481.48	582471.13	4130481.48	2.89E-05	3.35E-06	1.19E-03	4.40E-04	0.006	Res
582527.7_4130481.48	582527.7	4130481.48	2.75E-05	3.18E-06	1.14E-03	4.18E-04	0.006	Res
582584.27_4130481.48	582584.27	4130481.48	2.42E-05	2.80E-06	9.95E-04	3.67E-04	0.005	Res
582640.84_4130481.48	582640.84	4130481.48	1.98E-05	2.30E-06	8.07E-04	3.00E-04	0.004	Res
582697.41_4130481.48	582697.41	4130481.48	1.90E-05	2.21E-06	7.75E-04	2.89E-04	0.004	Res
582753.98_4130481.48	582753.98	4130481.48	1.88E-05	2.19E-06	7.69E-04	2.86E-04	0.004	Res
582810.55_4130481.48	582810.55	4130481.48	1.78E-05	2.08E-06	7.27E-04	2.71E-04	0.004	Res
582867.12_4130481.48	582867.12	4130481.48	1.76E-05	2.06E-06	7.19E-04	2.68E-04	0.004	Res
581735.72_4130565.39	581735.72	4130565.39	2.33E-05	2.74E-06	9.42E-04	3.55E-04	0.005	Res
581792.29_4130565.39	581792.29	4130565.39	2.29E-05	2.70E-06	9.19E-04	3.48E-04	0.005	Res
581848.86_4130565.39	581848.86	4130565.39	2.56E-05	3.00E-06	1.03E-03	3.88E-04	0.005	Res
581905.43_4130565.39	581905.43	4130565.39	3.18E-05	3.70E-06	1.30E-03	4.83E-04	0.007	Res
581962_4130565.39	581962	4130565.39	3.17E-05	3.69E-06	1.30E-03	4.82E-04	0.007	Res
582018.57_4130565.39	582018.57	4130565.39	3.29E-05	3.82E-06	1.35E-03	4.99E-04	0.007	Res
582075.14_4130565.39	582075.14	4130565.39	3.34E-05	3.88E-06	1.37E-03	5.08E-04	0.007	Res
582131.71_4130565.39	582131.71	4130565.39	3.06E-05	3.56E-06	1.25E-03	4.65E-04	0.006	Res
582188.28_4130565.39	582188.28	4130565.39	3.31E-05	3.83E-06	1.36E-03	5.03E-04	0.007	Res
582244.85_4130565.39	582244.85	4130565.39	3.13E-05	3.63E-06	1.29E-03	4.76E-04	0.007	Res
582301.42_4130565.39	582301.42	4130565.39	3.21E-05	3.72E-06	1.33E-03	4.88E-04	0.007	Res
582357.99_4130565.39	582357.99	4130565.39	3.31E-05	3.83E-06	1.37E-03	5.04E-04	0.007	Res
582414.56_4130565.39	582414.56	4130565.39	3.04E-05	3.51E-06	1.26E-03	4.62E-04	0.006	Res
582471.13_4130565.39	582471.13	4130565.39	2.59E-05	3.01E-06	1.07E-03	3.94E-04	0.005	Res
582527.7_4130565.39	582527.7	4130565.39	2.28E-05	2.66E-06	9.32E-04	3.47E-04	0.005	Res
582584.27_4130565.39	582584.27	4130565.39	2.27E-05	2.65E-06	9.29E-04	3.45E-04	0.005	Res
582640.84_4130565.39	582640.84	4130565.39	2.12E-05	2.48E-06	8.67E-04	3.23E-04	0.004	Res
582697.41_4130565.39	582697.41	4130565.39	2.06E-05	2.41E-06	8.42E-04	3.14E-04	0.004	Res
582753.98_4130565.39	582753.98	4130565.39	1.91E-05	2.23E-06	7.77E-04	2.90E-04	0.004	Res
582810.55_4130565.39	582810.55	4130565.39	1.70E-05	1.99E-06	6.88E-04	2.58E-04	0.004	Res
582867.12_4130565.39	582867.12	4130565.39	1.46E-05	1.71E-06	5.85E-04	2.21E-04	0.003	Res
581735.72_4130649.3	581735.72	4130649.3	2.03E-05	2.38E-06	8.23E-04	3.09E-04	0.004	Res
581792.29_4130649.3	581792.29	4130649.3	2.01E-05	2.34E-06	8.24E-04	3.05E-04	0.004	Res
581905.43_4130649.3	581905.43	4130649.3	3.60E-05	4.13E-06	1.50E-03	5.47E-04	0.008	Res
581962_4130649.3	581962	4130649.3	3.83E-05	4.40E-06	1.60E-03	5.82E-04	0.008	Res
582018.57_4130649.3	582018.57	4130649.3	3.54E-05	4.07E-06	1.47E-03	5.38E-04	0.008	Res
582075.14_4130649.3	582075.14	4130649.3	3.82E-05	4.39E-06	1.59E-03	5.80E-04	0.008	Res
582131.71_4130649.3	582131.71	4130649.3	3.63E-05	4.18E-06	1.51E-03	5.51E-04	0.008	Res
582188.28_4130649.3	582188.28	4130649.3	3.89E-05	4.47E-06	1.62E-03	5.91E-04	0.008	Res
582244.85_4130649.3	582244.85	4130649.3	3.83E-05	4.41E-06	1.59E-03	5.82E-04	0.008	Res
582301.42_4130649.3	582301.42	4130649.3	3.36E-05	3.88E-06	1.39E-03	5.11E-04	0.007	Res
582357.99_4130649.3	582357.99	4130649.3	2.79E-05	3.24E-06	1.15E-03	4.25E-04	0.006	Res
582414.56_4130649.3	582414.56	4130649.3	2.80E-05	3.24E-06	1.15E-03	4.25E-04	0.006	Res
582471.13_4130649.3	582471.13	4130649.3	2.63E-05	3.05E-06	1.08E-03	4.00E-04	0.006	Res
582527.7_4130649.3	582527.7	4130649.3	2.49E-05	2.90E-06	1.02E-03	3.79E-04	0.005	Res
582584.27_4130649.3	582584.27	4130649.3	2.23E-05	2.60E-06	9.12E-04	3.39E-04	0.005	Res
582640.84_4130649.3	582640.84	4130649.3	1.90E-05	2.22E-06	7.70E-04	2.88E-04	0.004	Res
582697.41_4130649.3	582697.41	4130649.3	1.71E-05	2.01E-06	6.93E-04	2.60E-04	0.004	Res
582753.98_4130649.3	582753.98	4130649.3	1.81E-05	2.11E-06	7.33E-04	2.74E-04	0.004	Res
582810.55_4130649.3	582810.55	4130649.3	1.88E-05	2.19E-06	7.66E-04	2.86E-04	0.004	Res

Acute Calculation, $\sum C_{TAC}$ /REL

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)				Total HI	Receptor Type
	UTM X	UTM Y	Arsenic	Mercury	Nickel	Vanadium		
582867.12_4130649.3	582867.12	4130649.3	1.91E-05	2.23E-06	7.80E-04	2.90E-04	0.004	Res
581848.86_4130733.21	581848.86	4130733.21	4.44E-05	5.07E-06	1.87E-03	6.75E-04	0.010	Res
581905.43_4130733.21	581905.43	4130733.21	4.25E-05	4.84E-06	1.80E-03	6.46E-04	0.009	Res
581962_4130733.21	581962	4130733.21	4.47E-05	5.07E-06	1.90E-03	6.80E-04	0.010	Res
582018.57_4130733.21	582018.57	4130733.21	4.26E-05	4.84E-06	1.80E-03	6.47E-04	0.009	Res
582075.14_4130733.21	582075.14	4130733.21	4.74E-05	5.39E-06	2.01E-03	7.21E-04	0.010	Res
582131.71_4130733.21	582131.71	4130733.21	4.28E-05	4.87E-06	1.80E-03	6.50E-04	0.009	Res
582188.28_4130733.21	582188.28	4130733.21	3.76E-05	4.30E-06	1.58E-03	5.72E-04	0.008	Res
582244.85_4130733.21	582244.85	4130733.21	3.52E-05	4.04E-06	1.47E-03	5.35E-04	0.008	Res
582301.42_4130733.21	582301.42	4130733.21	3.36E-05	3.86E-06	1.40E-03	5.11E-04	0.007	Res
582357.99_4130733.21	582357.99	4130733.21	3.11E-05	3.59E-06	1.29E-03	4.73E-04	0.007	Res
582414.56_4130733.21	582414.56	4130733.21	2.65E-05	3.07E-06	1.09E-03	4.03E-04	0.006	Res
582471.13_4130733.21	582471.13	4130733.21	2.23E-05	2.60E-06	9.10E-04	3.39E-04	0.005	Res
582527.7_4130733.21	582527.7	4130733.21	2.36E-05	2.74E-06	9.66E-04	3.58E-04	0.005	Res
582584.27_4130733.21	582584.27	4130733.21	2.42E-05	2.81E-06	9.97E-04	3.69E-04	0.005	Res
582640.84_4130733.21	582640.84	4130733.21	2.42E-05	2.81E-06	9.98E-04	3.68E-04	0.005	Res
582697.41_4130733.21	582697.41	4130733.21	2.37E-05	2.74E-06	9.75E-04	3.60E-04	0.005	Res
582753.98_4130733.21	582753.98	4130733.21	2.25E-05	2.61E-06	9.27E-04	3.42E-04	0.005	Res
582810.55_4130733.21	582810.55	4130733.21	2.12E-05	2.46E-06	8.70E-04	3.22E-04	0.004	Res
582867.12_4130733.21	582867.12	4130733.21	1.96E-05	2.28E-06	8.01E-04	2.97E-04	0.004	Res
581735.72_4130817.12	581735.72	4130817.12	4.46E-05	5.13E-06	1.86E-03	6.78E-04	0.010	Res
581792.29_4130817.12	581792.29	4130817.12	5.51E-05	6.30E-06	2.32E-03	8.38E-04	0.012	Res
581848.86_4130817.12	581848.86	4130817.12	5.93E-05	6.76E-06	2.50E-03	9.02E-04	0.013	Res
581905.43_4130817.12	581905.43	4130817.12	5.86E-05	6.67E-06	2.48E-03	8.91E-04	0.013	Res
581962_4130817.12	581962	4130817.12	5.82E-05	6.61E-06	2.47E-03	8.85E-04	0.013	Res
582018.57_4130817.12	582018.57	4130817.12	5.07E-05	5.75E-06	2.15E-03	7.71E-04	0.011	Res
582075.14_4130817.12	582075.14	4130817.12	4.74E-05	5.37E-06	2.02E-03	7.21E-04	0.010	Res
582131.71_4130817.12	582131.71	4130817.12	4.54E-05	5.13E-06	1.93E-03	6.90E-04	0.010	Res
582188.28_4130817.12	582188.28	4130817.12	4.00E-05	4.54E-06	1.70E-03	6.08E-04	0.009	Res
582244.85_4130817.12	582244.85	4130817.12	3.17E-05	3.62E-06	1.34E-03	4.82E-04	0.007	Res
582301.42_4130817.12	582301.42	4130817.12	3.40E-05	3.88E-06	1.43E-03	5.17E-04	0.007	Res
582357.99_4130817.12	582357.99	4130817.12	3.44E-05	3.93E-06	1.45E-03	5.23E-04	0.007	Res
582414.56_4130817.12	582414.56	4130817.12	3.30E-05	3.77E-06	1.38E-03	5.01E-04	0.007	Res
582471.13_4130817.12	582471.13	4130817.12	3.06E-05	3.52E-06	1.28E-03	4.66E-04	0.007	Res
582527.7_4130817.12	582527.7	4130817.12	2.74E-05	3.15E-06	1.14E-03	4.16E-04	0.006	Res
582584.27_4130817.12	582584.27	4130817.12	2.63E-05	3.03E-06	1.09E-03	3.99E-04	0.006	Res
582640.84_4130817.12	582640.84	4130817.12	2.58E-05	2.97E-06	1.07E-03	3.91E-04	0.005	Res
582697.41_4130817.12	582697.41	4130817.12	2.49E-05	2.88E-06	1.03E-03	3.78E-04	0.005	Res
582753.98_4130817.12	582753.98	4130817.12	2.36E-05	2.73E-06	9.75E-04	3.59E-04	0.005	Res
582810.55_4130817.12	582810.55	4130817.12	2.25E-05	2.61E-06	9.26E-04	3.42E-04	0.005	Res
582867.12_4130817.12	582867.12	4130817.12	2.19E-05	2.54E-06	9.04E-04	3.34E-04	0.005	Res
581735.72_4130901.03	581735.72	4130901.03	8.08E-05	9.17E-06	3.43E-03	1.23E-03	0.018	Res
581792.29_4130901.03	581792.29	4130901.03	9.15E-05	1.04E-05	3.89E-03	1.39E-03	0.020	Res
581848.86_4130901.03	581848.86	4130901.03	7.90E-05	8.97E-06	3.35E-03	1.20E-03	0.017	Res
581905.43_4130901.03	581905.43	4130901.03	7.17E-05	8.15E-06	3.04E-03	1.09E-03	0.016	Res
581962_4130901.03	581962	4130901.03	7.00E-05	7.94E-06	2.97E-03	1.06E-03	0.015	Res
582018.57_4130901.03	582018.57	4130901.03	5.92E-05	6.73E-06	2.51E-03	9.00E-04	0.013	Res
582075.14_4130901.03	582075.14	4130901.03	6.13E-05	6.96E-06	2.61E-03	9.32E-04	0.013	Res
582131.71_4130901.03	582131.71	4130901.03	5.79E-05	6.55E-06	2.46E-03	8.79E-04	0.013	Res

Acute Calculation, $\sum C_{TAC}$ /REL

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)				Total HI	Receptor Type
	UTM X	UTM Y	Arsenic	Mercury	Nickel	Vanadium		
582188.28_4130901.03	582188.28	4130901.03	5.01E-05	5.67E-06	2.13E-03	7.62E-04	0.011	Res
582244.85_4130901.03	582244.85	4130901.03	4.42E-05	5.01E-06	1.88E-03	6.72E-04	0.010	Res
582301.42_4130901.03	582301.42	4130901.03	4.07E-05	4.61E-06	1.74E-03	6.19E-04	0.009	Res
582357.99_4130901.03	582357.99	4130901.03	3.70E-05	4.20E-06	1.58E-03	5.63E-04	0.008	Res
582414.56_4130901.03	582414.56	4130901.03	3.40E-05	3.86E-06	1.44E-03	5.17E-04	0.007	Res
582471.13_4130901.03	582471.13	4130901.03	3.18E-05	3.62E-06	1.34E-03	4.83E-04	0.007	Res
582527.7_4130901.03	582527.7	4130901.03	2.94E-05	3.36E-06	1.24E-03	4.47E-04	0.006	Res
582584.27_4130901.03	582584.27	4130901.03	2.73E-05	3.13E-06	1.15E-03	4.16E-04	0.006	Res
582640.84_4130901.03	582640.84	4130901.03	2.53E-05	2.91E-06	1.06E-03	3.85E-04	0.005	Res
582697.41_4130901.03	582697.41	4130901.03	2.34E-05	2.69E-06	9.72E-04	3.55E-04	0.005	Res
582753.98_4130901.03	582753.98	4130901.03	2.17E-05	2.51E-06	8.99E-04	3.30E-04	0.005	Res
582810.55_4130901.03	582810.55	4130901.03	2.11E-05	2.44E-06	8.69E-04	3.20E-04	0.004	Res
582867.12_4130901.03	582867.12	4130901.03	2.05E-05	2.37E-06	8.44E-04	3.11E-04	0.004	Res
581735.72_4130984.94	581735.72	4130984.94	1.65E-04	1.86E-05	7.08E-03	2.51E-03	0.036	Res
581792.29_4130984.94	581792.29	4130984.94	1.73E-04	1.95E-05	7.43E-03	2.63E-03	0.038	Res
581848.86_4130984.94	581848.86	4130984.94	1.78E-04	2.01E-05	7.64E-03	2.71E-03	0.039	Res
581905.43_4130984.94	581905.43	4130984.94	1.61E-04	1.82E-05	6.91E-03	2.45E-03	0.035	Res
581962_4130984.94	581962	4130984.94	1.15E-04	1.29E-05	4.89E-03	1.74E-03	0.025	Res
582018.57_4130984.94	582018.57	4130984.94	8.38E-05	9.48E-06	3.56E-03	1.27E-03	0.018	Res
582075.14_4130984.94	582075.14	4130984.94	6.53E-05	7.41E-06	2.77E-03	9.92E-04	0.014	Res
582131.71_4130984.94	582131.71	4130984.94	5.43E-05	6.18E-06	2.30E-03	8.26E-04	0.012	Res
582188.28_4130984.94	582188.28	4130984.94	4.83E-05	5.49E-06	2.04E-03	7.33E-04	0.010	Res
582244.85_4130984.94	582244.85	4130984.94	4.33E-05	4.93E-06	1.83E-03	6.59E-04	0.009	Res
582301.42_4130984.94	582301.42	4130984.94	3.94E-05	4.47E-06	1.67E-03	5.98E-04	0.009	Res
582357.99_4130984.94	582357.99	4130984.94	3.61E-05	4.10E-06	1.53E-03	5.49E-04	0.008	Res
582414.56_4130984.94	582414.56	4130984.94	3.33E-05	3.77E-06	1.41E-03	5.06E-04	0.007	Res
582471.13_4130984.94	582471.13	4130984.94	3.09E-05	3.50E-06	1.31E-03	4.70E-04	0.007	Res
582527.7_4130984.94	582527.7	4130984.94	2.90E-05	3.29E-06	1.23E-03	4.40E-04	0.006	Res
582584.27_4130984.94	582584.27	4130984.94	2.75E-05	3.13E-06	1.17E-03	4.19E-04	0.006	Res
582640.84_4130984.94	582640.84	4130984.94	2.65E-05	3.02E-06	1.12E-03	4.02E-04	0.006	Res
582697.41_4130984.94	582697.41	4130984.94	2.53E-05	2.89E-06	1.06E-03	3.85E-04	0.005	Res
582753.98_4130984.94	582753.98	4130984.94	2.45E-05	2.80E-06	1.03E-03	3.72E-04	0.005	Res
582810.55_4130984.94	582810.55	4130984.94	2.36E-05	2.70E-06	9.87E-04	3.59E-04	0.005	Res
582867.12_4130984.94	582867.12	4130984.94	2.27E-05	2.61E-06	9.49E-04	3.46E-04	0.005	Res
581735.72_4131068.85	581735.72	4131068.85	6.00E-05	6.81E-06	2.54E-03	9.11E-04	0.013	Res
581792.29_4131068.85	581792.29	4131068.85	6.08E-05	6.88E-06	2.58E-03	9.24E-04	0.013	Res
581848.86_4131068.85	581848.86	4131068.85	6.59E-05	7.47E-06	2.80E-03	1.00E-03	0.014	Res
581905.43_4131068.85	581905.43	4131068.85	6.50E-05	7.37E-06	2.76E-03	9.88E-04	0.014	Res
581962_4131068.85	581962	4131068.85	6.71E-05	7.61E-06	2.85E-03	1.02E-03	0.015	Res
582018.57_4131068.85	582018.57	4131068.85	5.87E-05	6.68E-06	2.49E-03	8.93E-04	0.013	Res
582075.14_4131068.85	582075.14	4131068.85	5.05E-05	5.76E-06	2.13E-03	7.68E-04	0.011	Res
582131.71_4131068.85	582131.71	4131068.85	4.56E-05	5.21E-06	1.92E-03	6.94E-04	0.010	Res
582188.28_4131068.85	582188.28	4131068.85	4.25E-05	4.86E-06	1.79E-03	6.47E-04	0.009	Res
582244.85_4131068.85	582244.85	4131068.85	4.01E-05	4.58E-06	1.69E-03	6.09E-04	0.009	Res
582301.42_4131068.85	582301.42	4131068.85	3.78E-05	4.31E-06	1.59E-03	5.74E-04	0.008	Res
582357.99_4131068.85	582357.99	4131068.85	3.54E-05	4.04E-06	1.49E-03	5.38E-04	0.008	Res
582414.56_4131068.85	582414.56	4131068.85	3.33E-05	3.79E-06	1.41E-03	5.06E-04	0.007	Res
582471.13_4131068.85	582471.13	4131068.85	3.12E-05	3.55E-06	1.32E-03	4.75E-04	0.007	Res
582527.7_4131068.85	582527.7	4131068.85	2.93E-05	3.32E-06	1.24E-03	4.45E-04	0.006	Res

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)				Acute Calculation, $\sum C_{TAC}$ /REL	
	UTM X	UTM Y	Arsenic	Mercury	Nickel	Vanadium	Total HI	Receptor Type
582584.27_4131068.85	582584.27	4131068.85	2.73E-05	3.10E-06	1.16E-03	4.15E-04	0.006	Res
582640.84_4131068.85	582640.84	4131068.85	2.62E-05	2.97E-06	1.12E-03	3.99E-04	0.006	Res
582697.41_4131068.85	582697.41	4131068.85	2.52E-05	2.85E-06	1.07E-03	3.83E-04	0.005	Res
582753.98_4131068.85	582753.98	4131068.85	2.45E-05	2.78E-06	1.04E-03	3.72E-04	0.005	Res
582810.55_4131068.85	582810.55	4131068.85	2.38E-05	2.71E-06	1.01E-03	3.62E-04	0.005	Res
582867.12_4131068.85	582867.12	4131068.85	2.27E-05	2.59E-06	9.55E-04	3.45E-04	0.005	Res
582018.57_4131152.76	582018.57	4131152.76	4.00E-05	4.56E-06	1.68E-03	6.08E-04	0.009	Res
582244.85_4131152.76	582244.85	4131152.76	3.46E-05	3.97E-06	1.45E-03	5.26E-04	0.007	Res
582301.42_4131152.76	582301.42	4131152.76	3.30E-05	3.78E-06	1.38E-03	5.01E-04	0.007	Res
582357.99_4131152.76	582357.99	4131152.76	3.07E-05	3.52E-06	1.29E-03	4.67E-04	0.007	Res
582414.56_4131152.76	582414.56	4131152.76	2.85E-05	3.27E-06	1.19E-03	4.33E-04	0.006	Res
582471.13_4131152.76	582471.13	4131152.76	2.56E-05	2.93E-06	1.07E-03	3.88E-04	0.005	Res
582527.7_4131152.76	582527.7	4131152.76	2.31E-05	2.65E-06	9.67E-04	3.51E-04	0.005	Res
582584.27_4131152.76	582584.27	4131152.76	2.14E-05	2.45E-06	8.96E-04	3.25E-04	0.005	Res
582640.84_4131152.76	582640.84	4131152.76	2.08E-05	2.38E-06	8.74E-04	3.16E-04	0.004	Res
582697.41_4131152.76	582697.41	4131152.76	2.02E-05	2.30E-06	8.52E-04	3.07E-04	0.004	Res
582753.98_4131152.76	582753.98	4131152.76	2.00E-05	2.28E-06	8.46E-04	3.04E-04	0.004	Res
582810.55_4131152.76	582810.55	4131152.76	1.96E-05	2.23E-06	8.33E-04	2.98E-04	0.004	Res
582867.12_4131152.76	582867.12	4131152.76	1.89E-05	2.15E-06	8.01E-04	2.87E-04	0.004	Res

HRA Permanente Creek Restoration Project

Construction Year 2026

Emissions Inputs

Construction Activity	Construction Year & Source	DPM Exhaust (tons/year)	PM10 Dust for speciation (tons/year)	Arsenic (tons/year)	Beryllium (tons/year)	Cadmium (tons/year)	Cobalt (tons/year)	Copper (tons/year)	Lead (tons/year)	Mercury (tons/year)	Nickel (tons/year)	Selenium (tons/year)	Chromium VI (tons/year)	Crystalline Silica (tons/year)	Vanadium (tons/year)
Concrete Channel 2024	2024_CONCRTE	0.000	0.00	2.91E-12	1.74E-12	2.91E-12	1.49E-11	3.26E-11	2.91E-12	4.65E-13	5.35E-11	5.81E-12	2.33E-13	8.63E-09	4.42E-11
Paved road	2024_PAVED	2.07E-04	0.08	1.04E-07	6.26E-08	1.04E-07	6.68E-08	2.09E-06	1.92E-07	1.17E-08	4.51E-06	2.09E-07	1.59E-07	5.93E-04	1.59E-06
Unpaved road	2024_CCP_UNPV	6.27E-05	0.20	2.56E-07	1.54E-07	2.56E-07	1.64E-07	5.12E-06	4.71E-07	2.87E-08	1.11E-05	5.12E-07	3.89E-07	1.46E-03	3.89E-06
Channel Widening 2024	2024_CHAN_RCK	0.002	0.16	2.05E-07	1.23E-07	2.05E-07	1.05E-06	2.29E-06	2.05E-07	3.28E-08	3.77E-06	4.09E-07	1.64E-08	6.08E-04	3.11E-06
Paved road	2024_PAVED	1.80E-03	2.39	2.99E-06	1.79E-06	2.99E-06	1.91E-06	5.98E-05	5.50E-06	3.35E-07	1.29E-04	5.98E-06	4.54E-06	1.70E-02	4.54E-05
Rock Pile Area 2025	2025_CHAN_RCK	0.006	0.25	3.16E-07	1.89E-07	3.16E-07	1.62E-06	3.54E-06	3.16E-07	5.05E-08	5.81E-06	6.31E-07	2.53E-08	9.37E-04	4.80E-06
Paved road	2025_PAVED	5.95E-03	2.44	3.05E-06	1.83E-06	3.05E-06	1.95E-06	6.10E-05	5.61E-06	3.41E-07	1.32E-04	6.10E-06	4.63E-06	1.73E-02	4.63E-05
Rock Pile Area 2026	2026_CHAN_RCK	0.006	0.25	3.16E-07	1.89E-07	3.16E-07	1.62E-06	3.54E-06	3.16E-07	5.05E-08	5.81E-06	6.31E-07	2.53E-08	9.37E-04	4.80E-06
Paved road	2026_PAVED	5.84E-03	2.44	3.05E-06	1.83E-06	3.05E-06	1.95E-06	6.10E-05	5.61E-06	3.41E-07	1.32E-04	6.10E-06	4.63E-06	1.73E-02	4.63E-05
Channel Widening 2027	2027_CHAN_RCK	0.002	0.98	1.23E-06	7.36E-07	1.23E-06	6.28E-06	1.37E-05	1.23E-06	1.96E-07	2.26E-05	2.45E-06	9.82E-08	3.64E-03	1.87E-05
Paved road	2027_PAVED	5.61E-03	2.39	2.99E-06	1.79E-06	2.99E-06	1.91E-06	5.98E-05	5.50E-06	3.35E-07	1.29E-04	5.98E-06	4.54E-06	1.70E-02	4.54E-05
Material Removal 2028	2028_MATRMVL	0.001	0.25	3.15E-07	1.89E-07	3.15E-07	1.62E-06	3.53E-06	3.15E-07	5.05E-08	5.80E-06	6.31E-07	2.52E-08	9.37E-04	4.80E-06
Paved road	2028_PAVED	5.57E-03	2.39	2.99E-06	1.80E-06	2.99E-06	1.92E-06	5.98E-05	5.51E-06	3.35E-07	1.29E-04	5.98E-06	4.55E-06	1.70E-02	4.55E-05
Unpaved road	2028_UNPAVED	3.40E-03	11.84	1.48E-05	8.88E-06	1.48E-05	9.47E-06	2.96E-04	2.72E-05	1.66E-06	6.40E-04	2.96E-05	2.25E-05	8.41E-02	2.25E-04
Material Removal 2029	2029_MATRMVL	0.001	0.25	3.15E-07	1.89E-07	3.15E-07	1.62E-06	3.53E-06	3.15E-07	5.05E-08	5.80E-06	6.31E-07	2.52E-08	9.37E-04	4.80E-06
Paved road	2029_PAVED	5.56E-03	2.41	3.01E-06	1.81E-06	3.01E-06	1.93E-06	6.03E-05	5.55E-06	3.38E-07	1.30E-04	6.03E-06	4.58E-06	1.71E-02	4.58E-05
Unpaved road	2029_UNPAVED	3.39E-03	11.93	1.49E-05	8.95E-06	1.49E-05	9.55E-06	2.98E-04	2.74E-05	1.67E-06	6.44E-04	2.98E-05	2.27E-05	8.47E-02	2.27E-04

Construction Activity	Construction Year	DPM (g/s)	Arsenic (g/s)	Beryllium (g/s)	Cadmium (g/s)	Cobalt (g/s)	Copper (g/s)	Lead (g/s)	Mercury (g/s)	Nickel (g/s)	Selenium (g/s)	Chromium VI (g/s)	Crystalline Silica (g/s)	Vanadium (g/s)	No. of Workdays (days)
Concrete Channel 2024	2024_CONCRTE	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	130.00
Paved road	2024_PAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	130.00
Unpaved road	2024_CCP_UNPV	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	130.00
Channel Widening 2024	2024_CHAN_RCK	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	130.00
Paved road	2024_PAVED	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	130.00
Rock Pile Area 2025	2025_CHAN_RCK	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	130.00
Paved road	2025_PAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	130.00
Rock Pile Area 2026	2026_CHAN_RCK	4.767E-04	2.55E-08	1.53E-08	2.55E-08	1.31E-07	2.86E-07	2.55E-08	4.08E-09	4.69E-07	5.10E-08	2.04E-09	7.57E-05	3.87E-07	130.00
Paved road	2026_PAVED	4.720E-04	2.46E-07	1.48E-07	2.46E-07	1.58E-07	4.92E-06	4.53E-07	2.76E-08	1.06E-05	4.92E-07	3.74E-07	1.40E-03	3.74E-06	130.00
Channel Widening 2027	2027_CHAN_RCK	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	130.00
Paved road	2027_PAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	130.00
Material Removal 2028	2028_MATRMVL	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	130.00
Paved road	2028_PAVED	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	130.00
Unpaved road	2028_UNPAVED	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	130.00
Material Removal 2029	2029_MATRMVL	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	130.00
Paved road	2029_PAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	130.00
Unpaved road	2029_UNPAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	130.00

N/A = not including PM10 on-site dust in HRA calculation; it is only for speciating metals.

Acute REL

TAC	UOM	
Arsenic	µg/m^3	0.2
Mercury	µg/m^3	0.61
Nickel	µg/m^3	0.2
Vanadium	µg/m^3	31

	Max
CT House	0.016
Res	0.039
Acute	0.013

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} (µg/m^3)				Acute Calculation, $\sum C_{TAC}$ /REL	
	UTM X	UTM Y	Arsenic	Mercury	Nickel	Vanadium	Total HI	Receptor Type
			0.2	0.61	0.2	31		
581336.22_4131207.48	581336.22	4131207.48	7.36E-05	8.33E-06	3.13E-03	1.12E-03	0.016	CT House
581554.22_4130688.06	581554.22	4130688.06	2.02E-05	2.48E-06	7.63E-04	3.08E-04	0.004	Res
579793.36_4131503.29	579793.36	4131503.29	2.44E-06	3.00E-07	9.17E-05	3.71E-05	0.000	Acute
580488.37_4131517.71	580488.37	4131517.71	6.73E-06	8.14E-07	2.59E-04	1.02E-04	0.001	Acute
581678.43_4131040.03	581678.43	4131040.03	9.18E-05	1.04E-05	3.91E-03	1.40E-03	0.020	Res
581635.43_4130978.54	581635.43	4130978.54	1.19E-04	1.34E-05	5.08E-03	1.81E-03	0.026	Res
581830.06_4131027.55	581830.06	4131027.55	1.27E-04	1.43E-05	5.42E-03	1.92E-03	0.028	Res
581727.48_4130976.54	581727.48	4130976.54	1.41E-04	1.59E-05	6.06E-03	2.15E-03	0.031	Res
581789.11_4130419.65	581789.11	4130419.65	2.60E-05	3.11E-06	1.02E-03	3.95E-04	0.005	Res
581700.32_4130781.89	581700.32	4130781.89	3.85E-05	4.45E-06	1.59E-03	5.85E-04	0.008	Res
581426.07_4131299.01	581426.07	4131299.01	6.13E-05	6.95E-06	2.60E-03	9.32E-04	0.013	Acute
582301.42_4129474.56	582301.42	4129474.56	1.24E-05	1.51E-06	4.71E-04	1.88E-04	0.002	Res
582357.99_4129474.56	582357.99	4129474.56	1.21E-05	1.48E-06	4.62E-04	1.84E-04	0.002	Res
582414.56_4129474.56	582414.56	4129474.56	1.30E-05	1.57E-06	5.03E-04	1.98E-04	0.003	Res
582471.13_4129474.56	582471.13	4129474.56	1.30E-05	1.56E-06	5.05E-04	1.97E-04	0.003	Res
582527.7_4129474.56	582527.7	4129474.56	1.30E-05	1.56E-06	5.10E-04	1.98E-04	0.003	Res
582584.27_4129474.56	582584.27	4129474.56	1.25E-05	1.49E-06	4.90E-04	1.90E-04	0.003	Res
582640.84_4129474.56	582640.84	4129474.56	1.25E-05	1.49E-06	4.93E-04	1.90E-04	0.003	Res
582244.85_4129558.47	582244.85	4129558.47	1.65E-05	1.99E-06	6.43E-04	2.51E-04	0.003	Res
582301.42_4129558.47	582301.42	4129558.47	1.60E-05	1.92E-06	6.27E-04	2.43E-04	0.003	Res
582357.99_4129558.47	582357.99	4129558.47	1.55E-05	1.85E-06	6.08E-04	2.35E-04	0.003	Res
582414.56_4129558.47	582414.56	4129558.47	1.51E-05	1.81E-06	5.94E-04	2.30E-04	0.003	Res
582471.13_4129558.47	582471.13	4129558.47	1.44E-05	1.72E-06	5.64E-04	2.18E-04	0.003	Res
582527.7_4129558.47	582527.7	4129558.47	1.37E-05	1.64E-06	5.37E-04	2.08E-04	0.003	Res
582584.27_4129558.47	582584.27	4129558.47	1.30E-05	1.56E-06	5.07E-04	1.97E-04	0.003	Res
582640.84_4129558.47	582640.84	4129558.47	1.23E-05	1.48E-06	4.79E-04	1.87E-04	0.002	Res
582697.41_4129558.47	582697.41	4129558.47	1.18E-05	1.42E-06	4.60E-04	1.79E-04	0.002	Res
582244.85_4129642.38	582244.85	4129642.38	1.92E-05	2.32E-06	7.44E-04	2.92E-04	0.004	Res
582301.42_4129642.38	582301.42	4129642.38	1.67E-05	2.02E-06	6.51E-04	2.54E-04	0.003	Res
582357.99_4129642.38	582357.99	4129642.38	1.45E-05	1.75E-06	5.64E-04	2.21E-04	0.003	Res
582414.56_4129642.38	582414.56	4129642.38	1.42E-05	1.71E-06	5.53E-04	2.16E-04	0.003	Res
582471.13_4129642.38	582471.13	4129642.38	1.40E-05	1.68E-06	5.45E-04	2.12E-04	0.003	Res
582527.7_4129642.38	582527.7	4129642.38	1.38E-05	1.66E-06	5.42E-04	2.10E-04	0.003	Res
582584.27_4129642.38	582584.27	4129642.38	1.33E-05	1.59E-06	5.18E-04	2.01E-04	0.003	Res
582640.84_4129642.38	582640.84	4129642.38	1.31E-05	1.57E-06	5.16E-04	2.00E-04	0.003	Res
582697.41_4129642.38	582697.41	4129642.38	1.35E-05	1.61E-06	5.32E-04	2.05E-04	0.003	Res
582753.98_4129642.38	582753.98	4129642.38	1.32E-05	1.58E-06	5.24E-04	2.01E-04	0.003	Res
582810.55_4129642.38	582810.55	4129642.38	1.27E-05	1.51E-06	5.02E-04	1.93E-04	0.003	Res
582867.12_4129642.38	582867.12	4129642.38	1.33E-05	1.58E-06	5.29E-04	2.02E-04	0.003	Res
582244.85_4129726.29	582244.85	4129726.29	1.93E-05	2.32E-06	7.50E-04	2.93E-04	0.004	Res

Acute Calculation, $\sum C_{TAC}$ /REL

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)				Total HI	Receptor Type
	UTM X	UTM Y	Arsenic	Mercury	Nickel	Vanadium		
582301.42_4129726.29	582301.42	4129726.29	1.87E-05	2.23E-06	7.32E-04	2.84E-04	0.004	Res
582357.99_4129726.29	582357.99	4129726.29	1.70E-05	2.02E-06	6.71E-04	2.58E-04	0.003	Res
582414.56_4129726.29	582414.56	4129726.29	1.59E-05	1.89E-06	6.29E-04	2.42E-04	0.003	Res
582471.13_4129726.29	582471.13	4129726.29	1.50E-05	1.79E-06	5.95E-04	2.29E-04	0.003	Res
582527.7_4129726.29	582527.7	4129726.29	1.43E-05	1.70E-06	5.64E-04	2.17E-04	0.003	Res
582584.27_4129726.29	582584.27	4129726.29	1.45E-05	1.72E-06	5.77E-04	2.20E-04	0.003	Res
582640.84_4129726.29	582640.84	4129726.29	1.50E-05	1.77E-06	6.02E-04	2.28E-04	0.003	Res
582697.41_4129726.29	582697.41	4129726.29	1.43E-05	1.69E-06	5.73E-04	2.17E-04	0.003	Res
582753.98_4129726.29	582753.98	4129726.29	1.36E-05	1.60E-06	5.43E-04	2.06E-04	0.003	Res
582810.55_4129726.29	582810.55	4129726.29	1.37E-05	1.62E-06	5.51E-04	2.09E-04	0.003	Res
582244.85_4129810.2	582244.85	4129810.2	2.03E-05	2.42E-06	8.00E-04	3.08E-04	0.004	Res
582301.42_4129810.2	582301.42	4129810.2	1.89E-05	2.25E-06	7.49E-04	2.88E-04	0.004	Res
582357.99_4129810.2	582357.99	4129810.2	1.76E-05	2.09E-06	6.97E-04	2.67E-04	0.004	Res
582414.56_4129810.2	582414.56	4129810.2	1.62E-05	1.92E-06	6.44E-04	2.46E-04	0.003	Res
582471.13_4129810.2	582471.13	4129810.2	1.51E-05	1.79E-06	5.98E-04	2.29E-04	0.003	Res
582527.7_4129810.2	582527.7	4129810.2	1.56E-05	1.84E-06	6.23E-04	2.37E-04	0.003	Res
582584.27_4129810.2	582584.27	4129810.2	1.57E-05	1.85E-06	6.28E-04	2.38E-04	0.003	Res
582640.84_4129810.2	582640.84	4129810.2	1.49E-05	1.76E-06	5.99E-04	2.27E-04	0.003	Res
582697.41_4129810.2	582697.41	4129810.2	1.49E-05	1.75E-06	5.97E-04	2.26E-04	0.003	Res
581905.43_4129894.11	581905.43	4129894.11	1.32E-05	1.58E-06	5.20E-04	2.01E-04	0.003	Res
581962_4129894.11	581962	4129894.11	1.79E-05	2.24E-06	6.52E-04	2.72E-04	0.003	Res
582131.71_4129894.11	582131.71	4129894.11	1.87E-05	2.27E-06	7.13E-04	2.84E-04	0.004	Res
582188.28_4129894.11	582188.28	4129894.11	1.82E-05	2.21E-06	7.00E-04	2.77E-04	0.004	Res
582244.85_4129894.11	582244.85	4129894.11	1.66E-05	2.01E-06	6.39E-04	2.52E-04	0.003	Res
582301.42_4129894.11	582301.42	4129894.11	1.60E-05	1.93E-06	6.20E-04	2.43E-04	0.003	Res
582357.99_4129894.11	582357.99	4129894.11	1.54E-05	1.86E-06	5.99E-04	2.34E-04	0.003	Res
582414.56_4129894.11	582414.56	4129894.11	1.58E-05	1.89E-06	6.22E-04	2.40E-04	0.003	Res
582471.13_4129894.11	582471.13	4129894.11	1.68E-05	2.00E-06	6.69E-04	2.56E-04	0.003	Res
582527.7_4129894.11	582527.7	4129894.11	1.66E-05	1.97E-06	6.61E-04	2.52E-04	0.003	Res
582584.27_4129894.11	582584.27	4129894.11	1.56E-05	1.85E-06	6.21E-04	2.38E-04	0.003	Res
582640.84_4129894.11	582640.84	4129894.11	1.62E-05	1.91E-06	6.46E-04	2.46E-04	0.003	Res
582697.41_4129894.11	582697.41	4129894.11	1.56E-05	1.85E-06	6.24E-04	2.37E-04	0.003	Res
581962_4129978.02	581962	4129978.02	2.04E-05	2.57E-06	7.27E-04	3.09E-04	0.004	Res
582018.57_4129978.02	582018.57	4129978.02	2.09E-05	2.65E-06	7.43E-04	3.18E-04	0.004	Res
582075.14_4129978.02	582075.14	4129978.02	2.21E-05	2.67E-06	8.52E-04	3.35E-04	0.004	Res
582131.71_4129978.02	582131.71	4129978.02	1.97E-05	2.38E-06	7.62E-04	3.00E-04	0.004	Res
582188.28_4129978.02	582188.28	4129978.02	1.84E-05	2.22E-06	7.19E-04	2.80E-04	0.004	Res
582244.85_4129978.02	582244.85	4129978.02	1.77E-05	2.13E-06	6.91E-04	2.69E-04	0.004	Res
582301.42_4129978.02	582301.42	4129978.02	1.64E-05	1.97E-06	6.41E-04	2.49E-04	0.003	Res
582357.99_4129978.02	582357.99	4129978.02	1.69E-05	2.02E-06	6.68E-04	2.57E-04	0.003	Res
582414.56_4129978.02	582414.56	4129978.02	1.81E-05	2.15E-06	7.22E-04	2.76E-04	0.004	Res
582471.13_4129978.02	582471.13	4129978.02	1.74E-05	2.06E-06	6.93E-04	2.65E-04	0.004	Res
582527.7_4129978.02	582527.7	4129978.02	1.70E-05	2.01E-06	6.76E-04	2.58E-04	0.003	Res
582584.27_4129978.02	582584.27	4129978.02	1.72E-05	2.03E-06	6.89E-04	2.62E-04	0.004	Res
582640.84_4129978.02	582640.84	4129978.02	1.67E-05	1.97E-06	6.69E-04	2.54E-04	0.003	Res
582697.41_4129978.02	582697.41	4129978.02	1.73E-05	2.04E-06	6.98E-04	2.64E-04	0.004	Res
582753.98_4129978.02	582753.98	4129978.02	1.62E-05	1.91E-06	6.49E-04	2.46E-04	0.003	Res

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)				Acute Calculation, $\sum C_{TAC}$ /REL	
	UTM X	UTM Y	Arsenic	Mercury	Nickel	Vanadium	Total HI	Receptor Type
582810.55_4129978.02	582810.55	4129978.02	1.37E-05	1.62E-06	5.42E-04	2.08E-04	0.003	Res
581905.43_4130061.93	581905.43	4130061.93	2.57E-05	3.07E-06	1.01E-03	3.90E-04	0.005	Res
581962_4130061.93	581962	4130061.93	2.47E-05	2.95E-06	9.74E-04	3.76E-04	0.005	Res
582018.57_4130061.93	582018.57	4130061.93	2.50E-05	2.98E-06	9.82E-04	3.79E-04	0.005	Res
582075.14_4130061.93	582075.14	4130061.93	2.43E-05	2.90E-06	9.55E-04	3.69E-04	0.005	Res
582131.71_4130061.93	582131.71	4130061.93	2.21E-05	2.64E-06	8.73E-04	3.36E-04	0.004	Res
582188.28_4130061.93	582188.28	4130061.93	2.07E-05	2.46E-06	8.18E-04	3.14E-04	0.004	Res
582244.85_4130061.93	582244.85	4130061.93	1.88E-05	2.24E-06	7.46E-04	2.86E-04	0.004	Res
582301.42_4130061.93	582301.42	4130061.93	1.81E-05	2.16E-06	7.19E-04	2.76E-04	0.004	Res
582357.99_4130061.93	582357.99	4130061.93	1.91E-05	2.25E-06	7.61E-04	2.90E-04	0.004	Res
582414.56_4130061.93	582414.56	4130061.93	1.79E-05	2.12E-06	7.13E-04	2.72E-04	0.004	Res
582471.13_4130061.93	582471.13	4130061.93	1.87E-05	2.21E-06	7.52E-04	2.85E-04	0.004	Res
582527.7_4130061.93	582527.7	4130061.93	1.84E-05	2.17E-06	7.40E-04	2.80E-04	0.004	Res
582584.27_4130061.93	582584.27	4130061.93	1.89E-05	2.22E-06	7.62E-04	2.87E-04	0.004	Res
582640.84_4130061.93	582640.84	4130061.93	1.84E-05	2.17E-06	7.44E-04	2.80E-04	0.004	Res
582697.41_4130061.93	582697.41	4130061.93	1.70E-05	2.01E-06	6.85E-04	2.59E-04	0.004	Res
582753.98_4130061.93	582753.98	4130061.93	1.64E-05	1.93E-06	6.59E-04	2.49E-04	0.003	Res
582810.55_4130061.93	582810.55	4130061.93	1.63E-05	1.92E-06	6.57E-04	2.48E-04	0.003	Res
581962_4130145.84	581962	4130145.84	2.27E-05	2.67E-06	9.10E-04	3.45E-04	0.005	Res
582018.57_4130145.84	582018.57	4130145.84	2.16E-05	2.55E-06	8.66E-04	3.28E-04	0.004	Res
582075.14_4130145.84	582075.14	4130145.84	2.17E-05	2.57E-06	8.71E-04	3.30E-04	0.004	Res
582131.71_4130145.84	582131.71	4130145.84	2.06E-05	2.43E-06	8.27E-04	3.14E-04	0.004	Res
582188.28_4130145.84	582188.28	4130145.84	1.88E-05	2.22E-06	7.52E-04	2.85E-04	0.004	Res
582244.85_4130145.84	582244.85	4130145.84	1.97E-05	2.32E-06	7.95E-04	3.00E-04	0.004	Res
582301.42_4130145.84	582301.42	4130145.84	1.97E-05	2.32E-06	7.98E-04	3.00E-04	0.004	Res
582357.99_4130145.84	582357.99	4130145.84	1.92E-05	2.26E-06	7.78E-04	2.92E-04	0.004	Res
582414.56_4130145.84	582414.56	4130145.84	1.98E-05	2.32E-06	8.05E-04	3.01E-04	0.004	Res
582471.13_4130145.84	582471.13	4130145.84	1.98E-05	2.31E-06	8.04E-04	3.01E-04	0.004	Res
582527.7_4130145.84	582527.7	4130145.84	2.02E-05	2.36E-06	8.26E-04	3.08E-04	0.004	Res
582584.27_4130145.84	582584.27	4130145.84	1.91E-05	2.23E-06	7.76E-04	2.90E-04	0.004	Res
582640.84_4130145.84	582640.84	4130145.84	1.77E-05	2.07E-06	7.17E-04	2.68E-04	0.004	Res
582697.41_4130145.84	582697.41	4130145.84	1.76E-05	2.06E-06	7.18E-04	2.68E-04	0.004	Res
582753.98_4130145.84	582753.98	4130145.84	1.85E-05	2.16E-06	7.56E-04	2.81E-04	0.004	Res
582810.55_4130145.84	582810.55	4130145.84	1.78E-05	2.07E-06	7.25E-04	2.70E-04	0.004	Res
582867.12_4130145.84	582867.12	4130145.84	1.42E-05	1.67E-06	5.72E-04	2.16E-04	0.003	Res
581962_4130229.75	581962	4130229.75	2.06E-05	2.47E-06	8.09E-04	3.14E-04	0.004	Res
582018.57_4130229.75	582018.57	4130229.75	1.94E-05	2.31E-06	7.63E-04	2.95E-04	0.004	Res
582075.14_4130229.75	582075.14	4130229.75	1.94E-05	2.31E-06	7.72E-04	2.96E-04	0.004	Res
582131.71_4130229.75	582131.71	4130229.75	1.98E-05	2.34E-06	7.93E-04	3.01E-04	0.004	Res
582188.28_4130229.75	582188.28	4130229.75	2.14E-05	2.51E-06	8.67E-04	3.26E-04	0.004	Res
582244.85_4130229.75	582244.85	4130229.75	2.06E-05	2.42E-06	8.37E-04	3.14E-04	0.004	Res
582301.42_4130229.75	582301.42	4130229.75	2.13E-05	2.48E-06	8.68E-04	3.23E-04	0.004	Res
582357.99_4130229.75	582357.99	4130229.75	2.05E-05	2.39E-06	8.40E-04	3.12E-04	0.004	Res
582414.56_4130229.75	582414.56	4130229.75	2.18E-05	2.53E-06	8.99E-04	3.32E-04	0.005	Res
582471.13_4130229.75	582471.13	4130229.75	2.07E-05	2.39E-06	8.52E-04	3.14E-04	0.004	Res
582527.7_4130229.75	582527.7	4130229.75	1.91E-05	2.21E-06	7.85E-04	2.90E-04	0.004	Res
582584.27_4130229.75	582584.27	4130229.75	1.93E-05	2.23E-06	7.94E-04	2.93E-04	0.004	Res
582640.84_4130229.75	582640.84	4130229.75	2.03E-05	2.34E-06	8.38E-04	3.08E-04	0.004	Res

Acute Calculation, $\sum C_{TAC}$ /REL

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)				Total HI	Receptor Type
	UTM X	UTM Y	Arsenic	Mercury	Nickel	Vanadium		
582697.41_4130229.75	582697.41	4130229.75	1.96E-05	2.27E-06	8.09E-04	2.98E-04	0.004	Res
582753.98_4130229.75	582753.98	4130229.75	1.75E-05	2.03E-06	7.17E-04	2.65E-04	0.004	Res
582810.55_4130229.75	582810.55	4130229.75	1.78E-05	2.06E-06	7.31E-04	2.70E-04	0.004	Res
582867.12_4130229.75	582867.12	4130229.75	1.90E-05	2.19E-06	7.84E-04	2.88E-04	0.004	Res
582018.57_4130313.66	582018.57	4130313.66	1.95E-05	2.34E-06	7.67E-04	2.97E-04	0.004	Res
582075.14_4130313.66	582075.14	4130313.66	2.20E-05	2.60E-06	8.77E-04	3.34E-04	0.005	Res
582131.71_4130313.66	582131.71	4130313.66	2.37E-05	2.79E-06	9.55E-04	3.60E-04	0.005	Res
582188.28_4130313.66	582188.28	4130313.66	2.25E-05	2.65E-06	9.04E-04	3.42E-04	0.005	Res
582244.85_4130313.66	582244.85	4130313.66	2.36E-05	2.76E-06	9.56E-04	3.59E-04	0.005	Res
582301.42_4130313.66	582301.42	4130313.66	2.41E-05	2.82E-06	9.83E-04	3.67E-04	0.005	Res
582357.99_4130313.66	582357.99	4130313.66	2.37E-05	2.76E-06	9.66E-04	3.60E-04	0.005	Res
582414.56_4130313.66	582414.56	4130313.66	2.17E-05	2.54E-06	8.84E-04	3.30E-04	0.005	Res
582471.13_4130313.66	582471.13	4130313.66	2.18E-05	2.54E-06	8.88E-04	3.31E-04	0.005	Res
582527.7_4130313.66	582527.7	4130313.66	2.32E-05	2.70E-06	9.55E-04	3.53E-04	0.005	Res
582584.27_4130313.66	582584.27	4130313.66	2.21E-05	2.57E-06	9.10E-04	3.36E-04	0.005	Res
582640.84_4130313.66	582640.84	4130313.66	1.97E-05	2.30E-06	8.09E-04	3.00E-04	0.004	Res
582697.41_4130313.66	582697.41	4130313.66	2.08E-05	2.41E-06	8.56E-04	3.16E-04	0.004	Res
582753.98_4130313.66	582753.98	4130313.66	2.14E-05	2.48E-06	8.86E-04	3.26E-04	0.005	Res
582810.55_4130313.66	582810.55	4130313.66	2.02E-05	2.33E-06	8.34E-04	3.06E-04	0.004	Res
582867.12_4130313.66	582867.12	4130313.66	1.78E-05	2.06E-06	7.32E-04	2.70E-04	0.004	Res
581848.86_4130397.57	581848.86	4130397.57	2.44E-05	2.91E-06	9.59E-04	3.70E-04	0.005	Res
581905.43_4130397.57	581905.43	4130397.57	2.31E-05	2.76E-06	9.09E-04	3.51E-04	0.005	Res
581962_4130397.57	581962	4130397.57	2.23E-05	2.66E-06	8.82E-04	3.39E-04	0.005	Res
582018.57_4130397.57	582018.57	4130397.57	2.44E-05	2.89E-06	9.77E-04	3.71E-04	0.005	Res
582075.14_4130397.57	582075.14	4130397.57	2.59E-05	3.05E-06	1.05E-03	3.94E-04	0.005	Res
582131.71_4130397.57	582131.71	4130397.57	2.60E-05	3.05E-06	1.06E-03	3.96E-04	0.005	Res
582188.28_4130397.57	582188.28	4130397.57	2.56E-05	3.00E-06	1.04E-03	3.89E-04	0.005	Res
582244.85_4130397.57	582244.85	4130397.57	2.66E-05	3.10E-06	1.09E-03	4.04E-04	0.006	Res
582301.42_4130397.57	582301.42	4130397.57	2.44E-05	2.84E-06	9.95E-04	3.70E-04	0.005	Res
582357.99_4130397.57	582357.99	4130397.57	2.39E-05	2.79E-06	9.77E-04	3.64E-04	0.005	Res
582414.56_4130397.57	582414.56	4130397.57	2.58E-05	3.00E-06	1.06E-03	3.93E-04	0.005	Res
582471.13_4130397.57	582471.13	4130397.57	2.50E-05	2.91E-06	1.03E-03	3.81E-04	0.005	Res
582527.7_4130397.57	582527.7	4130397.57	2.24E-05	2.61E-06	9.15E-04	3.40E-04	0.005	Res
582584.27_4130397.57	582584.27	4130397.57	2.45E-05	2.84E-06	1.01E-03	3.73E-04	0.005	Res
582640.84_4130397.57	582640.84	4130397.57	2.45E-05	2.84E-06	1.01E-03	3.72E-04	0.005	Res
582697.41_4130397.57	582697.41	4130397.57	2.21E-05	2.57E-06	9.09E-04	3.36E-04	0.005	Res
582753.98_4130397.57	582753.98	4130397.57	1.89E-05	2.20E-06	7.72E-04	2.87E-04	0.004	Res
582810.55_4130397.57	582810.55	4130397.57	1.61E-05	1.89E-06	6.53E-04	2.45E-04	0.003	Res
582867.12_4130397.57	582867.12	4130397.57	1.64E-05	1.92E-06	6.68E-04	2.50E-04	0.003	Res
581848.86_4130481.48	581848.86	4130481.48	2.53E-05	3.00E-06	1.01E-03	3.84E-04	0.005	Res
581905.43_4130481.48	581905.43	4130481.48	2.58E-05	3.05E-06	1.03E-03	3.92E-04	0.005	Res
581962_4130481.48	581962	4130481.48	2.68E-05	3.16E-06	1.08E-03	4.08E-04	0.006	Res
582018.57_4130481.48	582018.57	4130481.48	2.77E-05	3.25E-06	1.12E-03	4.21E-04	0.006	Res
582075.14_4130481.48	582075.14	4130481.48	2.90E-05	3.39E-06	1.18E-03	4.41E-04	0.006	Res
582131.71_4130481.48	582131.71	4130481.48	3.01E-05	3.51E-06	1.23E-03	4.58E-04	0.006	Res
582188.28_4130481.48	582188.28	4130481.48	2.84E-05	3.32E-06	1.16E-03	4.32E-04	0.006	Res
582244.85_4130481.48	582244.85	4130481.48	2.71E-05	3.16E-06	1.10E-03	4.12E-04	0.006	Res
582301.42_4130481.48	582301.42	4130481.48	2.89E-05	3.36E-06	1.19E-03	4.40E-04	0.006	Res
582357.99_4130481.48	582357.99	4130481.48	2.78E-05	3.23E-06	1.14E-03	4.22E-04	0.006	Res

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)				Acute Calculation, $\sum C_{TAC}$ /REL	
	UTM X	UTM Y	Arsenic	Mercury	Nickel	Vanadium	Total HI	Receptor Type
582414.56_4130481.48	582414.56	4130481.48	2.65E-05	3.08E-06	1.09E-03	4.02E-04	0.006	Res
582471.13_4130481.48	582471.13	4130481.48	2.89E-05	3.35E-06	1.19E-03	4.40E-04	0.006	Res
582527.7_4130481.48	582527.7	4130481.48	2.75E-05	3.18E-06	1.14E-03	4.18E-04	0.006	Res
582584.27_4130481.48	582584.27	4130481.48	2.42E-05	2.80E-06	9.95E-04	3.67E-04	0.005	Res
582640.84_4130481.48	582640.84	4130481.48	1.98E-05	2.30E-06	8.07E-04	3.00E-04	0.004	Res
582697.41_4130481.48	582697.41	4130481.48	1.90E-05	2.21E-06	7.75E-04	2.89E-04	0.004	Res
582753.98_4130481.48	582753.98	4130481.48	1.88E-05	2.19E-06	7.69E-04	2.86E-04	0.004	Res
582810.55_4130481.48	582810.55	4130481.48	1.78E-05	2.08E-06	7.27E-04	2.71E-04	0.004	Res
582867.12_4130481.48	582867.12	4130481.48	1.76E-05	2.06E-06	7.19E-04	2.68E-04	0.004	Res
581735.72_4130565.39	581735.72	4130565.39	2.33E-05	2.74E-06	9.42E-04	3.55E-04	0.005	Res
581792.29_4130565.39	581792.29	4130565.39	2.29E-05	2.70E-06	9.19E-04	3.48E-04	0.005	Res
581848.86_4130565.39	581848.86	4130565.39	2.56E-05	3.00E-06	1.03E-03	3.88E-04	0.005	Res
581905.43_4130565.39	581905.43	4130565.39	3.18E-05	3.70E-06	1.30E-03	4.83E-04	0.007	Res
581962_4130565.39	581962	4130565.39	3.17E-05	3.69E-06	1.30E-03	4.82E-04	0.007	Res
582018.57_4130565.39	582018.57	4130565.39	3.29E-05	3.82E-06	1.35E-03	4.99E-04	0.007	Res
582075.14_4130565.39	582075.14	4130565.39	3.34E-05	3.88E-06	1.37E-03	5.08E-04	0.007	Res
582131.71_4130565.39	582131.71	4130565.39	3.06E-05	3.56E-06	1.25E-03	4.65E-04	0.006	Res
582188.28_4130565.39	582188.28	4130565.39	3.31E-05	3.83E-06	1.36E-03	5.03E-04	0.007	Res
582244.85_4130565.39	582244.85	4130565.39	3.13E-05	3.63E-06	1.29E-03	4.76E-04	0.007	Res
582301.42_4130565.39	582301.42	4130565.39	3.21E-05	3.72E-06	1.33E-03	4.88E-04	0.007	Res
582357.99_4130565.39	582357.99	4130565.39	3.31E-05	3.83E-06	1.37E-03	5.04E-04	0.007	Res
582414.56_4130565.39	582414.56	4130565.39	3.04E-05	3.51E-06	1.26E-03	4.62E-04	0.006	Res
582471.13_4130565.39	582471.13	4130565.39	2.59E-05	3.01E-06	1.07E-03	3.94E-04	0.005	Res
582527.7_4130565.39	582527.7	4130565.39	2.28E-05	2.66E-06	9.32E-04	3.47E-04	0.005	Res
582584.27_4130565.39	582584.27	4130565.39	2.27E-05	2.65E-06	9.29E-04	3.45E-04	0.005	Res
582640.84_4130565.39	582640.84	4130565.39	2.12E-05	2.48E-06	8.67E-04	3.23E-04	0.004	Res
582697.41_4130565.39	582697.41	4130565.39	2.06E-05	2.41E-06	8.42E-04	3.14E-04	0.004	Res
582753.98_4130565.39	582753.98	4130565.39	1.91E-05	2.23E-06	7.77E-04	2.90E-04	0.004	Res
582810.55_4130565.39	582810.55	4130565.39	1.70E-05	1.99E-06	6.88E-04	2.58E-04	0.004	Res
582867.12_4130565.39	582867.12	4130565.39	1.46E-05	1.71E-06	5.85E-04	2.21E-04	0.003	Res
581735.72_4130649.3	581735.72	4130649.3	2.03E-05	2.38E-06	8.23E-04	3.09E-04	0.004	Res
581792.29_4130649.3	581792.29	4130649.3	2.01E-05	2.34E-06	8.24E-04	3.05E-04	0.004	Res
581905.43_4130649.3	581905.43	4130649.3	3.60E-05	4.13E-06	1.50E-03	5.47E-04	0.008	Res
581962_4130649.3	581962	4130649.3	3.83E-05	4.40E-06	1.60E-03	5.82E-04	0.008	Res
582018.57_4130649.3	582018.57	4130649.3	3.54E-05	4.07E-06	1.47E-03	5.38E-04	0.008	Res
582075.14_4130649.3	582075.14	4130649.3	3.82E-05	4.39E-06	1.59E-03	5.80E-04	0.008	Res
582131.71_4130649.3	582131.71	4130649.3	3.63E-05	4.18E-06	1.51E-03	5.51E-04	0.008	Res
582188.28_4130649.3	582188.28	4130649.3	3.89E-05	4.47E-06	1.62E-03	5.91E-04	0.008	Res
582244.85_4130649.3	582244.85	4130649.3	3.83E-05	4.41E-06	1.59E-03	5.82E-04	0.008	Res
582301.42_4130649.3	582301.42	4130649.3	3.36E-05	3.88E-06	1.39E-03	5.11E-04	0.007	Res
582357.99_4130649.3	582357.99	4130649.3	2.79E-05	3.24E-06	1.15E-03	4.25E-04	0.006	Res
582414.56_4130649.3	582414.56	4130649.3	2.80E-05	3.24E-06	1.15E-03	4.25E-04	0.006	Res
582471.13_4130649.3	582471.13	4130649.3	2.63E-05	3.05E-06	1.08E-03	4.00E-04	0.006	Res
582527.7_4130649.3	582527.7	4130649.3	2.49E-05	2.90E-06	1.02E-03	3.79E-04	0.005	Res
582584.27_4130649.3	582584.27	4130649.3	2.23E-05	2.60E-06	9.12E-04	3.39E-04	0.005	Res
582640.84_4130649.3	582640.84	4130649.3	1.90E-05	2.22E-06	7.70E-04	2.88E-04	0.004	Res
582697.41_4130649.3	582697.41	4130649.3	1.71E-05	2.01E-06	6.93E-04	2.60E-04	0.004	Res
582753.98_4130649.3	582753.98	4130649.3	1.81E-05	2.11E-06	7.33E-04	2.74E-04	0.004	Res
582810.55_4130649.3	582810.55	4130649.3	1.88E-05	2.19E-06	7.66E-04	2.86E-04	0.004	Res

Acute Calculation, $\sum C_{TAC}$ /REL

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)				Total HI	Receptor Type
	UTM X	UTM Y	Arsenic	Mercury	Nickel	Vanadium		
582867.12_4130649.3	582867.12	4130649.3	1.91E-05	2.23E-06	7.80E-04	2.90E-04	0.004	Res
581848.86_4130733.21	581848.86	4130733.21	4.44E-05	5.07E-06	1.87E-03	6.75E-04	0.010	Res
581905.43_4130733.21	581905.43	4130733.21	4.25E-05	4.84E-06	1.80E-03	6.46E-04	0.009	Res
581962_4130733.21	581962	4130733.21	4.47E-05	5.07E-06	1.90E-03	6.80E-04	0.010	Res
582018.57_4130733.21	582018.57	4130733.21	4.26E-05	4.84E-06	1.80E-03	6.47E-04	0.009	Res
582075.14_4130733.21	582075.14	4130733.21	4.74E-05	5.39E-06	2.01E-03	7.21E-04	0.010	Res
582131.71_4130733.21	582131.71	4130733.21	4.28E-05	4.87E-06	1.80E-03	6.50E-04	0.009	Res
582188.28_4130733.21	582188.28	4130733.21	3.76E-05	4.30E-06	1.58E-03	5.72E-04	0.008	Res
582244.85_4130733.21	582244.85	4130733.21	3.52E-05	4.04E-06	1.47E-03	5.35E-04	0.008	Res
582301.42_4130733.21	582301.42	4130733.21	3.36E-05	3.86E-06	1.40E-03	5.11E-04	0.007	Res
582357.99_4130733.21	582357.99	4130733.21	3.11E-05	3.59E-06	1.29E-03	4.73E-04	0.007	Res
582414.56_4130733.21	582414.56	4130733.21	2.65E-05	3.07E-06	1.09E-03	4.03E-04	0.006	Res
582471.13_4130733.21	582471.13	4130733.21	2.23E-05	2.60E-06	9.10E-04	3.39E-04	0.005	Res
582527.7_4130733.21	582527.7	4130733.21	2.36E-05	2.74E-06	9.66E-04	3.58E-04	0.005	Res
582584.27_4130733.21	582584.27	4130733.21	2.42E-05	2.81E-06	9.97E-04	3.69E-04	0.005	Res
582640.84_4130733.21	582640.84	4130733.21	2.42E-05	2.81E-06	9.98E-04	3.68E-04	0.005	Res
582697.41_4130733.21	582697.41	4130733.21	2.37E-05	2.74E-06	9.75E-04	3.60E-04	0.005	Res
582753.98_4130733.21	582753.98	4130733.21	2.25E-05	2.61E-06	9.27E-04	3.42E-04	0.005	Res
582810.55_4130733.21	582810.55	4130733.21	2.12E-05	2.46E-06	8.70E-04	3.22E-04	0.004	Res
582867.12_4130733.21	582867.12	4130733.21	1.96E-05	2.28E-06	8.01E-04	2.97E-04	0.004	Res
581735.72_4130817.12	581735.72	4130817.12	4.46E-05	5.13E-06	1.86E-03	6.78E-04	0.010	Res
581792.29_4130817.12	581792.29	4130817.12	5.51E-05	6.30E-06	2.32E-03	8.38E-04	0.012	Res
581848.86_4130817.12	581848.86	4130817.12	5.93E-05	6.76E-06	2.50E-03	9.02E-04	0.013	Res
581905.43_4130817.12	581905.43	4130817.12	5.86E-05	6.67E-06	2.48E-03	8.91E-04	0.013	Res
581962_4130817.12	581962	4130817.12	5.82E-05	6.61E-06	2.47E-03	8.85E-04	0.013	Res
582018.57_4130817.12	582018.57	4130817.12	5.07E-05	5.75E-06	2.15E-03	7.71E-04	0.011	Res
582075.14_4130817.12	582075.14	4130817.12	4.74E-05	5.37E-06	2.02E-03	7.21E-04	0.010	Res
582131.71_4130817.12	582131.71	4130817.12	4.54E-05	5.13E-06	1.93E-03	6.90E-04	0.010	Res
582188.28_4130817.12	582188.28	4130817.12	4.00E-05	4.54E-06	1.70E-03	6.08E-04	0.009	Res
582244.85_4130817.12	582244.85	4130817.12	3.17E-05	3.62E-06	1.34E-03	4.82E-04	0.007	Res
582301.42_4130817.12	582301.42	4130817.12	3.40E-05	3.88E-06	1.43E-03	5.17E-04	0.007	Res
582357.99_4130817.12	582357.99	4130817.12	3.44E-05	3.93E-06	1.45E-03	5.23E-04	0.007	Res
582414.56_4130817.12	582414.56	4130817.12	3.30E-05	3.77E-06	1.38E-03	5.01E-04	0.007	Res
582471.13_4130817.12	582471.13	4130817.12	3.06E-05	3.52E-06	1.28E-03	4.66E-04	0.007	Res
582527.7_4130817.12	582527.7	4130817.12	2.74E-05	3.15E-06	1.14E-03	4.16E-04	0.006	Res
582584.27_4130817.12	582584.27	4130817.12	2.63E-05	3.03E-06	1.09E-03	3.99E-04	0.006	Res
582640.84_4130817.12	582640.84	4130817.12	2.58E-05	2.97E-06	1.07E-03	3.91E-04	0.005	Res
582697.41_4130817.12	582697.41	4130817.12	2.49E-05	2.88E-06	1.03E-03	3.78E-04	0.005	Res
582753.98_4130817.12	582753.98	4130817.12	2.36E-05	2.73E-06	9.75E-04	3.59E-04	0.005	Res
582810.55_4130817.12	582810.55	4130817.12	2.25E-05	2.61E-06	9.26E-04	3.42E-04	0.005	Res
582867.12_4130817.12	582867.12	4130817.12	2.19E-05	2.54E-06	9.04E-04	3.34E-04	0.005	Res
581735.72_4130901.03	581735.72	4130901.03	8.08E-05	9.17E-06	3.43E-03	1.23E-03	0.018	Res
581792.29_4130901.03	581792.29	4130901.03	9.15E-05	1.04E-05	3.89E-03	1.39E-03	0.020	Res
581848.86_4130901.03	581848.86	4130901.03	7.90E-05	8.97E-06	3.35E-03	1.20E-03	0.017	Res
581905.43_4130901.03	581905.43	4130901.03	7.17E-05	8.15E-06	3.04E-03	1.09E-03	0.016	Res
581962_4130901.03	581962	4130901.03	7.00E-05	7.94E-06	2.97E-03	1.06E-03	0.015	Res
582018.57_4130901.03	582018.57	4130901.03	5.92E-05	6.73E-06	2.51E-03	9.00E-04	0.013	Res
582075.14_4130901.03	582075.14	4130901.03	6.13E-05	6.96E-06	2.61E-03	9.32E-04	0.013	Res
582131.71_4130901.03	582131.71	4130901.03	5.79E-05	6.55E-06	2.46E-03	8.79E-04	0.013	Res

Acute Calculation, $\sum C_{TAC}$ /REL

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)				Total HI	Receptor Type
	UTM X	UTM Y	Arsenic	Mercury	Nickel	Vanadium		
582188.28_4130901.03	582188.28	4130901.03	5.01E-05	5.67E-06	2.13E-03	7.62E-04	0.011	Res
582244.85_4130901.03	582244.85	4130901.03	4.42E-05	5.01E-06	1.88E-03	6.72E-04	0.010	Res
582301.42_4130901.03	582301.42	4130901.03	4.07E-05	4.61E-06	1.74E-03	6.19E-04	0.009	Res
582357.99_4130901.03	582357.99	4130901.03	3.70E-05	4.20E-06	1.58E-03	5.63E-04	0.008	Res
582414.56_4130901.03	582414.56	4130901.03	3.40E-05	3.86E-06	1.44E-03	5.17E-04	0.007	Res
582471.13_4130901.03	582471.13	4130901.03	3.18E-05	3.62E-06	1.34E-03	4.83E-04	0.007	Res
582527.7_4130901.03	582527.7	4130901.03	2.94E-05	3.36E-06	1.24E-03	4.47E-04	0.006	Res
582584.27_4130901.03	582584.27	4130901.03	2.73E-05	3.13E-06	1.15E-03	4.16E-04	0.006	Res
582640.84_4130901.03	582640.84	4130901.03	2.53E-05	2.91E-06	1.06E-03	3.85E-04	0.005	Res
582697.41_4130901.03	582697.41	4130901.03	2.34E-05	2.69E-06	9.72E-04	3.55E-04	0.005	Res
582753.98_4130901.03	582753.98	4130901.03	2.17E-05	2.51E-06	8.99E-04	3.30E-04	0.005	Res
582810.55_4130901.03	582810.55	4130901.03	2.11E-05	2.44E-06	8.69E-04	3.20E-04	0.004	Res
582867.12_4130901.03	582867.12	4130901.03	2.05E-05	2.37E-06	8.44E-04	3.11E-04	0.004	Res
581735.72_4130984.94	581735.72	4130984.94	1.65E-04	1.86E-05	7.08E-03	2.51E-03	0.036	Res
581792.29_4130984.94	581792.29	4130984.94	1.73E-04	1.95E-05	7.43E-03	2.63E-03	0.038	Res
581848.86_4130984.94	581848.86	4130984.94	1.78E-04	2.01E-05	7.64E-03	2.71E-03	0.039	Res
581905.43_4130984.94	581905.43	4130984.94	1.61E-04	1.82E-05	6.91E-03	2.45E-03	0.035	Res
581962_4130984.94	581962	4130984.94	1.15E-04	1.29E-05	4.89E-03	1.74E-03	0.025	Res
582018.57_4130984.94	582018.57	4130984.94	8.38E-05	9.48E-06	3.56E-03	1.27E-03	0.018	Res
582075.14_4130984.94	582075.14	4130984.94	6.53E-05	7.41E-06	2.77E-03	9.92E-04	0.014	Res
582131.71_4130984.94	582131.71	4130984.94	5.43E-05	6.18E-06	2.30E-03	8.26E-04	0.012	Res
582188.28_4130984.94	582188.28	4130984.94	4.83E-05	5.49E-06	2.04E-03	7.33E-04	0.010	Res
582244.85_4130984.94	582244.85	4130984.94	4.33E-05	4.93E-06	1.83E-03	6.59E-04	0.009	Res
582301.42_4130984.94	582301.42	4130984.94	3.94E-05	4.47E-06	1.67E-03	5.98E-04	0.009	Res
582357.99_4130984.94	582357.99	4130984.94	3.61E-05	4.10E-06	1.53E-03	5.49E-04	0.008	Res
582414.56_4130984.94	582414.56	4130984.94	3.33E-05	3.77E-06	1.41E-03	5.06E-04	0.007	Res
582471.13_4130984.94	582471.13	4130984.94	3.09E-05	3.50E-06	1.31E-03	4.70E-04	0.007	Res
582527.7_4130984.94	582527.7	4130984.94	2.90E-05	3.29E-06	1.23E-03	4.40E-04	0.006	Res
582584.27_4130984.94	582584.27	4130984.94	2.75E-05	3.13E-06	1.17E-03	4.19E-04	0.006	Res
582640.84_4130984.94	582640.84	4130984.94	2.65E-05	3.02E-06	1.12E-03	4.02E-04	0.006	Res
582697.41_4130984.94	582697.41	4130984.94	2.53E-05	2.89E-06	1.06E-03	3.85E-04	0.005	Res
582753.98_4130984.94	582753.98	4130984.94	2.45E-05	2.80E-06	1.03E-03	3.72E-04	0.005	Res
582810.55_4130984.94	582810.55	4130984.94	2.36E-05	2.70E-06	9.87E-04	3.59E-04	0.005	Res
582867.12_4130984.94	582867.12	4130984.94	2.27E-05	2.61E-06	9.49E-04	3.46E-04	0.005	Res
581735.72_4131068.85	581735.72	4131068.85	6.00E-05	6.81E-06	2.54E-03	9.11E-04	0.013	Res
581792.29_4131068.85	581792.29	4131068.85	6.08E-05	6.88E-06	2.58E-03	9.24E-04	0.013	Res
581848.86_4131068.85	581848.86	4131068.85	6.59E-05	7.47E-06	2.80E-03	1.00E-03	0.014	Res
581905.43_4131068.85	581905.43	4131068.85	6.50E-05	7.37E-06	2.76E-03	9.88E-04	0.014	Res
581962_4131068.85	581962	4131068.85	6.71E-05	7.61E-06	2.85E-03	1.02E-03	0.015	Res
582018.57_4131068.85	582018.57	4131068.85	5.87E-05	6.68E-06	2.49E-03	8.93E-04	0.013	Res
582075.14_4131068.85	582075.14	4131068.85	5.05E-05	5.76E-06	2.13E-03	7.68E-04	0.011	Res
582131.71_4131068.85	582131.71	4131068.85	4.56E-05	5.21E-06	1.92E-03	6.94E-04	0.010	Res
582188.28_4131068.85	582188.28	4131068.85	4.25E-05	4.86E-06	1.79E-03	6.47E-04	0.009	Res
582244.85_4131068.85	582244.85	4131068.85	4.01E-05	4.58E-06	1.69E-03	6.09E-04	0.009	Res
582301.42_4131068.85	582301.42	4131068.85	3.78E-05	4.31E-06	1.59E-03	5.74E-04	0.008	Res
582357.99_4131068.85	582357.99	4131068.85	3.54E-05	4.04E-06	1.49E-03	5.38E-04	0.008	Res
582414.56_4131068.85	582414.56	4131068.85	3.33E-05	3.79E-06	1.41E-03	5.06E-04	0.007	Res
582471.13_4131068.85	582471.13	4131068.85	3.12E-05	3.55E-06	1.32E-03	4.75E-04	0.007	Res
582527.7_4131068.85	582527.7	4131068.85	2.93E-05	3.32E-06	1.24E-03	4.45E-04	0.006	Res

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)				Acute Calculation, $\sum C_{TAC}$ /REL	
	UTM X	UTM Y	Arsenic	Mercury	Nickel	Vanadium	Total HI	Receptor Type
582584.27_4131068.85	582584.27	4131068.85	2.73E-05	3.10E-06	1.16E-03	4.15E-04	0.006	Res
582640.84_4131068.85	582640.84	4131068.85	2.62E-05	2.97E-06	1.12E-03	3.99E-04	0.006	Res
582697.41_4131068.85	582697.41	4131068.85	2.52E-05	2.85E-06	1.07E-03	3.83E-04	0.005	Res
582753.98_4131068.85	582753.98	4131068.85	2.45E-05	2.78E-06	1.04E-03	3.72E-04	0.005	Res
582810.55_4131068.85	582810.55	4131068.85	2.38E-05	2.71E-06	1.01E-03	3.62E-04	0.005	Res
582867.12_4131068.85	582867.12	4131068.85	2.27E-05	2.59E-06	9.55E-04	3.45E-04	0.005	Res
582018.57_4131152.76	582018.57	4131152.76	4.00E-05	4.56E-06	1.68E-03	6.08E-04	0.009	Res
582244.85_4131152.76	582244.85	4131152.76	3.46E-05	3.97E-06	1.45E-03	5.26E-04	0.007	Res
582301.42_4131152.76	582301.42	4131152.76	3.30E-05	3.78E-06	1.38E-03	5.01E-04	0.007	Res
582357.99_4131152.76	582357.99	4131152.76	3.07E-05	3.52E-06	1.29E-03	4.67E-04	0.007	Res
582414.56_4131152.76	582414.56	4131152.76	2.85E-05	3.27E-06	1.19E-03	4.33E-04	0.006	Res
582471.13_4131152.76	582471.13	4131152.76	2.56E-05	2.93E-06	1.07E-03	3.88E-04	0.005	Res
582527.7_4131152.76	582527.7	4131152.76	2.31E-05	2.65E-06	9.67E-04	3.51E-04	0.005	Res
582584.27_4131152.76	582584.27	4131152.76	2.14E-05	2.45E-06	8.96E-04	3.25E-04	0.005	Res
582640.84_4131152.76	582640.84	4131152.76	2.08E-05	2.38E-06	8.74E-04	3.16E-04	0.004	Res
582697.41_4131152.76	582697.41	4131152.76	2.02E-05	2.30E-06	8.52E-04	3.07E-04	0.004	Res
582753.98_4131152.76	582753.98	4131152.76	2.00E-05	2.28E-06	8.46E-04	3.04E-04	0.004	Res
582810.55_4131152.76	582810.55	4131152.76	1.96E-05	2.23E-06	8.33E-04	2.98E-04	0.004	Res
582867.12_4131152.76	582867.12	4131152.76	1.89E-05	2.15E-06	8.01E-04	2.87E-04	0.004	Res

HRA Permanente Creek Restoration Project

Construction Year 2027

Emissions Inputs

Construction Activity	Construction Year & Source	DPM Exhaust (tons/year)	PM10 Dust for speciation (tons/year)	Arsenic (tons/year)	Beryllium (tons/year)	Cadmium (tons/year)	Cobalt (tons/year)	Copper (tons/year)	Lead (tons/year)	Mercury (tons/year)	Nickel (tons/year)	Selenium (tons/year)	Chromium VI (tons/year)	Crystalline Silica (tons/year)	Vanadium (tons/year)
Concrete Channel 2024	2024_CONCRTE	0.000	0.00	2.91E-12	1.74E-12	2.91E-12	1.49E-11	3.26E-11	2.91E-12	4.65E-13	5.35E-11	5.81E-12	2.33E-13	8.63E-09	4.42E-11
Paved road	2024_PAVED	2.07E-04	0.08	1.04E-07	6.26E-08	1.04E-07	6.68E-08	2.09E-06	1.92E-07	1.17E-08	4.51E-06	2.09E-07	1.59E-07	5.93E-04	1.59E-06
Unpaved road	2024_CCP_UNPV	6.27E-05	0.20	2.56E-07	1.54E-07	2.56E-07	1.64E-07	5.12E-06	4.71E-07	2.87E-08	1.11E-05	5.12E-07	3.89E-07	1.46E-03	3.89E-06
Channel Widening 2024	2024_CHAN_RCK	0.002	0.16	2.05E-07	1.23E-07	2.05E-07	1.05E-06	2.29E-06	2.05E-07	3.28E-08	3.77E-06	4.09E-07	1.64E-08	6.08E-04	3.11E-06
Paved road	2024_PAVED	1.80E-03	2.39	2.99E-06	1.79E-06	2.99E-06	1.91E-06	5.98E-05	5.50E-06	3.35E-07	1.29E-04	5.98E-06	4.54E-06	1.70E-02	4.54E-05
Rock Pile Area 2025	2025_CHAN_RCK	0.006	0.25	3.16E-07	1.89E-07	3.16E-07	1.62E-06	3.54E-06	3.16E-07	5.05E-08	5.81E-06	6.31E-07	2.53E-08	9.37E-04	4.80E-06
Paved road	2025_PAVED	5.95E-03	2.44	3.05E-06	1.83E-06	3.05E-06	1.95E-06	6.10E-05	5.61E-06	3.41E-07	1.32E-04	6.10E-06	4.63E-06	1.73E-02	4.63E-05
Rock Pile Area 2026	2026_CHAN_RCK	0.006	0.25	3.16E-07	1.89E-07	3.16E-07	1.62E-06	3.54E-06	3.16E-07	5.05E-08	5.81E-06	6.31E-07	2.53E-08	9.37E-04	4.80E-06
Paved road	2026_PAVED	5.84E-03	2.44	3.05E-06	1.83E-06	3.05E-06	1.95E-06	6.10E-05	5.61E-06	3.41E-07	1.32E-04	6.10E-06	4.63E-06	1.73E-02	4.63E-05
Channel Widening 2027	2027_CHAN_RCK	0.002	0.98	1.23E-06	7.36E-07	1.23E-06	6.28E-06	1.37E-05	1.23E-06	1.96E-07	2.26E-05	2.45E-06	9.82E-08	3.64E-03	1.87E-05
Paved road	2027_PAVED	5.61E-03	2.39	2.99E-06	1.79E-06	2.99E-06	1.91E-06	5.98E-05	5.50E-06	3.35E-07	1.29E-04	5.98E-06	4.54E-06	1.70E-02	4.54E-05
Material Removal 2028	2028_MATRMVL	0.001	0.25	3.15E-07	1.89E-07	3.15E-07	1.62E-06	3.53E-06	3.15E-07	5.05E-08	5.80E-06	6.31E-07	2.52E-08	9.37E-04	4.80E-06
Paved road	2028_PAVED	5.57E-03	2.39	2.99E-06	1.80E-06	2.99E-06	1.92E-06	5.98E-05	5.51E-06	3.35E-07	1.29E-04	5.98E-06	4.55E-06	1.70E-02	4.55E-05
Unpaved road	2028_UNPAVED	3.40E-03	11.84	1.48E-05	8.88E-06	1.48E-05	9.47E-06	2.96E-04	2.72E-05	1.66E-06	6.40E-04	2.96E-05	2.25E-05	8.41E-02	2.25E-04
Material Removal 2029	2029_MATRMVL	0.001	0.25	3.15E-07	1.89E-07	3.15E-07	1.62E-06	3.53E-06	3.15E-07	5.05E-08	5.80E-06	6.31E-07	2.52E-08	9.37E-04	4.80E-06
Paved road	2029_PAVED	5.56E-03	2.41	3.01E-06	1.81E-06	3.01E-06	1.93E-06	6.03E-05	5.55E-06	3.38E-07	1.30E-04	6.03E-06	4.58E-06	1.71E-02	4.58E-05
Unpaved road	2029_UNPAVED	3.39E-03	11.93	1.49E-05	8.95E-06	1.49E-05	9.55E-06	2.98E-04	2.74E-05	1.67E-06	6.44E-04	2.98E-05	2.27E-05	8.47E-02	2.27E-04

Construction Activity	Construction Year	DPM (g/s)	Arsenic (g/s)	Beryllium (g/s)	Cadmium (g/s)	Cobalt (g/s)	Copper (g/s)	Lead (g/s)	Mercury (g/s)	Nickel (g/s)	Selenium (g/s)	Chromium VI (g/s)	Crystalline Silica (g/s)	Vanadium (g/s)	No. of Workdays (days)
Concrete Channel 2024	2024_CONCRTE	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	130.00
Paved road	2024_PAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	130.00
Unpaved road	2024_CCP_UNPV	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	130.00
Channel Widening 2024	2024_CHAN_RCK	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	130.00
Paved road	2024_PAVED	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	130.00
Rock Pile Area 2025	2025_CHAN_RCK	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	130.00
Paved road	2025_PAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	130.00
Rock Pile Area 2026	2026_CHAN_RCK	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	130.00
Paved road	2026_PAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	130.00
Channel Widening 2027	2027_CHAN_RCK	1.563E-04	9.91E-08	5.95E-08	9.91E-08	5.07E-07	1.11E-06	9.91E-08	1.59E-08	1.82E-06	1.98E-07	7.93E-09	2.94E-04	1.51E-06	130.00
Paved road	2027_PAVED	4.532E-04	2.41E-07	1.45E-07	2.41E-07	1.54E-07	4.83E-06	4.44E-07	2.70E-08	1.04E-05	4.83E-07	3.67E-07	1.37E-03	3.67E-06	130.00
Material Removal 2028	2028_MATRMVL	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	130.00
Paved road	2028_PAVED	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	130.00
Unpaved road	2028_UNPAVED	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	130.00
Material Removal 2029	2029_MATRMVL	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	130.00
Paved road	2029_PAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	130.00
Unpaved road	2029_UNPAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	130.00

N/A = not including PM10 on-site dust in HRA calculation; it is only for speciating metals.

Acute REL

TAC	UOM	
Arsenic	$\mu g/m^3$	0.2
Mercury	$\mu g/m^3$	0.61
Nickel	$\mu g/m^3$	0.2
Vanadium	$\mu g/m^3$	31

	Max
CT House	0.016
Res	0.039
Acute	0.014

Acute Calculation, $\sum C_{TAC}$ /REL

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)				Total HI	Receptor Type
	UTM X	UTM Y	Arsenic	Mercury	Nickel	Vanadium		
			0.2	0.61	0.2	31		
581336.22_4131207.48	581336.22	4131207.48	7.78E-05	9.07E-06	3.17E-03	1.18E-03	0.016	CT House
581554.22_4130688.06	581554.22	4130688.06	3.28E-05	4.51E-06	9.87E-04	4.99E-04	0.005	Res
579793.36_4131503.29	579793.36	4131503.29	4.01E-06	5.53E-07	1.20E-04	6.10E-05	0.001	Acute
580488.37_4131517.71	580488.37	4131517.71	1.03E-05	1.39E-06	3.22E-04	1.56E-04	0.002	Acute
581678.43_4131040.03	581678.43	4131040.03	9.62E-05	1.12E-05	3.95E-03	1.46E-03	0.020	Res
581635.43_4130978.54	581635.43	4130978.54	1.23E-04	1.41E-05	5.10E-03	1.87E-03	0.026	Res
581830.06_4131027.55	581830.06	4131027.55	1.30E-04	1.49E-05	5.42E-03	1.98E-03	0.028	Res
581727.48_4130976.54	581727.48	4130976.54	1.45E-04	1.66E-05	6.05E-03	2.20E-03	0.031	Res
581789.11_4130419.65	581789.11	4130419.65	3.77E-05	5.00E-06	1.22E-03	5.72E-04	0.006	Res
581700.32_4130781.89	581700.32	4130781.89	4.63E-05	5.74E-06	1.72E-03	7.04E-04	0.009	Res
581426.07_4131299.01	581426.07	4131299.01	6.54E-05	7.66E-06	2.65E-03	9.94E-04	0.014	Acute
582301.42_4129474.56	582301.42	4129474.56	1.96E-05	2.67E-06	5.99E-04	2.98E-04	0.003	Res
582357.99_4129474.56	582357.99	4129474.56	1.90E-05	2.59E-06	5.85E-04	2.89E-04	0.003	Res
582414.56_4129474.56	582414.56	4129474.56	1.96E-05	2.63E-06	6.19E-04	2.98E-04	0.003	Res
582471.13_4129474.56	582471.13	4129474.56	1.92E-05	2.57E-06	6.15E-04	2.92E-04	0.003	Res
582527.7_4129474.56	582527.7	4129474.56	1.89E-05	2.51E-06	6.13E-04	2.88E-04	0.003	Res
582584.27_4129474.56	582584.27	4129474.56	1.80E-05	2.39E-06	5.87E-04	2.74E-04	0.003	Res
582640.84_4129474.56	582640.84	4129474.56	1.79E-05	2.36E-06	5.87E-04	2.72E-04	0.003	Res
582244.85_4129558.47	582244.85	4129558.47	2.46E-05	3.30E-06	7.85E-04	3.75E-04	0.004	Res
582301.42_4129558.47	582301.42	4129558.47	2.33E-05	3.09E-06	7.54E-04	3.54E-04	0.004	Res
582357.99_4129558.47	582357.99	4129558.47	2.23E-05	2.96E-06	7.28E-04	3.39E-04	0.004	Res
582414.56_4129558.47	582414.56	4129558.47	2.18E-05	2.88E-06	7.10E-04	3.31E-04	0.004	Res
582471.13_4129558.47	582471.13	4129558.47	2.07E-05	2.75E-06	6.75E-04	3.15E-04	0.003	Res
582527.7_4129558.47	582527.7	4129558.47	1.99E-05	2.64E-06	6.45E-04	3.02E-04	0.003	Res
582584.27_4129558.47	582584.27	4129558.47	1.90E-05	2.53E-06	6.12E-04	2.88E-04	0.003	Res
582640.84_4129558.47	582640.84	4129558.47	1.81E-05	2.42E-06	5.82E-04	2.75E-04	0.003	Res
582697.41_4129558.47	582697.41	4129558.47	1.74E-05	2.33E-06	5.59E-04	2.65E-04	0.003	Res
582244.85_4129642.38	582244.85	4129642.38	2.90E-05	3.90E-06	9.16E-04	4.41E-04	0.005	Res
582301.42_4129642.38	582301.42	4129642.38	2.49E-05	3.33E-06	7.94E-04	3.79E-04	0.004	Res
582357.99_4129642.38	582357.99	4129642.38	2.17E-05	2.91E-06	6.90E-04	3.30E-04	0.004	Res
582414.56_4129642.38	582414.56	4129642.38	2.10E-05	2.80E-06	6.72E-04	3.19E-04	0.003	Res
582471.13_4129642.38	582471.13	4129642.38	2.05E-05	2.73E-06	6.59E-04	3.11E-04	0.003	Res
582527.7_4129642.38	582527.7	4129642.38	2.01E-05	2.67E-06	6.52E-04	3.06E-04	0.003	Res
582584.27_4129642.38	582584.27	4129642.38	1.93E-05	2.57E-06	6.25E-04	2.94E-04	0.003	Res
582640.84_4129642.38	582640.84	4129642.38	1.90E-05	2.52E-06	6.18E-04	2.89E-04	0.003	Res
582697.41_4129642.38	582697.41	4129642.38	1.91E-05	2.52E-06	6.30E-04	2.90E-04	0.003	Res
582753.98_4129642.38	582753.98	4129642.38	1.87E-05	2.46E-06	6.18E-04	2.84E-04	0.003	Res
582810.55_4129642.38	582810.55	4129642.38	1.80E-05	2.36E-06	5.94E-04	2.73E-04	0.003	Res
582867.12_4129642.38	582867.12	4129642.38	1.83E-05	2.39E-06	6.16E-04	2.79E-04	0.003	Res
582244.85_4129726.29	582244.85	4129726.29	2.85E-05	3.80E-06	9.12E-04	4.33E-04	0.005	Res

Acute Calculation, $\sum C_{TAC}$ /REL

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)				Total HI	Receptor Type
	UTM X	UTM Y	Arsenic	Mercury	Nickel	Vanadium		
582301.42_4129726.29	582301.42	4129726.29	2.70E-05	3.58E-06	8.78E-04	4.10E-04	0.005	Res
582357.99_4129726.29	582357.99	4129726.29	2.41E-05	3.17E-06	7.94E-04	3.66E-04	0.004	Res
582414.56_4129726.29	582414.56	4129726.29	2.24E-05	2.95E-06	7.43E-04	3.41E-04	0.004	Res
582471.13_4129726.29	582471.13	4129726.29	2.12E-05	2.79E-06	7.02E-04	3.22E-04	0.004	Res
582527.7_4129726.29	582527.7	4129726.29	2.00E-05	2.63E-06	6.65E-04	3.05E-04	0.003	Res
582584.27_4129726.29	582584.27	4129726.29	2.00E-05	2.61E-06	6.72E-04	3.03E-04	0.003	Res
582640.84_4129726.29	582640.84	4129726.29	2.02E-05	2.61E-06	6.91E-04	3.07E-04	0.004	Res
582697.41_4129726.29	582697.41	4129726.29	1.92E-05	2.48E-06	6.58E-04	2.92E-04	0.003	Res
582753.98_4129726.29	582753.98	4129726.29	1.83E-05	2.37E-06	6.25E-04	2.78E-04	0.003	Res
582810.55_4129726.29	582810.55	4129726.29	1.83E-05	2.37E-06	6.30E-04	2.79E-04	0.003	Res
582244.85_4129810.2	582244.85	4129810.2	2.88E-05	3.80E-06	9.49E-04	4.38E-04	0.005	Res
582301.42_4129810.2	582301.42	4129810.2	2.65E-05	3.48E-06	8.81E-04	4.03E-04	0.005	Res
582357.99_4129810.2	582357.99	4129810.2	2.44E-05	3.19E-06	8.16E-04	3.71E-04	0.004	Res
582414.56_4129810.2	582414.56	4129810.2	2.25E-05	2.94E-06	7.52E-04	3.41E-04	0.004	Res
582471.13_4129810.2	582471.13	4129810.2	2.09E-05	2.74E-06	7.00E-04	3.18E-04	0.004	Res
582527.7_4129810.2	582527.7	4129810.2	2.12E-05	2.76E-06	7.20E-04	3.23E-04	0.004	Res
582584.27_4129810.2	582584.27	4129810.2	2.10E-05	2.72E-06	7.21E-04	3.20E-04	0.004	Res
582640.84_4129810.2	582640.84	4129810.2	2.01E-05	2.61E-06	6.88E-04	3.06E-04	0.004	Res
582697.41_4129810.2	582697.41	4129810.2	1.98E-05	2.56E-06	6.82E-04	3.02E-04	0.004	Res
581905.43_4129894.11	581905.43	4129894.11	1.89E-05	2.50E-06	6.19E-04	2.87E-04	0.003	Res
581962_4129894.11	581962	4129894.11	3.17E-05	4.46E-06	8.99E-04	4.82E-04	0.005	Res
582131.71_4129894.11	582131.71	4129894.11	2.93E-05	3.99E-06	9.02E-04	4.46E-04	0.005	Res
582188.28_4129894.11	582188.28	4129894.11	2.81E-05	3.80E-06	8.74E-04	4.26E-04	0.005	Res
582244.85_4129894.11	582244.85	4129894.11	2.55E-05	3.44E-06	7.95E-04	3.87E-04	0.004	Res
582301.42_4129894.11	582301.42	4129894.11	2.41E-05	3.24E-06	7.63E-04	3.67E-04	0.004	Res
582357.99_4129894.11	582357.99	4129894.11	2.30E-05	3.07E-06	7.32E-04	3.49E-04	0.004	Res
582414.56_4129894.11	582414.56	4129894.11	2.26E-05	2.98E-06	7.40E-04	3.43E-04	0.004	Res
582471.13_4129894.11	582471.13	4129894.11	2.33E-05	3.04E-06	7.81E-04	3.54E-04	0.004	Res
582527.7_4129894.11	582527.7	4129894.11	2.28E-05	2.97E-06	7.69E-04	3.47E-04	0.004	Res
582584.27_4129894.11	582584.27	4129894.11	2.17E-05	2.83E-06	7.26E-04	3.29E-04	0.004	Res
582640.84_4129894.11	582640.84	4129894.11	2.20E-05	2.86E-06	7.46E-04	3.34E-04	0.004	Res
582697.41_4129894.11	582697.41	4129894.11	2.13E-05	2.76E-06	7.21E-04	3.23E-04	0.004	Res
581962_4129978.02	581962	4129978.02	3.78E-05	5.37E-06	1.04E-03	5.74E-04	0.005	Res
582018.57_4129978.02	582018.57	4129978.02	3.92E-05	5.59E-06	1.07E-03	5.96E-04	0.006	Res
582075.14_4129978.02	582075.14	4129978.02	3.35E-05	4.51E-06	1.05E-03	5.09E-04	0.005	Res
582131.71_4129978.02	582131.71	4129978.02	2.98E-05	4.00E-06	9.40E-04	4.52E-04	0.005	Res
582188.28_4129978.02	582188.28	4129978.02	2.72E-05	3.64E-06	8.73E-04	4.14E-04	0.005	Res
582244.85_4129978.02	582244.85	4129978.02	2.62E-05	3.49E-06	8.39E-04	3.98E-04	0.004	Res
582301.42_4129978.02	582301.42	4129978.02	2.40E-05	3.20E-06	7.75E-04	3.65E-04	0.004	Res
582357.99_4129978.02	582357.99	4129978.02	2.41E-05	3.18E-06	7.92E-04	3.66E-04	0.004	Res
582414.56_4129978.02	582414.56	4129978.02	2.50E-05	3.26E-06	8.40E-04	3.79E-04	0.004	Res
582471.13_4129978.02	582471.13	4129978.02	2.40E-05	3.13E-06	8.06E-04	3.64E-04	0.004	Res
582527.7_4129978.02	582527.7	4129978.02	2.33E-05	3.04E-06	7.85E-04	3.54E-04	0.004	Res
582584.27_4129978.02	582584.27	4129978.02	2.33E-05	3.02E-06	7.94E-04	3.54E-04	0.004	Res
582640.84_4129978.02	582640.84	4129978.02	2.26E-05	2.93E-06	7.70E-04	3.44E-04	0.004	Res
582697.41_4129978.02	582697.41	4129978.02	2.30E-05	2.96E-06	7.95E-04	3.50E-04	0.004	Res
582753.98_4129978.02	582753.98	4129978.02	2.17E-05	2.80E-06	7.43E-04	3.29E-04	0.004	Res

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)				Acute Calculation, $\sum C_{TAC}$ /REL	
	UTM X	UTM Y	Arsenic	Mercury	Nickel	Vanadium	Total HI	Receptor Type
582810.55_4129978.02	582810.55	4129978.02	1.90E-05	2.49E-06	6.35E-04	2.89E-04	0.003	Res
581905.43_4130061.93	581905.43	4130061.93	3.69E-05	4.88E-06	1.20E-03	5.60E-04	0.006	Res
581962_4130061.93	581962	4130061.93	3.52E-05	4.65E-06	1.16E-03	5.35E-04	0.006	Res
582018.57_4130061.93	582018.57	4130061.93	3.58E-05	4.74E-06	1.17E-03	5.44E-04	0.006	Res
582075.14_4130061.93	582075.14	4130061.93	3.48E-05	4.60E-06	1.14E-03	5.29E-04	0.006	Res
582131.71_4130061.93	582131.71	4130061.93	3.14E-05	4.14E-06	1.03E-03	4.78E-04	0.005	Res
582188.28_4130061.93	582188.28	4130061.93	2.90E-05	3.81E-06	9.62E-04	4.41E-04	0.005	Res
582244.85_4130061.93	582244.85	4130061.93	2.64E-05	3.47E-06	8.78E-04	4.01E-04	0.005	Res
582301.42_4130061.93	582301.42	4130061.93	2.53E-05	3.32E-06	8.44E-04	3.85E-04	0.004	Res
582357.99_4130061.93	582357.99	4130061.93	2.59E-05	3.37E-06	8.80E-04	3.94E-04	0.005	Res
582414.56_4130061.93	582414.56	4130061.93	2.45E-05	3.19E-06	8.27E-04	3.72E-04	0.004	Res
582471.13_4130061.93	582471.13	4130061.93	2.51E-05	3.24E-06	8.62E-04	3.82E-04	0.004	Res
582527.7_4130061.93	582527.7	4130061.93	2.46E-05	3.17E-06	8.45E-04	3.73E-04	0.004	Res
582584.27_4130061.93	582584.27	4130061.93	2.48E-05	3.18E-06	8.63E-04	3.77E-04	0.004	Res
582640.84_4130061.93	582640.84	4130061.93	2.42E-05	3.10E-06	8.42E-04	3.68E-04	0.004	Res
582697.41_4130061.93	582697.41	4130061.93	2.26E-05	2.92E-06	7.81E-04	3.44E-04	0.004	Res
582753.98_4130061.93	582753.98	4130061.93	2.18E-05	2.81E-06	7.52E-04	3.32E-04	0.004	Res
582810.55_4130061.93	582810.55	4130061.93	2.16E-05	2.78E-06	7.47E-04	3.28E-04	0.004	Res
581962_4130145.84	581962	4130145.84	3.04E-05	3.93E-06	1.04E-03	4.62E-04	0.005	Res
582018.57_4130145.84	582018.57	4130145.84	2.90E-05	3.75E-06	9.93E-04	4.40E-04	0.005	Res
582075.14_4130145.84	582075.14	4130145.84	2.93E-05	3.80E-06	1.00E-03	4.46E-04	0.005	Res
582131.71_4130145.84	582131.71	4130145.84	2.78E-05	3.59E-06	9.49E-04	4.22E-04	0.005	Res
582188.28_4130145.84	582188.28	4130145.84	2.53E-05	3.28E-06	8.65E-04	3.85E-04	0.004	Res
582244.85_4130145.84	582244.85	4130145.84	2.60E-05	3.34E-06	9.02E-04	3.95E-04	0.005	Res
582301.42_4130145.84	582301.42	4130145.84	2.58E-05	3.30E-06	9.01E-04	3.92E-04	0.005	Res
582357.99_4130145.84	582357.99	4130145.84	2.51E-05	3.21E-06	8.78E-04	3.82E-04	0.005	Res
582414.56_4130145.84	582414.56	4130145.84	2.55E-05	3.24E-06	9.00E-04	3.87E-04	0.005	Res
582471.13_4130145.84	582471.13	4130145.84	2.52E-05	3.20E-06	8.96E-04	3.84E-04	0.005	Res
582527.7_4130145.84	582527.7	4130145.84	2.55E-05	3.22E-06	9.14E-04	3.88E-04	0.005	Res
582584.27_4130145.84	582584.27	4130145.84	2.42E-05	3.07E-06	8.63E-04	3.68E-04	0.004	Res
582640.84_4130145.84	582640.84	4130145.84	2.27E-05	2.88E-06	8.02E-04	3.45E-04	0.004	Res
582697.41_4130145.84	582697.41	4130145.84	2.25E-05	2.86E-06	8.00E-04	3.42E-04	0.004	Res
582753.98_4130145.84	582753.98	4130145.84	2.32E-05	2.93E-06	8.34E-04	3.53E-04	0.004	Res
582810.55_4130145.84	582810.55	4130145.84	2.24E-05	2.82E-06	8.03E-04	3.40E-04	0.004	Res
582867.12_4130145.84	582867.12	4130145.84	1.87E-05	2.40E-06	6.49E-04	2.84E-04	0.003	Res
581962_4130229.75	581962	4130229.75	2.99E-05	3.98E-06	9.72E-04	4.55E-04	0.005	Res
582018.57_4130229.75	582018.57	4130229.75	2.77E-05	3.66E-06	9.08E-04	4.21E-04	0.005	Res
582075.14_4130229.75	582075.14	4130229.75	2.70E-05	3.53E-06	9.03E-04	4.10E-04	0.005	Res
582131.71_4130229.75	582131.71	4130229.75	2.68E-05	3.47E-06	9.13E-04	4.07E-04	0.005	Res
582188.28_4130229.75	582188.28	4130229.75	2.79E-05	3.56E-06	9.77E-04	4.24E-04	0.005	Res
582244.85_4130229.75	582244.85	4130229.75	2.66E-05	3.39E-06	9.38E-04	4.05E-04	0.005	Res
582301.42_4130229.75	582301.42	4130229.75	2.68E-05	3.38E-06	9.60E-04	4.07E-04	0.005	Res
582357.99_4130229.75	582357.99	4130229.75	2.57E-05	3.23E-06	9.26E-04	3.91E-04	0.005	Res
582414.56_4130229.75	582414.56	4130229.75	2.66E-05	3.31E-06	9.76E-04	4.04E-04	0.005	Res
582471.13_4130229.75	582471.13	4130229.75	2.51E-05	3.12E-06	9.24E-04	3.81E-04	0.005	Res
582527.7_4130229.75	582527.7	4130229.75	2.33E-05	2.90E-06	8.54E-04	3.54E-04	0.004	Res
582584.27_4130229.75	582584.27	4130229.75	2.34E-05	2.91E-06	8.62E-04	3.56E-04	0.004	Res
582640.84_4130229.75	582640.84	4130229.75	2.43E-05	3.01E-06	9.04E-04	3.70E-04	0.005	Res

Acute Calculation, $\sum C_{TAC}$ /REL

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)				Total HI	Receptor Type
	UTM X	UTM Y	Arsenic	Mercury	Nickel	Vanadium		
582697.41_4130229.75	582697.41	4130229.75	2.36E-05	2.92E-06	8.74E-04	3.58E-04	0.005	Res
582753.98_4130229.75	582753.98	4130229.75	2.14E-05	2.68E-06	7.83E-04	3.26E-04	0.004	Res
582810.55_4130229.75	582810.55	4130229.75	2.16E-05	2.70E-06	7.94E-04	3.29E-04	0.004	Res
582867.12_4130229.75	582867.12	4130229.75	2.28E-05	2.82E-06	8.46E-04	3.46E-04	0.004	Res
582018.57_4130313.66	582018.57	4130313.66	2.81E-05	3.73E-06	9.18E-04	4.28E-04	0.005	Res
582075.14_4130313.66	582075.14	4130313.66	3.00E-05	3.91E-06	1.02E-03	4.56E-04	0.005	Res
582131.71_4130313.66	582131.71	4130313.66	3.14E-05	4.03E-06	1.09E-03	4.77E-04	0.006	Res
582188.28_4130313.66	582188.28	4130313.66	2.98E-05	3.84E-06	1.03E-03	4.53E-04	0.005	Res
582244.85_4130313.66	582244.85	4130313.66	3.06E-05	3.90E-06	1.07E-03	4.64E-04	0.006	Res
582301.42_4130313.66	582301.42	4130313.66	3.07E-05	3.90E-06	1.09E-03	4.67E-04	0.006	Res
582357.99_4130313.66	582357.99	4130313.66	3.00E-05	3.79E-06	1.07E-03	4.55E-04	0.006	Res
582414.56_4130313.66	582414.56	4130313.66	2.77E-05	3.51E-06	9.84E-04	4.21E-04	0.005	Res
582471.13_4130313.66	582471.13	4130313.66	2.74E-05	3.46E-06	9.82E-04	4.16E-04	0.005	Res
582527.7_4130313.66	582527.7	4130313.66	2.85E-05	3.56E-06	1.04E-03	4.34E-04	0.005	Res
582584.27_4130313.66	582584.27	4130313.66	2.71E-05	3.39E-06	9.92E-04	4.13E-04	0.005	Res
582640.84_4130313.66	582640.84	4130313.66	2.45E-05	3.08E-06	8.88E-04	3.73E-04	0.005	Res
582697.41_4130313.66	582697.41	4130313.66	2.53E-05	3.14E-06	9.29E-04	3.84E-04	0.005	Res
582753.98_4130313.66	582753.98	4130313.66	2.56E-05	3.16E-06	9.54E-04	3.89E-04	0.005	Res
582810.55_4130313.66	582810.55	4130313.66	2.41E-05	2.98E-06	8.98E-04	3.67E-04	0.005	Res
582867.12_4130313.66	582867.12	4130313.66	2.15E-05	2.68E-06	7.94E-04	3.27E-04	0.004	Res
581848.86_4130397.57	581848.86	4130397.57	3.49E-05	4.62E-06	1.14E-03	5.31E-04	0.006	Res
581905.43_4130397.57	581905.43	4130397.57	3.30E-05	4.36E-06	1.08E-03	5.01E-04	0.006	Res
581962_4130397.57	581962	4130397.57	3.16E-05	4.16E-06	1.04E-03	4.80E-04	0.005	Res
582018.57_4130397.57	582018.57	4130397.57	3.32E-05	4.31E-06	1.13E-03	5.04E-04	0.006	Res
582075.14_4130397.57	582075.14	4130397.57	3.41E-05	4.38E-06	1.19E-03	5.19E-04	0.006	Res
582131.71_4130397.57	582131.71	4130397.57	3.37E-05	4.31E-06	1.19E-03	5.13E-04	0.006	Res
582188.28_4130397.57	582188.28	4130397.57	3.28E-05	4.17E-06	1.16E-03	4.99E-04	0.006	Res
582244.85_4130397.57	582244.85	4130397.57	3.33E-05	4.19E-06	1.20E-03	5.06E-04	0.006	Res
582301.42_4130397.57	582301.42	4130397.57	3.07E-05	3.88E-06	1.10E-03	4.67E-04	0.006	Res
582357.99_4130397.57	582357.99	4130397.57	3.01E-05	3.80E-06	1.08E-03	4.58E-04	0.006	Res
582414.56_4130397.57	582414.56	4130397.57	3.18E-05	3.98E-06	1.16E-03	4.84E-04	0.006	Res
582471.13_4130397.57	582471.13	4130397.57	3.09E-05	3.86E-06	1.12E-03	4.69E-04	0.006	Res
582527.7_4130397.57	582527.7	4130397.57	2.81E-05	3.53E-06	1.01E-03	4.26E-04	0.005	Res
582584.27_4130397.57	582584.27	4130397.57	2.99E-05	3.73E-06	1.10E-03	4.55E-04	0.006	Res
582640.84_4130397.57	582640.84	4130397.57	2.97E-05	3.69E-06	1.09E-03	4.52E-04	0.006	Res
582697.41_4130397.57	582697.41	4130397.57	2.72E-05	3.40E-06	9.92E-04	4.13E-04	0.005	Res
582753.98_4130397.57	582753.98	4130397.57	2.38E-05	3.01E-06	8.54E-04	3.62E-04	0.004	Res
582810.55_4130397.57	582810.55	4130397.57	2.09E-05	2.67E-06	7.34E-04	3.18E-04	0.004	Res
582867.12_4130397.57	582867.12	4130397.57	2.10E-05	2.66E-06	7.45E-04	3.19E-04	0.004	Res
581848.86_4130481.48	581848.86	4130481.48	3.50E-05	4.58E-06	1.17E-03	5.32E-04	0.006	Res
581905.43_4130481.48	581905.43	4130481.48	3.50E-05	4.55E-06	1.19E-03	5.32E-04	0.006	Res
581962_4130481.48	581962	4130481.48	3.57E-05	4.61E-06	1.23E-03	5.43E-04	0.006	Res
582018.57_4130481.48	582018.57	4130481.48	3.61E-05	4.62E-06	1.26E-03	5.49E-04	0.007	Res
582075.14_4130481.48	582075.14	4130481.48	3.68E-05	4.67E-06	1.31E-03	5.60E-04	0.007	Res
582131.71_4130481.48	582131.71	4130481.48	3.76E-05	4.72E-06	1.36E-03	5.71E-04	0.007	Res
582188.28_4130481.48	582188.28	4130481.48	3.57E-05	4.51E-06	1.28E-03	5.43E-04	0.007	Res
582244.85_4130481.48	582244.85	4130481.48	3.42E-05	4.32E-06	1.22E-03	5.20E-04	0.006	Res
582301.42_4130481.48	582301.42	4130481.48	3.58E-05	4.48E-06	1.30E-03	5.44E-04	0.007	Res
582357.99_4130481.48	582357.99	4130481.48	3.43E-05	4.30E-06	1.25E-03	5.22E-04	0.006	Res

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)				Acute Calculation, $\sum C_{TAC}$ /REL	
	UTM X	UTM Y	Arsenic	Mercury	Nickel	Vanadium	Total HI	Receptor Type
582414.56_4130481.48	582414.56	4130481.48	3.27E-05	4.10E-06	1.19E-03	4.98E-04	0.006	Res
582471.13_4130481.48	582471.13	4130481.48	3.48E-05	4.31E-06	1.29E-03	5.29E-04	0.007	Res
582527.7_4130481.48	582527.7	4130481.48	3.31E-05	4.10E-06	1.23E-03	5.03E-04	0.006	Res
582584.27_4130481.48	582584.27	4130481.48	2.95E-05	3.67E-06	1.08E-03	4.48E-04	0.006	Res
582640.84_4130481.48	582640.84	4130481.48	2.48E-05	3.13E-06	8.91E-04	3.77E-04	0.005	Res
582697.41_4130481.48	582697.41	4130481.48	2.39E-05	3.01E-06	8.57E-04	3.63E-04	0.004	Res
582753.98_4130481.48	582753.98	4130481.48	2.36E-05	2.98E-06	8.49E-04	3.59E-04	0.004	Res
582810.55_4130481.48	582810.55	4130481.48	2.26E-05	2.85E-06	8.06E-04	3.43E-04	0.004	Res
582867.12_4130481.48	582867.12	4130481.48	2.23E-05	2.81E-06	7.96E-04	3.38E-04	0.004	Res
581735.72_4130565.39	581735.72	4130565.39	3.06E-05	3.92E-06	1.07E-03	4.65E-04	0.006	Res
581792.29_4130565.39	581792.29	4130565.39	3.06E-05	3.95E-06	1.05E-03	4.65E-04	0.005	Res
581848.86_4130565.39	581848.86	4130565.39	3.35E-05	4.30E-06	1.17E-03	5.10E-04	0.006	Res
581905.43_4130565.39	581905.43	4130565.39	3.97E-05	5.00E-06	1.43E-03	6.04E-04	0.007	Res
581962_4130565.39	581962	4130565.39	3.97E-05	5.00E-06	1.43E-03	6.03E-04	0.007	Res
582018.57_4130565.39	582018.57	4130565.39	4.08E-05	5.11E-06	1.48E-03	6.19E-04	0.008	Res
582075.14_4130565.39	582075.14	4130565.39	4.11E-05	5.14E-06	1.50E-03	6.25E-04	0.008	Res
582131.71_4130565.39	582131.71	4130565.39	3.81E-05	4.78E-06	1.38E-03	5.79E-04	0.007	Res
582188.28_4130565.39	582188.28	4130565.39	4.02E-05	5.00E-06	1.48E-03	6.11E-04	0.008	Res
582244.85_4130565.39	582244.85	4130565.39	3.82E-05	4.76E-06	1.40E-03	5.81E-04	0.007	Res
582301.42_4130565.39	582301.42	4130565.39	3.87E-05	4.79E-06	1.43E-03	5.88E-04	0.007	Res
582357.99_4130565.39	582357.99	4130565.39	3.93E-05	4.84E-06	1.47E-03	5.98E-04	0.008	Res
582414.56_4130565.39	582414.56	4130565.39	3.64E-05	4.49E-06	1.35E-03	5.53E-04	0.007	Res
582471.13_4130565.39	582471.13	4130565.39	3.19E-05	3.99E-06	1.16E-03	4.85E-04	0.006	Res
582527.7_4130565.39	582527.7	4130565.39	2.87E-05	3.62E-06	1.03E-03	4.36E-04	0.005	Res
582584.27_4130565.39	582584.27	4130565.39	2.84E-05	3.58E-06	1.02E-03	4.32E-04	0.005	Res
582640.84_4130565.39	582640.84	4130565.39	2.68E-05	3.38E-06	9.60E-04	4.07E-04	0.005	Res
582697.41_4130565.39	582697.41	4130565.39	2.60E-05	3.28E-06	9.32E-04	3.95E-04	0.005	Res
582753.98_4130565.39	582753.98	4130565.39	2.43E-05	3.07E-06	8.64E-04	3.69E-04	0.004	Res
582810.55_4130565.39	582810.55	4130565.39	2.19E-05	2.80E-06	7.72E-04	3.33E-04	0.004	Res
582867.12_4130565.39	582867.12	4130565.39	1.93E-05	2.49E-06	6.67E-04	2.94E-04	0.003	Res
581735.72_4130649.3	581735.72	4130649.3	2.64E-05	3.36E-06	9.26E-04	4.01E-04	0.005	Res
581792.29_4130649.3	581792.29	4130649.3	2.49E-05	3.11E-06	9.03E-04	3.78E-04	0.005	Res
581905.43_4130649.3	581905.43	4130649.3	4.12E-05	5.00E-06	1.58E-03	6.27E-04	0.008	Res
581962_4130649.3	581962	4130649.3	4.39E-05	5.33E-06	1.69E-03	6.68E-04	0.009	Res
582018.57_4130649.3	582018.57	4130649.3	4.14E-05	5.07E-06	1.57E-03	6.30E-04	0.008	Res
582075.14_4130649.3	582075.14	4130649.3	4.44E-05	5.42E-06	1.69E-03	6.75E-04	0.009	Res
582131.71_4130649.3	582131.71	4130649.3	4.27E-05	5.24E-06	1.61E-03	6.49E-04	0.008	Res
582188.28_4130649.3	582188.28	4130649.3	4.53E-05	5.54E-06	1.72E-03	6.89E-04	0.009	Res
582244.85_4130649.3	582244.85	4130649.3	4.47E-05	5.47E-06	1.69E-03	6.80E-04	0.009	Res
582301.42_4130649.3	582301.42	4130649.3	4.00E-05	4.94E-06	1.50E-03	6.09E-04	0.008	Res
582357.99_4130649.3	582357.99	4130649.3	3.43E-05	4.28E-06	1.25E-03	5.21E-04	0.006	Res
582414.56_4130649.3	582414.56	4130649.3	3.41E-05	4.24E-06	1.25E-03	5.18E-04	0.006	Res
582471.13_4130649.3	582471.13	4130649.3	3.22E-05	4.02E-06	1.18E-03	4.90E-04	0.006	Res
582527.7_4130649.3	582527.7	4130649.3	3.07E-05	3.84E-06	1.12E-03	4.66E-04	0.006	Res
582584.27_4130649.3	582584.27	4130649.3	2.78E-05	3.50E-06	1.00E-03	4.23E-04	0.005	Res
582640.84_4130649.3	582640.84	4130649.3	2.43E-05	3.09E-06	8.60E-04	3.69E-04	0.004	Res
582697.41_4130649.3	582697.41	4130649.3	2.23E-05	2.85E-06	7.81E-04	3.39E-04	0.004	Res
582753.98_4130649.3	582753.98	4130649.3	2.32E-05	2.94E-06	8.20E-04	3.52E-04	0.004	Res
582810.55_4130649.3	582810.55	4130649.3	2.38E-05	3.01E-06	8.50E-04	3.62E-04	0.004	Res

Acute Calculation, $\sum C_{TAC}$ /REL

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)				Total HI	Receptor Type
	UTM X	UTM Y	Arsenic	Mercury	Nickel	Vanadium		
582867.12_4130649.3	582867.12	4130649.3	2.40E-05	3.03E-06	8.62E-04	3.65E-04	0.004	Res
581848.86_4130733.21	581848.86	4130733.21	4.92E-05	5.88E-06	1.94E-03	7.48E-04	0.010	Res
581905.43_4130733.21	581905.43	4130733.21	4.63E-05	5.49E-06	1.85E-03	7.04E-04	0.009	Res
581962_4130733.21	581962	4130733.21	4.77E-05	5.59E-06	1.93E-03	7.25E-04	0.010	Res
582018.57_4130733.21	582018.57	4130733.21	4.60E-05	5.44E-06	1.85E-03	7.00E-04	0.009	Res
582075.14_4130733.21	582075.14	4130733.21	5.13E-05	6.05E-06	2.06E-03	7.79E-04	0.011	Res
582131.71_4130733.21	582131.71	4130733.21	4.71E-05	5.61E-06	1.86E-03	7.16E-04	0.010	Res
582188.28_4130733.21	582188.28	4130733.21	4.24E-05	5.10E-06	1.65E-03	6.45E-04	0.008	Res
582244.85_4130733.21	582244.85	4130733.21	4.03E-05	4.89E-06	1.55E-03	6.13E-04	0.008	Res
582301.42_4130733.21	582301.42	4130733.21	3.89E-05	4.75E-06	1.48E-03	5.92E-04	0.008	Res
582357.99_4130733.21	582357.99	4130733.21	3.66E-05	4.49E-06	1.38E-03	5.57E-04	0.007	Res
582414.56_4130733.21	582414.56	4130733.21	3.21E-05	4.00E-06	1.18E-03	4.89E-04	0.006	Res
582471.13_4130733.21	582471.13	4130733.21	2.80E-05	3.53E-06	1.01E-03	4.26E-04	0.005	Res
582527.7_4130733.21	582527.7	4130733.21	2.92E-05	3.66E-06	1.06E-03	4.44E-04	0.005	Res
582584.27_4130733.21	582584.27	4130733.21	2.97E-05	3.71E-06	1.09E-03	4.52E-04	0.006	Res
582640.84_4130733.21	582640.84	4130733.21	2.95E-05	3.68E-06	1.08E-03	4.49E-04	0.006	Res
582697.41_4130733.21	582697.41	4130733.21	2.88E-05	3.59E-06	1.06E-03	4.38E-04	0.005	Res
582753.98_4130733.21	582753.98	4130733.21	2.76E-05	3.44E-06	1.01E-03	4.19E-04	0.005	Res
582810.55_4130733.21	582810.55	4130733.21	2.61E-05	3.27E-06	9.52E-04	3.97E-04	0.005	Res
582867.12_4130733.21	582867.12	4130733.21	2.43E-05	3.05E-06	8.80E-04	3.69E-04	0.005	Res
581735.72_4130817.12	581735.72	4130817.12	5.20E-05	6.36E-06	1.97E-03	7.91E-04	0.010	Res
581792.29_4130817.12	581792.29	4130817.12	6.17E-05	7.40E-06	2.41E-03	9.38E-04	0.012	Res
581848.86_4130817.12	581848.86	4130817.12	6.52E-05	7.75E-06	2.58E-03	9.90E-04	0.013	Res
581905.43_4130817.12	581905.43	4130817.12	6.37E-05	7.53E-06	2.55E-03	9.68E-04	0.013	Res
581962_4130817.12	581962	4130817.12	6.25E-05	7.34E-06	2.52E-03	9.49E-04	0.013	Res
582018.57_4130817.12	582018.57	4130817.12	5.43E-05	6.38E-06	2.19E-03	8.26E-04	0.011	Res
582075.14_4130817.12	582075.14	4130817.12	5.03E-05	5.89E-06	2.05E-03	7.65E-04	0.011	Res
582131.71_4130817.12	582131.71	4130817.12	4.77E-05	5.54E-06	1.95E-03	7.25E-04	0.010	Res
582188.28_4130817.12	582188.28	4130817.12	4.28E-05	5.02E-06	1.73E-03	6.50E-04	0.009	Res
582244.85_4130817.12	582244.85	4130817.12	3.51E-05	4.18E-06	1.38E-03	5.33E-04	0.007	Res
582301.42_4130817.12	582301.42	4130817.12	3.76E-05	4.49E-06	1.48E-03	5.72E-04	0.008	Res
582357.99_4130817.12	582357.99	4130817.12	3.84E-05	4.59E-06	1.50E-03	5.83E-04	0.008	Res
582414.56_4130817.12	582414.56	4130817.12	3.72E-05	4.48E-06	1.45E-03	5.66E-04	0.007	Res
582471.13_4130817.12	582471.13	4130817.12	3.51E-05	4.26E-06	1.35E-03	5.34E-04	0.007	Res
582527.7_4130817.12	582527.7	4130817.12	3.21E-05	3.93E-06	1.21E-03	4.88E-04	0.006	Res
582584.27_4130817.12	582584.27	4130817.12	3.11E-05	3.82E-06	1.17E-03	4.73E-04	0.006	Res
582640.84_4130817.12	582640.84	4130817.12	3.06E-05	3.78E-06	1.14E-03	4.66E-04	0.006	Res
582697.41_4130817.12	582697.41	4130817.12	2.98E-05	3.68E-06	1.11E-03	4.53E-04	0.006	Res
582753.98_4130817.12	582753.98	4130817.12	2.85E-05	3.54E-06	1.05E-03	4.33E-04	0.005	Res
582810.55_4130817.12	582810.55	4130817.12	2.73E-05	3.40E-06	1.01E-03	4.15E-04	0.005	Res
582867.12_4130817.12	582867.12	4130817.12	2.67E-05	3.32E-06	9.81E-04	4.05E-04	0.005	Res
581735.72_4130901.03	581735.72	4130901.03	8.66E-05	1.02E-05	3.50E-03	1.32E-03	0.018	Res
581792.29_4130901.03	581792.29	4130901.03	9.72E-05	1.14E-05	3.95E-03	1.48E-03	0.020	Res
581848.86_4130901.03	581848.86	4130901.03	8.48E-05	9.96E-06	3.42E-03	1.29E-03	0.018	Res
581905.43_4130901.03	581905.43	4130901.03	7.72E-05	9.10E-06	3.11E-03	1.17E-03	0.016	Res
581962_4130901.03	581962	4130901.03	7.51E-05	8.82E-06	3.03E-03	1.14E-03	0.016	Res
582018.57_4130901.03	582018.57	4130901.03	6.39E-05	7.53E-06	2.57E-03	9.71E-04	0.013	Res
582075.14_4130901.03	582075.14	4130901.03	6.53E-05	7.65E-06	2.65E-03	9.93E-04	0.014	Res
582131.71_4130901.03	582131.71	4130901.03	6.12E-05	7.15E-06	2.50E-03	9.31E-04	0.013	Res

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)				Acute Calculation, $\sum C_{TAC}$ /REL	
	UTM X	UTM Y	Arsenic	Mercury	Nickel	Vanadium	Total HI	Receptor Type
582188.28_4130901.03	582188.28	4130901.03	5.30E-05	6.18E-06	2.16E-03	8.05E-04	0.011	Res
582244.85_4130901.03	582244.85	4130901.03	4.66E-05	5.43E-06	1.91E-03	7.08E-04	0.010	Res
582301.42_4130901.03	582301.42	4130901.03	4.26E-05	4.95E-06	1.75E-03	6.48E-04	0.009	Res
582357.99_4130901.03	582357.99	4130901.03	3.93E-05	4.59E-06	1.60E-03	5.97E-04	0.008	Res
582414.56_4130901.03	582414.56	4130901.03	3.66E-05	4.31E-06	1.47E-03	5.57E-04	0.008	Res
582471.13_4130901.03	582471.13	4130901.03	3.48E-05	4.12E-06	1.38E-03	5.28E-04	0.007	Res
582527.7_4130901.03	582527.7	4130901.03	3.28E-05	3.92E-06	1.29E-03	4.98E-04	0.007	Res
582584.27_4130901.03	582584.27	4130901.03	3.09E-05	3.73E-06	1.20E-03	4.70E-04	0.006	Res
582640.84_4130901.03	582640.84	4130901.03	2.92E-05	3.55E-06	1.12E-03	4.44E-04	0.006	Res
582697.41_4130901.03	582697.41	4130901.03	2.75E-05	3.36E-06	1.04E-03	4.17E-04	0.005	Res
582753.98_4130901.03	582753.98	4130901.03	2.60E-05	3.21E-06	9.67E-04	3.95E-04	0.005	Res
582810.55_4130901.03	582810.55	4130901.03	2.54E-05	3.15E-06	9.39E-04	3.86E-04	0.005	Res
582867.12_4130901.03	582867.12	4130901.03	2.49E-05	3.09E-06	9.15E-04	3.78E-04	0.005	Res
581735.72_4130984.94	581735.72	4130984.94	1.68E-04	1.92E-05	7.05E-03	2.55E-03	0.036	Res
581792.29_4130984.94	581792.29	4130984.94	1.76E-04	2.01E-05	7.40E-03	2.68E-03	0.038	Res
581848.86_4130984.94	581848.86	4130984.94	1.81E-04	2.07E-05	7.62E-03	2.76E-03	0.039	Res
581905.43_4130984.94	581905.43	4130984.94	1.65E-04	1.89E-05	6.90E-03	2.50E-03	0.035	Res
581962_4130984.94	581962	4130984.94	1.19E-04	1.37E-05	4.92E-03	1.81E-03	0.025	Res
582018.57_4130984.94	582018.57	4130984.94	8.85E-05	1.03E-05	3.61E-03	1.34E-03	0.019	Res
582075.14_4130984.94	582075.14	4130984.94	7.00E-05	8.22E-06	2.82E-03	1.06E-03	0.015	Res
582131.71_4130984.94	582131.71	4130984.94	5.88E-05	6.93E-06	2.36E-03	8.93E-04	0.012	Res
582188.28_4130984.94	582188.28	4130984.94	5.22E-05	6.17E-06	2.09E-03	7.94E-04	0.011	Res
582244.85_4130984.94	582244.85	4130984.94	4.69E-05	5.53E-06	1.88E-03	7.12E-04	0.010	Res
582301.42_4130984.94	582301.42	4130984.94	4.24E-05	4.99E-06	1.71E-03	6.44E-04	0.009	Res
582357.99_4130984.94	582357.99	4130984.94	3.86E-05	4.54E-06	1.56E-03	5.87E-04	0.008	Res
582414.56_4130984.94	582414.56	4130984.94	3.54E-05	4.14E-06	1.44E-03	5.38E-04	0.007	Res
582471.13_4130984.94	582471.13	4130984.94	3.26E-05	3.80E-06	1.33E-03	4.96E-04	0.007	Res
582527.7_4130984.94	582527.7	4130984.94	3.09E-05	3.62E-06	1.25E-03	4.70E-04	0.006	Res
582584.27_4130984.94	582584.27	4130984.94	2.98E-05	3.52E-06	1.19E-03	4.53E-04	0.006	Res
582640.84_4130984.94	582640.84	4130984.94	2.90E-05	3.45E-06	1.15E-03	4.41E-04	0.006	Res
582697.41_4130984.94	582697.41	4130984.94	2.81E-05	3.36E-06	1.11E-03	4.28E-04	0.006	Res
582753.98_4130984.94	582753.98	4130984.94	2.76E-05	3.31E-06	1.07E-03	4.19E-04	0.006	Res
582810.55_4130984.94	582810.55	4130984.94	2.69E-05	3.25E-06	1.04E-03	4.09E-04	0.005	Res
582867.12_4130984.94	582867.12	4130984.94	2.62E-05	3.19E-06	1.00E-03	3.99E-04	0.005	Res
581735.72_4131068.85	581735.72	4131068.85	6.44E-05	7.57E-06	2.60E-03	9.78E-04	0.013	Res
581792.29_4131068.85	581792.29	4131068.85	6.43E-05	7.51E-06	2.62E-03	9.78E-04	0.013	Res
581848.86_4131068.85	581848.86	4131068.85	6.99E-05	8.17E-06	2.85E-03	1.06E-03	0.015	Res
581905.43_4131068.85	581905.43	4131068.85	6.94E-05	8.13E-06	2.81E-03	1.05E-03	0.014	Res
581962_4131068.85	581962	4131068.85	7.17E-05	8.42E-06	2.90E-03	1.09E-03	0.015	Res
582018.57_4131068.85	582018.57	4131068.85	6.36E-05	7.51E-06	2.55E-03	9.67E-04	0.013	Res
582075.14_4131068.85	582075.14	4131068.85	5.55E-05	6.60E-06	2.20E-03	8.44E-04	0.011	Res
582131.71_4131068.85	582131.71	4131068.85	5.06E-05	6.04E-06	1.99E-03	7.69E-04	0.010	Res
582188.28_4131068.85	582188.28	4131068.85	4.72E-05	5.65E-06	1.86E-03	7.18E-04	0.010	Res
582244.85_4131068.85	582244.85	4131068.85	4.45E-05	5.31E-06	1.75E-03	6.76E-04	0.009	Res
582301.42_4131068.85	582301.42	4131068.85	4.17E-05	4.98E-06	1.65E-03	6.34E-04	0.008	Res
582357.99_4131068.85	582357.99	4131068.85	3.90E-05	4.63E-06	1.54E-03	5.92E-04	0.008	Res
582414.56_4131068.85	582414.56	4131068.85	3.64E-05	4.31E-06	1.45E-03	5.53E-04	0.007	Res
582471.13_4131068.85	582471.13	4131068.85	3.39E-05	4.00E-06	1.36E-03	5.15E-04	0.007	Res
582527.7_4131068.85	582527.7	4131068.85	3.15E-05	3.71E-06	1.27E-03	4.79E-04	0.007	Res

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)				Acute Calculation, $\sum C_{TAC}$ /REL	
	UTM X	UTM Y	Arsenic	Mercury	Nickel	Vanadium	Total HI	Receptor Type
582584.27_4131068.85	582584.27	4131068.85	2.92E-05	3.42E-06	1.18E-03	4.43E-04	0.006	Res
582640.84_4131068.85	582640.84	4131068.85	2.77E-05	3.24E-06	1.13E-03	4.22E-04	0.006	Res
582697.41_4131068.85	582697.41	4131068.85	2.68E-05	3.14E-06	1.09E-03	4.08E-04	0.006	Res
582753.98_4131068.85	582753.98	4131068.85	2.64E-05	3.11E-06	1.06E-03	4.02E-04	0.005	Res
582810.55_4131068.85	582810.55	4131068.85	2.60E-05	3.08E-06	1.04E-03	3.95E-04	0.005	Res
582867.12_4131068.85	582867.12	4131068.85	2.51E-05	3.00E-06	9.89E-04	3.82E-04	0.005	Res
582018.57_4131152.76	582018.57	4131152.76	4.44E-05	5.30E-06	1.75E-03	6.74E-04	0.009	Res
582244.85_4131152.76	582244.85	4131152.76	3.93E-05	4.75E-06	1.52E-03	5.98E-04	0.008	Res
582301.42_4131152.76	582301.42	4131152.76	3.75E-05	4.53E-06	1.45E-03	5.70E-04	0.007	Res
582357.99_4131152.76	582357.99	4131152.76	3.50E-05	4.23E-06	1.35E-03	5.32E-04	0.007	Res
582414.56_4131152.76	582414.56	4131152.76	3.24E-05	3.92E-06	1.25E-03	4.93E-04	0.006	Res
582471.13_4131152.76	582471.13	4131152.76	2.91E-05	3.53E-06	1.12E-03	4.43E-04	0.006	Res
582527.7_4131152.76	582527.7	4131152.76	2.63E-05	3.18E-06	1.02E-03	4.00E-04	0.005	Res
582584.27_4131152.76	582584.27	4131152.76	2.42E-05	2.92E-06	9.38E-04	3.68E-04	0.005	Res
582640.84_4131152.76	582640.84	4131152.76	2.32E-05	2.78E-06	9.09E-04	3.53E-04	0.005	Res
582697.41_4131152.76	582697.41	4131152.76	2.22E-05	2.65E-06	8.80E-04	3.38E-04	0.005	Res
582753.98_4131152.76	582753.98	4131152.76	2.17E-05	2.57E-06	8.68E-04	3.30E-04	0.004	Res
582810.55_4131152.76	582810.55	4131152.76	2.10E-05	2.47E-06	8.50E-04	3.20E-04	0.004	Res
582867.12_4131152.76	582867.12	4131152.76	2.04E-05	2.40E-06	8.19E-04	3.10E-04	0.004	Res

HRA Permanente Creek Restoration Project

Construction Year 2028

Emissions Inputs

Construction Activity	Construction Year & Source	DPM Exhaust (tons/year)	PM10 Dust for speciation (tons/year)	Arsenic (tons/year)	Beryllium (tons/year)	Cadmium (tons/year)	Cobalt (tons/year)	Copper (tons/year)	Lead (tons/year)	Mercury (tons/year)	Nickel (tons/year)	Selenium (tons/year)	Chromium VI (tons/year)	Crystalline Silica (tons/year)	Vanadium (tons/year)
Concrete Channel 2024	2024_CONCRTE	0.000	0.00	2.91E-12	1.74E-12	2.91E-12	1.49E-11	3.26E-11	2.91E-12	4.65E-13	5.35E-11	5.81E-12	2.33E-13	8.63E-09	4.42E-11
Paved road	2024_PAVED	2.07E-04	0.08	1.04E-07	6.26E-08	1.04E-07	6.68E-08	2.09E-06	1.92E-07	1.17E-08	4.51E-06	2.09E-07	1.59E-07	5.93E-04	1.59E-06
Unpaved road	2024_CCP_UNPV	6.27E-05	0.20	2.56E-07	1.54E-07	2.56E-07	1.64E-07	5.12E-06	4.71E-07	2.87E-08	1.11E-05	5.12E-07	3.89E-07	1.46E-03	3.89E-06
Channel Widening 2024	2024_CHAN_RCK	0.002	0.16	2.05E-07	1.23E-07	2.05E-07	1.05E-06	2.29E-06	2.05E-07	3.28E-08	3.77E-06	4.09E-07	1.64E-08	6.08E-04	3.11E-06
Paved road	2024_PAVED	1.80E-03	2.39	2.99E-06	1.79E-06	2.99E-06	1.91E-06	5.98E-05	5.50E-06	3.35E-07	1.29E-04	5.98E-06	4.54E-06	1.70E-02	4.54E-05
Rock Pile Area 2025	2025_CHAN_RCK	0.006	0.25	3.16E-07	1.89E-07	3.16E-07	1.62E-06	3.54E-06	3.16E-07	5.05E-08	5.81E-06	6.31E-07	2.53E-08	9.37E-04	4.80E-06
Paved road	2025_PAVED	5.95E-03	2.44	3.05E-06	1.83E-06	3.05E-06	1.95E-06	6.10E-05	5.61E-06	3.41E-07	1.32E-04	6.10E-06	4.63E-06	1.73E-02	4.63E-05
Rock Pile Area 2026	2026_CHAN_RCK	0.006	0.25	3.16E-07	1.89E-07	3.16E-07	1.62E-06	3.54E-06	3.16E-07	5.05E-08	5.81E-06	6.31E-07	2.53E-08	9.37E-04	4.80E-06
Paved road	2026_PAVED	5.84E-03	2.44	3.05E-06	1.83E-06	3.05E-06	1.95E-06	6.10E-05	5.61E-06	3.41E-07	1.32E-04	6.10E-06	4.63E-06	1.73E-02	4.63E-05
Channel Widening 2027	2027_CHAN_RCK	0.002	0.98	1.23E-06	7.36E-07	1.23E-06	6.28E-06	1.37E-05	1.23E-06	1.96E-07	2.26E-05	2.45E-06	9.82E-08	3.64E-03	1.87E-05
Paved road	2027_PAVED	5.61E-03	2.39	2.99E-06	1.79E-06	2.99E-06	1.91E-06	5.98E-05	5.50E-06	3.35E-07	1.29E-04	5.98E-06	4.54E-06	1.70E-02	4.54E-05
Material Removal 2028	2028_MATRMVL	0.001	0.25	3.15E-07	1.89E-07	3.15E-07	1.62E-06	3.53E-06	3.15E-07	5.05E-08	5.80E-06	6.31E-07	2.52E-08	9.37E-04	4.80E-06
Paved road	2028_PAVED	5.57E-03	2.39	2.99E-06	1.80E-06	2.99E-06	1.92E-06	5.98E-05	5.51E-06	3.35E-07	1.29E-04	5.98E-06	4.55E-06	1.70E-02	4.55E-05
Unpaved road	2028_UNPAVED	3.40E-03	11.84	1.48E-05	8.88E-06	1.48E-05	9.47E-06	2.96E-04	2.72E-05	1.66E-06	6.40E-04	2.96E-05	2.25E-05	8.41E-02	2.25E-04
Material Removal 2029	2029_MATRMVL	0.001	0.25	3.15E-07	1.89E-07	3.15E-07	1.62E-06	3.53E-06	3.15E-07	5.05E-08	5.80E-06	6.31E-07	2.52E-08	9.37E-04	4.80E-06
Paved road	2029_PAVED	5.56E-03	2.41	3.01E-06	1.81E-06	3.01E-06	1.93E-06	6.03E-05	5.55E-06	3.38E-07	1.30E-04	6.03E-06	4.58E-06	1.71E-02	4.58E-05
Unpaved road	2029_UNPAVED	3.39E-03	11.93	1.49E-05	8.95E-06	1.49E-05	9.55E-06	2.98E-04	2.74E-05	1.67E-06	6.44E-04	2.98E-05	2.27E-05	8.47E-02	2.27E-04

Construction Activity	Construction Year	DPM (g/s)	Arsenic (g/s)	Beryllium (g/s)	Cadmium (g/s)	Cobalt (g/s)	Copper (g/s)	Lead (g/s)	Mercury (g/s)	Nickel (g/s)	Selenium (g/s)	Chromium VI (g/s)	Crystalline Silica (g/s)	Vanadium (g/s)	No. of Workdays (days)
Concrete Channel 2024	2024_CONCRTE	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	130.00
Paved road	2024_PAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	130.00
Unpaved road	2024_CCP_UNPV	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	130.00
Channel Widening 2024	2024_CHAN_RCK	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	130.00
Paved road	2024_PAVED	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	130.00
Rock Pile Area 2025	2025_CHAN_RCK	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	130.00
Paved road	2025_PAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	130.00
Rock Pile Area 2026	2026_CHAN_RCK	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	130.00
Paved road	2026_PAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	130.00
Channel Widening 2027	2027_CHAN_RCK	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	130.00
Paved road	2027_PAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	130.00
Material Removal 2028	2028_MATRMVL	9.332E-05	2.548E-08	1.529E-08	2.548E-08	1.305E-07	2.854E-07	2.548E-08	4.077E-09	4.688E-07	5.096E-08	2.038E-09	7.568E-05	3.873E-07	130.00
Paved road	2028_PAVED	4.502E-04	2.417E-07	1.450E-07	2.417E-07	1.547E-07	4.834E-06	4.447E-07	2.707E-08	1.044E-05	4.834E-07	3.673E-07	1.373E-03	3.673E-06	130.00
Unpaved road	2028_UNPAVED	2.750E-04	1.196E-06	7.174E-07	1.196E-06	7.653E-07	2.391E-05	2.200E-06	1.339E-07	5.166E-05	2.391E-06	1.817E-06	6.791E-03	1.817E-05	130.00
Material Removal 2029	2029_MATRMVL	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	130.00
Paved road	2029_PAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	130.00
Unpaved road	2029_UNPAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	130.00

N/A = not including PM10 on-site dust in HRA calculation; it is only for speciating metals.

Acute REL

TAC	UOM	
Arsenic	$\mu g/m^3$	0.2
Mercury	$\mu g/m^3$	0.61
Nickel	$\mu g/m^3$	0.2
Vanadium	$\mu g/m^3$	31

	Max
CT House	0.036
Res	0.055
Acute	0.033

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)				Acute Calculation, $\sum C_{TAC}$ /REL	
	UTM X	UTM Y	Arsenic	Mercury	Nickel	Vanadium	Total HI	Receptor Type
			0.2	0.61	0.2	31		
581336.22_4131207.48	581336.22	4131207.48	1.64E-04	1.85E-05	7.06E-03	2.50E-03	0.036	CT House
581554.22_4130688.06	581554.22	4130688.06	1.09E-04	1.22E-05	4.67E-03	1.65E-03	0.024	Res
579793.36_4131503.29	579793.36	4131503.29	8.12E-05	9.19E-06	3.46E-03	1.23E-03	0.018	Acute
580488.37_4131517.71	580488.37	4131517.71	8.46E-05	9.52E-06	3.63E-03	1.29E-03	0.019	Acute
581678.43_4131040.03	581678.43	4131040.03	1.73E-04	1.94E-05	7.43E-03	2.62E-03	0.038	Res
581635.43_4130978.54	581635.43	4130978.54	2.00E-04	2.25E-05	8.63E-03	3.05E-03	0.044	Res
581830.06_4131027.55	581830.06	4131027.55	2.01E-04	2.26E-05	8.67E-03	3.06E-03	0.044	Res
581727.48_4130976.54	581727.48	4130976.54	2.18E-04	2.44E-05	9.38E-03	3.31E-03	0.048	Res
581789.11_4130419.65	581789.11	4130419.65	1.07E-04	1.20E-05	4.57E-03	1.62E-03	0.023	Res
581700.32_4130781.89	581700.32	4130781.89	1.10E-04	1.24E-05	4.73E-03	1.67E-03	0.024	Res
581426.07_4131299.01	581426.07	4131299.01	1.47E-04	1.66E-05	6.33E-03	2.24E-03	0.033	Acute
582301.42_4129474.56	582301.42	4129474.56	6.94E-05	7.82E-06	2.97E-03	1.06E-03	0.015	Res
582357.99_4129474.56	582357.99	4129474.56	6.59E-05	7.43E-06	2.82E-03	1.00E-03	0.014	Res
582414.56_4129474.56	582414.56	4129474.56	6.33E-05	7.13E-06	2.71E-03	9.61E-04	0.014	Res
582471.13_4129474.56	582471.13	4129474.56	5.95E-05	6.71E-06	2.55E-03	9.04E-04	0.013	Res
582527.7_4129474.56	582527.7	4129474.56	5.57E-05	6.29E-06	2.39E-03	8.47E-04	0.012	Res
582584.27_4129474.56	582584.27	4129474.56	5.14E-05	5.80E-06	2.20E-03	7.81E-04	0.011	Res
582640.84_4129474.56	582640.84	4129474.56	4.84E-05	5.47E-06	2.07E-03	7.36E-04	0.011	Res
582244.85_4129558.47	582244.85	4129558.47	6.84E-05	7.71E-06	2.93E-03	1.04E-03	0.015	Res
582301.42_4129558.47	582301.42	4129558.47	6.37E-05	7.18E-06	2.73E-03	9.68E-04	0.014	Res
582357.99_4129558.47	582357.99	4129558.47	5.88E-05	6.63E-06	2.52E-03	8.93E-04	0.013	Res
582414.56_4129558.47	582414.56	4129558.47	5.55E-05	6.26E-06	2.37E-03	8.43E-04	0.012	Res
582471.13_4129558.47	582471.13	4129558.47	5.65E-05	6.37E-06	2.42E-03	8.59E-04	0.012	Res
582527.7_4129558.47	582527.7	4129558.47	5.74E-05	6.47E-06	2.46E-03	8.73E-04	0.013	Res
582584.27_4129558.47	582584.27	4129558.47	5.82E-05	6.55E-06	2.49E-03	8.84E-04	0.013	Res
582640.84_4129558.47	582640.84	4129558.47	5.88E-05	6.62E-06	2.52E-03	8.93E-04	0.013	Res
582697.41_4129558.47	582697.41	4129558.47	5.94E-05	6.69E-06	2.54E-03	9.03E-04	0.013	Res
582244.85_4129642.38	582244.85	4129642.38	6.65E-05	7.49E-06	2.85E-03	1.01E-03	0.015	Res
582301.42_4129642.38	582301.42	4129642.38	6.63E-05	7.47E-06	2.84E-03	1.01E-03	0.015	Res
582357.99_4129642.38	582357.99	4129642.38	6.59E-05	7.42E-06	2.82E-03	1.00E-03	0.014	Res
582414.56_4129642.38	582414.56	4129642.38	6.69E-05	7.54E-06	2.87E-03	1.02E-03	0.015	Res
582471.13_4129642.38	582471.13	4129642.38	6.77E-05	7.63E-06	2.90E-03	1.03E-03	0.015	Res
582527.7_4129642.38	582527.7	4129642.38	6.83E-05	7.70E-06	2.93E-03	1.04E-03	0.015	Res
582584.27_4129642.38	582584.27	4129642.38	6.83E-05	7.69E-06	2.93E-03	1.04E-03	0.015	Res
582640.84_4129642.38	582640.84	4129642.38	6.84E-05	7.70E-06	2.93E-03	1.04E-03	0.015	Res
582697.41_4129642.38	582697.41	4129642.38	6.87E-05	7.74E-06	2.95E-03	1.04E-03	0.015	Res
582753.98_4129642.38	582753.98	4129642.38	6.82E-05	7.68E-06	2.92E-03	1.04E-03	0.015	Res
582810.55_4129642.38	582810.55	4129642.38	6.72E-05	7.56E-06	2.88E-03	1.02E-03	0.015	Res
582867.12_4129642.38	582867.12	4129642.38	6.70E-05	7.55E-06	2.87E-03	1.02E-03	0.015	Res
582244.85_4129726.29	582244.85	4129726.29	7.96E-05	8.97E-06	3.42E-03	1.21E-03	0.018	Res

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)				Acute Calculation, $\sum C_{TAC}$ /REL	
	UTM X	UTM Y	Arsenic	Mercury	Nickel	Vanadium	Total HI	Receptor Type
582301.42_4129726.29	582301.42	4129726.29	7.98E-05	8.99E-06	3.42E-03	1.21E-03	0.018	Res
582357.99_4129726.29	582357.99	4129726.29	7.88E-05	8.87E-06	3.38E-03	1.20E-03	0.017	Res
582414.56_4129726.29	582414.56	4129726.29	7.77E-05	8.75E-06	3.33E-03	1.18E-03	0.017	Res
582471.13_4129726.29	582471.13	4129726.29	7.65E-05	8.61E-06	3.28E-03	1.16E-03	0.017	Res
582527.7_4129726.29	582527.7	4129726.29	7.51E-05	8.45E-06	3.22E-03	1.14E-03	0.017	Res
582584.27_4129726.29	582584.27	4129726.29	7.44E-05	8.38E-06	3.19E-03	1.13E-03	0.016	Res
582640.84_4129726.29	582640.84	4129726.29	7.38E-05	8.30E-06	3.16E-03	1.12E-03	0.016	Res
582697.41_4129726.29	582697.41	4129726.29	7.17E-05	8.07E-06	3.07E-03	1.09E-03	0.016	Res
582753.98_4129726.29	582753.98	4129726.29	6.93E-05	7.81E-06	2.97E-03	1.05E-03	0.015	Res
582810.55_4129726.29	582810.55	4129726.29	6.77E-05	7.63E-06	2.91E-03	1.03E-03	0.015	Res
582244.85_4129810.2	582244.85	4129810.2	8.81E-05	9.92E-06	3.78E-03	1.34E-03	0.019	Res
582301.42_4129810.2	582301.42	4129810.2	8.57E-05	9.64E-06	3.68E-03	1.30E-03	0.019	Res
582357.99_4129810.2	582357.99	4129810.2	8.30E-05	9.34E-06	3.56E-03	1.26E-03	0.018	Res
582414.56_4129810.2	582414.56	4129810.2	7.99E-05	9.00E-06	3.43E-03	1.21E-03	0.018	Res
582471.13_4129810.2	582471.13	4129810.2	7.68E-05	8.65E-06	3.30E-03	1.17E-03	0.017	Res
582527.7_4129810.2	582527.7	4129810.2	7.52E-05	8.46E-06	3.22E-03	1.14E-03	0.017	Res
582584.27_4129810.2	582584.27	4129810.2	7.29E-05	8.21E-06	3.13E-03	1.11E-03	0.016	Res
582640.84_4129810.2	582640.84	4129810.2	6.98E-05	7.86E-06	2.99E-03	1.06E-03	0.015	Res
582697.41_4129810.2	582697.41	4129810.2	6.72E-05	7.57E-06	2.88E-03	1.02E-03	0.015	Res
581905.43_4129894.11	581905.43	4129894.11	9.39E-05	1.06E-05	4.03E-03	1.43E-03	0.021	Res
581962_4129894.11	581962	4129894.11	9.40E-05	1.06E-05	4.03E-03	1.43E-03	0.021	Res
582131.71_4129894.11	582131.71	4129894.11	8.92E-05	1.00E-05	3.83E-03	1.36E-03	0.020	Res
582188.28_4129894.11	582188.28	4129894.11	8.63E-05	9.71E-06	3.70E-03	1.31E-03	0.019	Res
582244.85_4129894.11	582244.85	4129894.11	8.21E-05	9.24E-06	3.52E-03	1.25E-03	0.018	Res
582301.42_4129894.11	582301.42	4129894.11	7.87E-05	8.86E-06	3.37E-03	1.20E-03	0.017	Res
582357.99_4129894.11	582357.99	4129894.11	7.54E-05	8.50E-06	3.23E-03	1.15E-03	0.017	Res
582414.56_4129894.11	582414.56	4129894.11	7.61E-05	8.57E-06	3.26E-03	1.16E-03	0.017	Res
582471.13_4129894.11	582471.13	4129894.11	7.71E-05	8.69E-06	3.31E-03	1.17E-03	0.017	Res
582527.7_4129894.11	582527.7	4129894.11	7.67E-05	8.63E-06	3.29E-03	1.17E-03	0.017	Res
582584.27_4129894.11	582584.27	4129894.11	7.53E-05	8.48E-06	3.23E-03	1.14E-03	0.017	Res
582640.84_4129894.11	582640.84	4129894.11	7.54E-05	8.48E-06	3.23E-03	1.15E-03	0.017	Res
582697.41_4129894.11	582697.41	4129894.11	7.41E-05	8.34E-06	3.18E-03	1.13E-03	0.016	Res
581962_4129978.02	581962	4129978.02	9.13E-05	1.03E-05	3.92E-03	1.39E-03	0.020	Res
582018.57_4129978.02	582018.57	4129978.02	8.87E-05	9.99E-06	3.81E-03	1.35E-03	0.020	Res
582075.14_4129978.02	582075.14	4129978.02	9.20E-05	1.04E-05	3.95E-03	1.40E-03	0.020	Res
582131.71_4129978.02	582131.71	4129978.02	8.97E-05	1.01E-05	3.85E-03	1.36E-03	0.020	Res
582188.28_4129978.02	582188.28	4129978.02	8.83E-05	9.94E-06	3.79E-03	1.34E-03	0.019	Res
582244.85_4129978.02	582244.85	4129978.02	8.68E-05	9.77E-06	3.73E-03	1.32E-03	0.019	Res
582301.42_4129978.02	582301.42	4129978.02	8.48E-05	9.54E-06	3.64E-03	1.29E-03	0.019	Res
582357.99_4129978.02	582357.99	4129978.02	8.43E-05	9.48E-06	3.62E-03	1.28E-03	0.019	Res
582414.56_4129978.02	582414.56	4129978.02	8.42E-05	9.47E-06	3.61E-03	1.28E-03	0.019	Res
582471.13_4129978.02	582471.13	4129978.02	8.21E-05	9.24E-06	3.52E-03	1.25E-03	0.018	Res
582527.7_4129978.02	582527.7	4129978.02	8.02E-05	9.02E-06	3.44E-03	1.22E-03	0.018	Res
582584.27_4129978.02	582584.27	4129978.02	7.88E-05	8.87E-06	3.39E-03	1.20E-03	0.017	Res
582640.84_4129978.02	582640.84	4129978.02	7.67E-05	8.63E-06	3.29E-03	1.17E-03	0.017	Res
582697.41_4129978.02	582697.41	4129978.02	7.56E-05	8.50E-06	3.25E-03	1.15E-03	0.017	Res
582753.98_4129978.02	582753.98	4129978.02	7.34E-05	8.26E-06	3.15E-03	1.12E-03	0.016	Res

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)				Acute Calculation, $\sum C_{TAC}$ /REL	
	UTM X	UTM Y	Arsenic	Mercury	Nickel	Vanadium	Total HI	Receptor Type
582810.55_4129978.02	582810.55	4129978.02	7.03E-05	7.91E-06	3.02E-03	1.07E-03	0.015	Res
581905.43_4130061.93	581905.43	4130061.93	1.07E-04	1.20E-05	4.59E-03	1.62E-03	0.024	Res
581962_4130061.93	581962	4130061.93	1.04E-04	1.17E-05	4.48E-03	1.59E-03	0.023	Res
582018.57_4130061.93	582018.57	4130061.93	1.03E-04	1.15E-05	4.40E-03	1.56E-03	0.023	Res
582075.14_4130061.93	582075.14	4130061.93	9.99E-05	1.12E-05	4.29E-03	1.52E-03	0.022	Res
582131.71_4130061.93	582131.71	4130061.93	9.60E-05	1.08E-05	4.12E-03	1.46E-03	0.021	Res
582188.28_4130061.93	582188.28	4130061.93	9.26E-05	1.04E-05	3.98E-03	1.41E-03	0.020	Res
582244.85_4130061.93	582244.85	4130061.93	8.87E-05	9.97E-06	3.81E-03	1.35E-03	0.020	Res
582301.42_4130061.93	582301.42	4130061.93	8.69E-05	9.77E-06	3.73E-03	1.32E-03	0.019	Res
582357.99_4130061.93	582357.99	4130061.93	8.68E-05	9.77E-06	3.73E-03	1.32E-03	0.019	Res
582414.56_4130061.93	582414.56	4130061.93	8.46E-05	9.52E-06	3.63E-03	1.29E-03	0.019	Res
582471.13_4130061.93	582471.13	4130061.93	8.43E-05	9.48E-06	3.62E-03	1.28E-03	0.019	Res
582527.7_4130061.93	582527.7	4130061.93	8.27E-05	9.31E-06	3.55E-03	1.26E-03	0.018	Res
582584.27_4130061.93	582584.27	4130061.93	8.19E-05	9.21E-06	3.52E-03	1.24E-03	0.018	Res
582640.84_4130061.93	582640.84	4130061.93	8.01E-05	9.01E-06	3.44E-03	1.22E-03	0.018	Res
582697.41_4130061.93	582697.41	4130061.93	7.73E-05	8.69E-06	3.32E-03	1.17E-03	0.017	Res
582753.98_4130061.93	582753.98	4130061.93	7.52E-05	8.46E-06	3.23E-03	1.14E-03	0.017	Res
582810.55_4130061.93	582810.55	4130061.93	7.37E-05	8.29E-06	3.16E-03	1.12E-03	0.016	Res
581962_4130145.84	581962	4130145.84	1.05E-04	1.18E-05	4.49E-03	1.59E-03	0.023	Res
582018.57_4130145.84	582018.57	4130145.84	1.02E-04	1.14E-05	4.37E-03	1.55E-03	0.022	Res
582075.14_4130145.84	582075.14	4130145.84	9.98E-05	1.12E-05	4.29E-03	1.52E-03	0.022	Res
582131.71_4130145.84	582131.71	4130145.84	9.68E-05	1.09E-05	4.16E-03	1.47E-03	0.021	Res
582188.28_4130145.84	582188.28	4130145.84	9.30E-05	1.05E-05	3.99E-03	1.41E-03	0.020	Res
582244.85_4130145.84	582244.85	4130145.84	9.18E-05	1.03E-05	3.94E-03	1.40E-03	0.020	Res
582301.42_4130145.84	582301.42	4130145.84	8.97E-05	1.01E-05	3.85E-03	1.36E-03	0.020	Res
582357.99_4130145.84	582357.99	4130145.84	8.71E-05	9.80E-06	3.74E-03	1.32E-03	0.019	Res
582414.56_4130145.84	582414.56	4130145.84	8.55E-05	9.62E-06	3.67E-03	1.30E-03	0.019	Res
582471.13_4130145.84	582471.13	4130145.84	8.33E-05	9.38E-06	3.58E-03	1.27E-03	0.018	Res
582527.7_4130145.84	582527.7	4130145.84	8.17E-05	9.19E-06	3.51E-03	1.24E-03	0.018	Res
582584.27_4130145.84	582584.27	4130145.84	7.84E-05	8.82E-06	3.37E-03	1.19E-03	0.017	Res
582640.84_4130145.84	582640.84	4130145.84	7.49E-05	8.43E-06	3.22E-03	1.14E-03	0.017	Res
582697.41_4130145.84	582697.41	4130145.84	7.29E-05	8.20E-06	3.13E-03	1.11E-03	0.016	Res
582753.98_4130145.84	582753.98	4130145.84	7.17E-05	8.07E-06	3.08E-03	1.09E-03	0.016	Res
582810.55_4130145.84	582810.55	4130145.84	6.90E-05	7.76E-06	2.96E-03	1.05E-03	0.015	Res
582867.12_4130145.84	582867.12	4130145.84	6.36E-05	7.15E-06	2.73E-03	9.66E-04	0.014	Res
581962_4130229.75	581962	4130229.75	9.83E-05	1.11E-05	4.22E-03	1.49E-03	0.022	Res
582018.57_4130229.75	582018.57	4130229.75	9.42E-05	1.06E-05	4.05E-03	1.43E-03	0.021	Res
582075.14_4130229.75	582075.14	4130229.75	9.14E-05	1.03E-05	3.92E-03	1.39E-03	0.020	Res
582131.71_4130229.75	582131.71	4130229.75	8.88E-05	1.00E-05	3.81E-03	1.35E-03	0.020	Res
582188.28_4130229.75	582188.28	4130229.75	8.76E-05	9.86E-06	3.76E-03	1.33E-03	0.019	Res
582244.85_4130229.75	582244.85	4130229.75	8.41E-05	9.46E-06	3.61E-03	1.28E-03	0.019	Res
582301.42_4130229.75	582301.42	4130229.75	8.20E-05	9.23E-06	3.52E-03	1.25E-03	0.018	Res
582357.99_4130229.75	582357.99	4130229.75	7.97E-05	8.97E-06	3.42E-03	1.21E-03	0.018	Res
582414.56_4130229.75	582414.56	4130229.75	8.01E-05	9.01E-06	3.44E-03	1.22E-03	0.018	Res
582471.13_4130229.75	582471.13	4130229.75	7.81E-05	8.79E-06	3.35E-03	1.19E-03	0.017	Res
582527.7_4130229.75	582527.7	4130229.75	7.56E-05	8.51E-06	3.25E-03	1.15E-03	0.017	Res
582584.27_4130229.75	582584.27	4130229.75	7.48E-05	8.42E-06	3.21E-03	1.14E-03	0.016	Res
582640.84_4130229.75	582640.84	4130229.75	7.49E-05	8.42E-06	3.22E-03	1.14E-03	0.017	Res

Acute Calculation, $\sum C_{TAC}$ /REL

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)				Total HI	Receptor Type
	UTM X	UTM Y	Arsenic	Mercury	Nickel	Vanadium		
582697.41_4130229.75	582697.41	4130229.75	7.32E-05	8.23E-06	3.14E-03	1.11E-03	0.016	Res
582753.98_4130229.75	582753.98	4130229.75	7.02E-05	7.89E-06	3.01E-03	1.07E-03	0.015	Res
582810.55_4130229.75	582810.55	4130229.75	6.95E-05	7.82E-06	2.98E-03	1.06E-03	0.015	Res
582867.12_4130229.75	582867.12	4130229.75	6.98E-05	7.85E-06	3.00E-03	1.06E-03	0.015	Res
582018.57_4130313.66	582018.57	4130313.66	9.07E-05	1.02E-05	3.89E-03	1.38E-03	0.020	Res
582075.14_4130313.66	582075.14	4130313.66	9.15E-05	1.03E-05	3.93E-03	1.39E-03	0.020	Res
582131.71_4130313.66	582131.71	4130313.66	9.16E-05	1.03E-05	3.93E-03	1.39E-03	0.020	Res
582188.28_4130313.66	582188.28	4130313.66	8.87E-05	9.99E-06	3.81E-03	1.35E-03	0.020	Res
582244.85_4130313.66	582244.85	4130313.66	8.83E-05	9.94E-06	3.79E-03	1.34E-03	0.019	Res
582301.42_4130313.66	582301.42	4130313.66	8.73E-05	9.83E-06	3.75E-03	1.33E-03	0.019	Res
582357.99_4130313.66	582357.99	4130313.66	8.54E-05	9.61E-06	3.66E-03	1.30E-03	0.019	Res
582414.56_4130313.66	582414.56	4130313.66	8.20E-05	9.23E-06	3.52E-03	1.25E-03	0.018	Res
582471.13_4130313.66	582471.13	4130313.66	8.06E-05	9.07E-06	3.46E-03	1.23E-03	0.018	Res
582527.7_4130313.66	582527.7	4130313.66	8.06E-05	9.07E-06	3.46E-03	1.23E-03	0.018	Res
582584.27_4130313.66	582584.27	4130313.66	7.82E-05	8.80E-06	3.35E-03	1.19E-03	0.017	Res
582640.84_4130313.66	582640.84	4130313.66	7.45E-05	8.39E-06	3.20E-03	1.13E-03	0.016	Res
582697.41_4130313.66	582697.41	4130313.66	7.42E-05	8.36E-06	3.19E-03	1.13E-03	0.016	Res
582753.98_4130313.66	582753.98	4130313.66	7.36E-05	8.29E-06	3.16E-03	1.12E-03	0.016	Res
582810.55_4130313.66	582810.55	4130313.66	7.11E-05	8.01E-06	3.05E-03	1.08E-03	0.016	Res
582867.12_4130313.66	582867.12	4130313.66	6.76E-05	7.61E-06	2.90E-03	1.03E-03	0.015	Res
581848.86_4130397.57	581848.86	4130397.57	9.90E-05	1.11E-05	4.25E-03	1.50E-03	0.022	Res
581905.43_4130397.57	581905.43	4130397.57	9.64E-05	1.09E-05	4.13E-03	1.46E-03	0.021	Res
581962_4130397.57	581962	4130397.57	9.43E-05	1.06E-05	4.04E-03	1.43E-03	0.021	Res
582018.57_4130397.57	582018.57	4130397.57	9.50E-05	1.07E-05	4.07E-03	1.44E-03	0.021	Res
582075.14_4130397.57	582075.14	4130397.57	9.52E-05	1.07E-05	4.08E-03	1.45E-03	0.021	Res
582131.71_4130397.57	582131.71	4130397.57	9.41E-05	1.06E-05	4.04E-03	1.43E-03	0.021	Res
582188.28_4130397.57	582188.28	4130397.57	9.24E-05	1.04E-05	3.97E-03	1.40E-03	0.020	Res
582244.85_4130397.57	582244.85	4130397.57	9.22E-05	1.04E-05	3.96E-03	1.40E-03	0.020	Res
582301.42_4130397.57	582301.42	4130397.57	8.89E-05	1.00E-05	3.81E-03	1.35E-03	0.020	Res
582357.99_4130397.57	582357.99	4130397.57	8.72E-05	9.82E-06	3.74E-03	1.33E-03	0.019	Res
582414.56_4130397.57	582414.56	4130397.57	8.80E-05	9.90E-06	3.78E-03	1.34E-03	0.019	Res
582471.13_4130397.57	582471.13	4130397.57	8.61E-05	9.69E-06	3.69E-03	1.31E-03	0.019	Res
582527.7_4130397.57	582527.7	4130397.57	8.24E-05	9.27E-06	3.53E-03	1.25E-03	0.018	Res
582584.27_4130397.57	582584.27	4130397.57	8.34E-05	9.39E-06	3.58E-03	1.27E-03	0.018	Res
582640.84_4130397.57	582640.84	4130397.57	8.23E-05	9.27E-06	3.53E-03	1.25E-03	0.018	Res
582697.41_4130397.57	582697.41	4130397.57	7.91E-05	8.90E-06	3.39E-03	1.20E-03	0.017	Res
582753.98_4130397.57	582753.98	4130397.57	7.50E-05	8.44E-06	3.22E-03	1.14E-03	0.017	Res
582810.55_4130397.57	582810.55	4130397.57	7.13E-05	8.03E-06	3.06E-03	1.08E-03	0.016	Res
582867.12_4130397.57	582867.12	4130397.57	7.07E-05	7.96E-06	3.03E-03	1.08E-03	0.016	Res
581848.86_4130481.48	581848.86	4130481.48	1.12E-04	1.26E-05	4.82E-03	1.71E-03	0.025	Res
581905.43_4130481.48	581905.43	4130481.48	1.11E-04	1.25E-05	4.75E-03	1.68E-03	0.024	Res
581962_4130481.48	581962	4130481.48	1.10E-04	1.23E-05	4.71E-03	1.67E-03	0.024	Res
582018.57_4130481.48	582018.57	4130481.48	1.09E-04	1.22E-05	4.66E-03	1.65E-03	0.024	Res
582075.14_4130481.48	582075.14	4130481.48	1.08E-04	1.21E-05	4.64E-03	1.64E-03	0.024	Res
582131.71_4130481.48	582131.71	4130481.48	1.07E-04	1.21E-05	4.61E-03	1.63E-03	0.024	Res
582188.28_4130481.48	582188.28	4130481.48	1.04E-04	1.17E-05	4.46E-03	1.58E-03	0.023	Res
582244.85_4130481.48	582244.85	4130481.48	1.01E-04	1.13E-05	4.33E-03	1.53E-03	0.022	Res
582301.42_4130481.48	582301.42	4130481.48	1.01E-04	1.14E-05	4.34E-03	1.53E-03	0.022	Res
582357.99_4130481.48	582357.99	4130481.48	9.83E-05	1.11E-05	4.22E-03	1.49E-03	0.022	Res

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)				Acute Calculation, $\sum C_{TAC}$ /REL	
	UTM X	UTM Y	Arsenic	Mercury	Nickel	Vanadium	Total HI	Receptor Type
582414.56_4130481.48	582414.56	4130481.48	9.55E-05	1.07E-05	4.10E-03	1.45E-03	0.021	Res
582471.13_4130481.48	582471.13	4130481.48	9.64E-05	1.08E-05	4.14E-03	1.47E-03	0.021	Res
582527.7_4130481.48	582527.7	4130481.48	9.36E-05	1.05E-05	4.02E-03	1.42E-03	0.021	Res
582584.27_4130481.48	582584.27	4130481.48	8.90E-05	1.00E-05	3.82E-03	1.35E-03	0.020	Res
582640.84_4130481.48	582640.84	4130481.48	8.34E-05	9.39E-06	3.58E-03	1.27E-03	0.018	Res
582697.41_4130481.48	582697.41	4130481.48	8.14E-05	9.16E-06	3.49E-03	1.24E-03	0.018	Res
582753.98_4130481.48	582753.98	4130481.48	8.00E-05	9.00E-06	3.43E-03	1.22E-03	0.018	Res
582810.55_4130481.48	582810.55	4130481.48	7.78E-05	8.75E-06	3.34E-03	1.18E-03	0.017	Res
582867.12_4130481.48	582867.12	4130481.48	7.64E-05	8.59E-06	3.28E-03	1.16E-03	0.017	Res
581735.72_4130565.39	581735.72	4130565.39	1.15E-04	1.29E-05	4.92E-03	1.74E-03	0.025	Res
581792.29_4130565.39	581792.29	4130565.39	1.11E-04	1.25E-05	4.78E-03	1.69E-03	0.025	Res
581848.86_4130565.39	581848.86	4130565.39	1.11E-04	1.25E-05	4.78E-03	1.69E-03	0.025	Res
581905.43_4130565.39	581905.43	4130565.39	1.15E-04	1.29E-05	4.94E-03	1.75E-03	0.025	Res
581962_4130565.39	581962	4130565.39	1.13E-04	1.27E-05	4.84E-03	1.71E-03	0.025	Res
582018.57_4130565.39	582018.57	4130565.39	1.12E-04	1.26E-05	4.80E-03	1.70E-03	0.025	Res
582075.14_4130565.39	582075.14	4130565.39	1.10E-04	1.24E-05	4.73E-03	1.68E-03	0.024	Res
582131.71_4130565.39	582131.71	4130565.39	1.06E-04	1.19E-05	4.54E-03	1.61E-03	0.023	Res
582188.28_4130565.39	582188.28	4130565.39	1.06E-04	1.20E-05	4.56E-03	1.62E-03	0.023	Res
582244.85_4130565.39	582244.85	4130565.39	1.03E-04	1.16E-05	4.41E-03	1.56E-03	0.023	Res
582301.42_4130565.39	582301.42	4130565.39	1.02E-04	1.15E-05	4.38E-03	1.55E-03	0.022	Res
582357.99_4130565.39	582357.99	4130565.39	1.01E-04	1.14E-05	4.36E-03	1.54E-03	0.022	Res
582414.56_4130565.39	582414.56	4130565.39	9.73E-05	1.09E-05	4.18E-03	1.48E-03	0.021	Res
582471.13_4130565.39	582471.13	4130565.39	9.14E-05	1.03E-05	3.92E-03	1.39E-03	0.020	Res
582527.7_4130565.39	582527.7	4130565.39	8.69E-05	9.77E-06	3.73E-03	1.32E-03	0.019	Res
582584.27_4130565.39	582584.27	4130565.39	8.54E-05	9.61E-06	3.66E-03	1.30E-03	0.019	Res
582640.84_4130565.39	582640.84	4130565.39	8.26E-05	9.29E-06	3.54E-03	1.26E-03	0.018	Res
582697.41_4130565.39	582697.41	4130565.39	8.07E-05	9.08E-06	3.46E-03	1.23E-03	0.018	Res
582753.98_4130565.39	582753.98	4130565.39	7.80E-05	8.77E-06	3.35E-03	1.18E-03	0.017	Res
582810.55_4130565.39	582810.55	4130565.39	7.47E-05	8.41E-06	3.20E-03	1.14E-03	0.016	Res
582867.12_4130565.39	582867.12	4130565.39	7.12E-05	8.01E-06	3.05E-03	1.08E-03	0.016	Res
581735.72_4130649.3	581735.72	4130649.3	1.10E-04	1.24E-05	4.72E-03	1.67E-03	0.024	Res
581792.29_4130649.3	581792.29	4130649.3	1.08E-04	1.21E-05	4.63E-03	1.64E-03	0.024	Res
581905.43_4130649.3	581905.43	4130649.3	1.19E-04	1.34E-05	5.10E-03	1.80E-03	0.026	Res
581962_4130649.3	581962	4130649.3	1.19E-04	1.34E-05	5.10E-03	1.81E-03	0.026	Res
582018.57_4130649.3	582018.57	4130649.3	1.14E-04	1.28E-05	4.89E-03	1.73E-03	0.025	Res
582075.14_4130649.3	582075.14	4130649.3	1.15E-04	1.29E-05	4.92E-03	1.74E-03	0.025	Res
582131.71_4130649.3	582131.71	4130649.3	1.11E-04	1.25E-05	4.76E-03	1.68E-03	0.024	Res
582188.28_4130649.3	582188.28	4130649.3	1.12E-04	1.25E-05	4.80E-03	1.70E-03	0.025	Res
582244.85_4130649.3	582244.85	4130649.3	1.09E-04	1.23E-05	4.70E-03	1.66E-03	0.024	Res
582301.42_4130649.3	582301.42	4130649.3	1.03E-04	1.16E-05	4.44E-03	1.57E-03	0.023	Res
582357.99_4130649.3	582357.99	4130649.3	9.62E-05	1.08E-05	4.13E-03	1.46E-03	0.021	Res
582414.56_4130649.3	582414.56	4130649.3	9.48E-05	1.07E-05	4.07E-03	1.44E-03	0.021	Res
582471.13_4130649.3	582471.13	4130649.3	9.17E-05	1.03E-05	3.94E-03	1.39E-03	0.020	Res
582527.7_4130649.3	582527.7	4130649.3	8.91E-05	1.00E-05	3.82E-03	1.35E-03	0.020	Res
582584.27_4130649.3	582584.27	4130649.3	8.52E-05	9.58E-06	3.66E-03	1.29E-03	0.019	Res
582640.84_4130649.3	582640.84	4130649.3	8.07E-05	9.08E-06	3.46E-03	1.23E-03	0.018	Res
582697.41_4130649.3	582697.41	4130649.3	7.77E-05	8.74E-06	3.33E-03	1.18E-03	0.017	Res
582753.98_4130649.3	582753.98	4130649.3	7.74E-05	8.71E-06	3.32E-03	1.18E-03	0.017	Res
582810.55_4130649.3	582810.55	4130649.3	7.69E-05	8.66E-06	3.30E-03	1.17E-03	0.017	Res

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)				Acute Calculation, $\sum C_{TAC}$ /REL	
	UTM X	UTM Y	Arsenic	Mercury	Nickel	Vanadium	Total HI	Receptor Type
582867.12_4130649.3	582867.12	4130649.3	7.61E-05	8.57E-06	3.27E-03	1.16E-03	0.017	Res
581848.86_4130733.21	581848.86	4130733.21	1.19E-04	1.34E-05	5.12E-03	1.81E-03	0.026	Res
581905.43_4130733.21	581905.43	4130733.21	1.16E-04	1.30E-05	4.97E-03	1.76E-03	0.026	Res
581962_4130733.21	581962	4130733.21	1.17E-04	1.31E-05	5.01E-03	1.77E-03	0.026	Res
582018.57_4130733.21	582018.57	4130733.21	1.13E-04	1.27E-05	4.84E-03	1.71E-03	0.025	Res
582075.14_4130733.21	582075.14	4130733.21	1.16E-04	1.30E-05	4.97E-03	1.76E-03	0.025	Res
582131.71_4130733.21	582131.71	4130733.21	1.09E-04	1.23E-05	4.70E-03	1.66E-03	0.024	Res
582188.28_4130733.21	582188.28	4130733.21	1.03E-04	1.15E-05	4.41E-03	1.56E-03	0.023	Res
582244.85_4130733.21	582244.85	4130733.21	9.87E-05	1.11E-05	4.24E-03	1.50E-03	0.022	Res
582301.42_4130733.21	582301.42	4130733.21	9.57E-05	1.08E-05	4.11E-03	1.45E-03	0.021	Res
582357.99_4130733.21	582357.99	4130733.21	9.18E-05	1.03E-05	3.94E-03	1.40E-03	0.020	Res
582414.56_4130733.21	582414.56	4130733.21	8.59E-05	9.66E-06	3.69E-03	1.31E-03	0.019	Res
582471.13_4130733.21	582471.13	4130733.21	8.05E-05	9.05E-06	3.45E-03	1.22E-03	0.018	Res
582527.7_4130733.21	582527.7	4130733.21	8.05E-05	9.06E-06	3.46E-03	1.22E-03	0.018	Res
582584.27_4130733.21	582584.27	4130733.21	8.00E-05	9.00E-06	3.43E-03	1.22E-03	0.018	Res
582640.84_4130733.21	582640.84	4130733.21	7.89E-05	8.87E-06	3.39E-03	1.20E-03	0.017	Res
582697.41_4130733.21	582697.41	4130733.21	7.72E-05	8.68E-06	3.31E-03	1.17E-03	0.017	Res
582753.98_4130733.21	582753.98	4130733.21	7.50E-05	8.44E-06	3.22E-03	1.14E-03	0.017	Res
582810.55_4130733.21	582810.55	4130733.21	7.27E-05	8.18E-06	3.12E-03	1.11E-03	0.016	Res
582867.12_4130733.21	582867.12	4130733.21	7.03E-05	7.91E-06	3.02E-03	1.07E-03	0.015	Res
581735.72_4130817.12	581735.72	4130817.12	1.08E-04	1.22E-05	4.65E-03	1.65E-03	0.024	Res
581792.29_4130817.12	581792.29	4130817.12	1.18E-04	1.32E-05	5.07E-03	1.79E-03	0.026	Res
581848.86_4130817.12	581848.86	4130817.12	1.21E-04	1.36E-05	5.21E-03	1.84E-03	0.027	Res
581905.43_4130817.12	581905.43	4130817.12	1.20E-04	1.35E-05	5.15E-03	1.82E-03	0.026	Res
581962_4130817.12	581962	4130817.12	1.19E-04	1.33E-05	5.11E-03	1.81E-03	0.026	Res
582018.57_4130817.12	582018.57	4130817.12	1.11E-04	1.24E-05	4.76E-03	1.68E-03	0.024	Res
582075.14_4130817.12	582075.14	4130817.12	1.07E-04	1.20E-05	4.59E-03	1.62E-03	0.024	Res
582131.71_4130817.12	582131.71	4130817.12	1.04E-04	1.17E-05	4.48E-03	1.58E-03	0.023	Res
582188.28_4130817.12	582188.28	4130817.12	9.79E-05	1.10E-05	4.21E-03	1.49E-03	0.022	Res
582244.85_4130817.12	582244.85	4130817.12	8.87E-05	9.98E-06	3.81E-03	1.35E-03	0.020	Res
582301.42_4130817.12	582301.42	4130817.12	8.99E-05	1.01E-05	3.86E-03	1.37E-03	0.020	Res
582357.99_4130817.12	582357.99	4130817.12	8.93E-05	1.00E-05	3.84E-03	1.36E-03	0.020	Res
582414.56_4130817.12	582414.56	4130817.12	8.70E-05	9.78E-06	3.74E-03	1.32E-03	0.019	Res
582471.13_4130817.12	582471.13	4130817.12	8.38E-05	9.42E-06	3.60E-03	1.27E-03	0.018	Res
582527.7_4130817.12	582527.7	4130817.12	7.97E-05	8.96E-06	3.42E-03	1.21E-03	0.018	Res
582584.27_4130817.12	582584.27	4130817.12	7.77E-05	8.74E-06	3.34E-03	1.18E-03	0.017	Res
582640.84_4130817.12	582640.84	4130817.12	7.63E-05	8.58E-06	3.28E-03	1.16E-03	0.017	Res
582697.41_4130817.12	582697.41	4130817.12	7.47E-05	8.40E-06	3.21E-03	1.14E-03	0.016	Res
582753.98_4130817.12	582753.98	4130817.12	7.27E-05	8.18E-06	3.12E-03	1.11E-03	0.016	Res
582810.55_4130817.12	582810.55	4130817.12	7.09E-05	7.97E-06	3.04E-03	1.08E-03	0.016	Res
582867.12_4130817.12	582867.12	4130817.12	6.96E-05	7.83E-06	2.99E-03	1.06E-03	0.015	Res
581735.72_4130901.03	581735.72	4130901.03	1.48E-04	1.66E-05	6.37E-03	2.25E-03	0.033	Res
581792.29_4130901.03	581792.29	4130901.03	1.55E-04	1.74E-05	6.69E-03	2.36E-03	0.034	Res
581848.86_4130901.03	581848.86	4130901.03	1.40E-04	1.57E-05	6.04E-03	2.13E-03	0.031	Res
581905.43_4130901.03	581905.43	4130901.03	1.30E-04	1.46E-05	5.60E-03	1.98E-03	0.029	Res
581962_4130901.03	581962	4130901.03	1.26E-04	1.41E-05	5.42E-03	1.91E-03	0.028	Res
582018.57_4130901.03	582018.57	4130901.03	1.13E-04	1.27E-05	4.85E-03	1.71E-03	0.025	Res
582075.14_4130901.03	582075.14	4130901.03	1.12E-04	1.26E-05	4.84E-03	1.71E-03	0.025	Res
582131.71_4130901.03	582131.71	4130901.03	1.07E-04	1.20E-05	4.59E-03	1.62E-03	0.024	Res

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)				Acute Calculation, $\sum C_{TAC}$ /REL	
	UTM X	UTM Y	Arsenic	Mercury	Nickel	Vanadium	Total HI	Receptor Type
582188.28_4130901.03	582188.28	4130901.03	9.69E-05	1.09E-05	4.17E-03	1.47E-03	0.021	Res
582244.85_4130901.03	582244.85	4130901.03	8.89E-05	1.00E-05	3.82E-03	1.35E-03	0.020	Res
582301.42_4130901.03	582301.42	4130901.03	8.44E-05	9.49E-06	3.63E-03	1.28E-03	0.019	Res
582357.99_4130901.03	582357.99	4130901.03	8.05E-05	9.05E-06	3.46E-03	1.22E-03	0.018	Res
582414.56_4130901.03	582414.56	4130901.03	7.71E-05	8.67E-06	3.31E-03	1.17E-03	0.017	Res
582471.13_4130901.03	582471.13	4130901.03	7.45E-05	8.38E-06	3.20E-03	1.13E-03	0.016	Res
582527.7_4130901.03	582527.7	4130901.03	7.18E-05	8.08E-06	3.09E-03	1.09E-03	0.016	Res
582584.27_4130901.03	582584.27	4130901.03	6.94E-05	7.80E-06	2.98E-03	1.05E-03	0.015	Res
582640.84_4130901.03	582640.84	4130901.03	6.70E-05	7.54E-06	2.88E-03	1.02E-03	0.015	Res
582697.41_4130901.03	582697.41	4130901.03	6.47E-05	7.28E-06	2.78E-03	9.83E-04	0.014	Res
582753.98_4130901.03	582753.98	4130901.03	6.27E-05	7.05E-06	2.69E-03	9.52E-04	0.014	Res
582810.55_4130901.03	582810.55	4130901.03	6.17E-05	6.94E-06	2.65E-03	9.37E-04	0.014	Res
582867.12_4130901.03	582867.12	4130901.03	6.08E-05	6.84E-06	2.61E-03	9.23E-04	0.013	Res
581735.72_4130984.94	581735.72	4130984.94	2.41E-04	2.71E-05	1.04E-02	3.67E-03	0.053	Res
581792.29_4130984.94	581792.29	4130984.94	2.46E-04	2.76E-05	1.06E-02	3.74E-03	0.054	Res
581848.86_4130984.94	581848.86	4130984.94	2.48E-04	2.79E-05	1.07E-02	3.77E-03	0.055	Res
581905.43_4130984.94	581905.43	4130984.94	2.29E-04	2.57E-05	9.86E-03	3.48E-03	0.051	Res
581962_4130984.94	581962	4130984.94	1.80E-04	2.03E-05	7.77E-03	2.74E-03	0.040	Res
582018.57_4130984.94	582018.57	4130984.94	1.48E-04	1.66E-05	6.36E-03	2.24E-03	0.033	Res
582075.14_4130984.94	582075.14	4130984.94	1.27E-04	1.43E-05	5.47E-03	1.93E-03	0.028	Res
582131.71_4130984.94	582131.71	4130984.94	1.14E-04	1.28E-05	4.90E-03	1.73E-03	0.025	Res
582188.28_4130984.94	582188.28	4130984.94	1.06E-04	1.19E-05	4.55E-03	1.61E-03	0.023	Res
582244.85_4130984.94	582244.85	4130984.94	9.88E-05	1.11E-05	4.25E-03	1.50E-03	0.022	Res
582301.42_4130984.94	582301.42	4130984.94	9.27E-05	1.04E-05	3.99E-03	1.41E-03	0.020	Res
582357.99_4130984.94	582357.99	4130984.94	8.74E-05	9.82E-06	3.76E-03	1.33E-03	0.019	Res
582414.56_4130984.94	582414.56	4130984.94	8.26E-05	9.29E-06	3.55E-03	1.26E-03	0.018	Res
582471.13_4130984.94	582471.13	4130984.94	7.82E-05	8.79E-06	3.36E-03	1.19E-03	0.017	Res
582527.7_4130984.94	582527.7	4130984.94	7.43E-05	8.35E-06	3.19E-03	1.13E-03	0.016	Res
582584.27_4130984.94	582584.27	4130984.94	7.07E-05	7.95E-06	3.04E-03	1.07E-03	0.016	Res
582640.84_4130984.94	582640.84	4130984.94	6.76E-05	7.59E-06	2.91E-03	1.03E-03	0.015	Res
582697.41_4130984.94	582697.41	4130984.94	6.46E-05	7.26E-06	2.78E-03	9.81E-04	0.014	Res
582753.98_4130984.94	582753.98	4130984.94	6.18E-05	6.95E-06	2.66E-03	9.39E-04	0.014	Res
582810.55_4130984.94	582810.55	4130984.94	5.91E-05	6.64E-06	2.54E-03	8.98E-04	0.013	Res
582867.12_4130984.94	582867.12	4130984.94	5.69E-05	6.40E-06	2.44E-03	8.65E-04	0.013	Res
581735.72_4131068.85	581735.72	4131068.85	1.38E-04	1.56E-05	5.95E-03	2.10E-03	0.031	Res
581792.29_4131068.85	581792.29	4131068.85	1.38E-04	1.55E-05	5.93E-03	2.10E-03	0.030	Res
581848.86_4131068.85	581848.86	4131068.85	1.41E-04	1.59E-05	6.07E-03	2.14E-03	0.031	Res
581905.43_4131068.85	581905.43	4131068.85	1.38E-04	1.55E-05	5.95E-03	2.10E-03	0.031	Res
581962_4131068.85	581962	4131068.85	1.39E-04	1.56E-05	5.96E-03	2.11E-03	0.031	Res
582018.57_4131068.85	582018.57	4131068.85	1.28E-04	1.44E-05	5.52E-03	1.95E-03	0.028	Res
582075.14_4131068.85	582075.14	4131068.85	1.18E-04	1.33E-05	5.09E-03	1.80E-03	0.026	Res
582131.71_4131068.85	582131.71	4131068.85	1.12E-04	1.26E-05	4.80E-03	1.70E-03	0.025	Res
582188.28_4131068.85	582188.28	4131068.85	1.07E-04	1.20E-05	4.59E-03	1.62E-03	0.024	Res
582244.85_4131068.85	582244.85	4131068.85	1.03E-04	1.15E-05	4.41E-03	1.56E-03	0.023	Res
582301.42_4131068.85	582301.42	4131068.85	9.84E-05	1.11E-05	4.23E-03	1.50E-03	0.022	Res
582357.99_4131068.85	582357.99	4131068.85	9.43E-05	1.06E-05	4.06E-03	1.43E-03	0.021	Res
582414.56_4131068.85	582414.56	4131068.85	9.04E-05	1.02E-05	3.89E-03	1.37E-03	0.020	Res
582471.13_4131068.85	582471.13	4131068.85	8.67E-05	9.75E-06	3.73E-03	1.32E-03	0.019	Res
582527.7_4131068.85	582527.7	4131068.85	8.29E-05	9.32E-06	3.56E-03	1.26E-03	0.018	Res

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)				Acute Calculation, $\sum C_{TAC}$ /REL	
	UTM X	UTM Y	Arsenic	Mercury	Nickel	Vanadium	Total HI	Receptor Type
582584.27_4131068.85	582584.27	4131068.85	7.93E-05	8.91E-06	3.41E-03	1.21E-03	0.017	Res
582640.84_4131068.85	582640.84	4131068.85	7.64E-05	8.59E-06	3.29E-03	1.16E-03	0.017	Res
582697.41_4131068.85	582697.41	4131068.85	7.35E-05	8.26E-06	3.16E-03	1.12E-03	0.016	Res
582753.98_4131068.85	582753.98	4131068.85	7.10E-05	7.98E-06	3.05E-03	1.08E-03	0.016	Res
582810.55_4131068.85	582810.55	4131068.85	6.84E-05	7.69E-06	2.94E-03	1.04E-03	0.015	Res
582867.12_4131068.85	582867.12	4131068.85	6.55E-05	7.37E-06	2.82E-03	9.96E-04	0.014	Res
582018.57_4131152.76	582018.57	4131152.76	1.07E-04	1.20E-05	4.58E-03	1.62E-03	0.024	Res
582244.85_4131152.76	582244.85	4131152.76	9.79E-05	1.10E-05	4.20E-03	1.49E-03	0.022	Res
582301.42_4131152.76	582301.42	4131152.76	9.51E-05	1.07E-05	4.09E-03	1.45E-03	0.021	Res
582357.99_4131152.76	582357.99	4131152.76	9.19E-05	1.03E-05	3.95E-03	1.40E-03	0.020	Res
582414.56_4131152.76	582414.56	4131152.76	8.85E-05	9.95E-06	3.80E-03	1.35E-03	0.020	Res
582471.13_4131152.76	582471.13	4131152.76	8.45E-05	9.50E-06	3.63E-03	1.28E-03	0.019	Res
582527.7_4131152.76	582527.7	4131152.76	8.08E-05	9.09E-06	3.47E-03	1.23E-03	0.018	Res
582584.27_4131152.76	582584.27	4131152.76	7.78E-05	8.75E-06	3.34E-03	1.18E-03	0.017	Res
582640.84_4131152.76	582640.84	4131152.76	7.59E-05	8.54E-06	3.26E-03	1.15E-03	0.017	Res
582697.41_4131152.76	582697.41	4131152.76	7.40E-05	8.33E-06	3.18E-03	1.13E-03	0.016	Res
582753.98_4131152.76	582753.98	4131152.76	7.24E-05	8.15E-06	3.11E-03	1.10E-03	0.016	Res
582810.55_4131152.76	582810.55	4131152.76	7.07E-05	7.96E-06	3.04E-03	1.08E-03	0.016	Res
582867.12_4131152.76	582867.12	4131152.76	6.84E-05	7.69E-06	2.94E-03	1.04E-03	0.015	Res

HRA Permanente Creek Restoration Project

Construction Year 2029

Emissions Inputs

Construction Activity	Construction Year & Source	DPM Exhaust (tons/year)	PM10 Dust for speciation (tons/year)	Arsenic (tons/year)	Beryllium (tons/year)	Cadmium (tons/year)	Cobalt (tons/year)	Copper (tons/year)	Lead (tons/year)	Mercury (tons/year)	Nickel (tons/year)	Selenium (tons/year)	Chromium VI (tons/year)	Crystalline Silica (tons/year)	Vanadium (tons/year)
Concrete Channel 2024	2024_CONCRTE	0.000	0.00	2.91E-12	1.74E-12	2.91E-12	1.49E-11	3.26E-11	2.91E-12	4.65E-13	5.35E-11	5.81E-12	2.33E-13	8.63E-09	4.42E-11
Paved road	2024_PAVED	2.07E-04	0.08	1.04E-07	6.26E-08	1.04E-07	6.68E-08	2.09E-06	1.92E-07	1.17E-08	4.51E-06	2.09E-07	1.59E-07	5.93E-04	1.59E-06
Unpaved road	2024_CCP_UNPV	6.27E-05	0.20	2.56E-07	1.54E-07	2.56E-07	1.64E-07	5.12E-06	4.71E-07	2.87E-08	1.11E-05	5.12E-07	3.89E-07	1.46E-03	3.89E-06
Channel Widening 2024	2024_CHAN_RCK	0.002	0.16	2.05E-07	1.23E-07	2.05E-07	1.05E-06	2.29E-06	2.05E-07	3.28E-08	3.77E-06	4.09E-07	1.64E-08	6.08E-04	3.11E-06
Paved road	2024_PAVED	1.80E-03	2.39	2.99E-06	1.79E-06	2.99E-06	1.91E-06	5.98E-05	5.50E-06	3.35E-07	1.29E-04	5.98E-06	4.54E-06	1.70E-02	4.54E-05
Rock Pile Area 2025	2025_CHAN_RCK	0.006	0.25	3.16E-07	1.89E-07	3.16E-07	1.62E-06	3.54E-06	3.16E-07	5.05E-08	5.81E-06	6.31E-07	2.53E-08	9.37E-04	4.80E-06
Paved road	2025_PAVED	5.95E-03	2.44	3.05E-06	1.83E-06	3.05E-06	1.95E-06	6.10E-05	5.61E-06	3.41E-07	1.32E-04	6.10E-06	4.63E-06	1.73E-02	4.63E-05
Rock Pile Area 2026	2026_CHAN_RCK	0.006	0.25	3.16E-07	1.89E-07	3.16E-07	1.62E-06	3.54E-06	3.16E-07	5.05E-08	5.81E-06	6.31E-07	2.53E-08	9.37E-04	4.80E-06
Paved road	2026_PAVED	5.84E-03	2.44	3.05E-06	1.83E-06	3.05E-06	1.95E-06	6.10E-05	5.61E-06	3.41E-07	1.32E-04	6.10E-06	4.63E-06	1.73E-02	4.63E-05
Channel Widening 2027	2027_CHAN_RCK	0.002	0.98	1.23E-06	7.36E-07	1.23E-06	6.28E-06	1.37E-05	1.23E-06	1.96E-07	2.26E-05	2.45E-06	9.82E-08	3.64E-03	1.87E-05
Paved road	2027_PAVED	5.61E-03	2.39	2.99E-06	1.79E-06	2.99E-06	1.91E-06	5.98E-05	5.50E-06	3.35E-07	1.29E-04	5.98E-06	4.54E-06	1.70E-02	4.54E-05
Material Removal 2028	2028_MATRMVL	0.001	0.25	3.15E-07	1.89E-07	3.15E-07	1.62E-06	3.53E-06	3.15E-07	5.05E-08	5.80E-06	6.31E-07	2.52E-08	9.37E-04	4.80E-06
Paved road	2028_PAVED	5.57E-03	2.39	2.99E-06	1.80E-06	2.99E-06	1.92E-06	5.98E-05	5.51E-06	3.35E-07	1.29E-04	5.98E-06	4.55E-06	1.70E-02	4.55E-05
Unpaved road	2028_UNPAVED	3.40E-03	11.84	1.48E-05	8.88E-06	1.48E-05	9.47E-06	2.96E-04	2.72E-05	1.66E-06	6.40E-04	2.96E-05	2.25E-05	8.41E-02	2.25E-04
Material Removal 2029	2029_MATRMVL	0.001	0.25	3.15E-07	1.89E-07	3.15E-07	1.62E-06	3.53E-06	3.15E-07	5.05E-08	5.80E-06	6.31E-07	2.52E-08	9.37E-04	4.80E-06
Paved road	2029_PAVED	5.56E-03	2.41	3.01E-06	1.81E-06	3.01E-06	1.93E-06	6.03E-05	5.55E-06	3.38E-07	1.30E-04	6.03E-06	4.58E-06	1.71E-02	4.58E-05
Unpaved road	2029_UNPAVED	3.39E-03	11.93	1.49E-05	8.95E-06	1.49E-05	9.55E-06	2.98E-04	2.74E-05	1.67E-06	6.44E-04	2.98E-05	2.27E-05	8.47E-02	2.27E-04

Construction Activity	Construction Year	DPM (g/s)	Arsenic (g/s)	Beryllium (g/s)	Cadmium (g/s)	Cobalt (g/s)	Copper (g/s)	Lead (g/s)	Mercury (g/s)	Nickel (g/s)	Selenium (g/s)	Chromium VI (g/s)	Crystalline Silica (g/s)	Vanadium (g/s)	No. of Workdays (days)
Concrete Channel 2024	2024_CONCRTE	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	130.00
Paved road	2024_PAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	130.00
Unpaved road	2024_CCP_UNPV	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	130.00
Channel Widening 2024	2024_CHAN_RCK	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	130.00
Paved road	2024_PAVED	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	130.00
Rock Pile Area 2025	2025_CHAN_RCK	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	130.00
Paved road	2025_PAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	130.00
Rock Pile Area 2026	2026_CHAN_RCK	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	130.00
Paved road	2026_PAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	130.00
Channel Widening 2027	2027_CHAN_RCK	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	130.00
Paved road	2027_PAVED	0.000E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	130.00
Material Removal 2028	2028_MATRMVL	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	130.00
Paved road	2028_PAVED	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	130.00
Unpaved road	2028_UNPAVED	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	130.00
Material Removal 2029	2029_MATRMVL	9.332E-05	2.55E-08	1.53E-08	2.55E-08	1.30E-07	2.85E-07	2.55E-08	4.08E-09	4.69E-07	5.10E-08	2.04E-09	7.57E-05	3.87E-07	130.00
Paved road	2029_PAVED	4.487E-04	2.43E-07	1.46E-07	2.43E-07	1.56E-07	4.87E-06	4.48E-07	2.73E-08	1.05E-05	4.87E-07	3.70E-07	1.38E-03	3.70E-06	130.00
Unpaved road	2029_UNPAVED	2.741E-04	1.20E-06	7.23E-07	1.20E-06	7.71E-07	2.41E-05	2.22E-06	1.35E-07	5.20E-05	2.41E-06	1.83E-06	6.84E-03	1.83E-05	130.00

N/A = not including PM10 on-site dust in HRA calculation; it is only for speciating metals.

Acute REL

TAC	UOM	
Arsenic	µg/m^3	0.2
Mercury	µg/m^3	0.61
Nickel	µg/m^3	0.2
Vanadium	µg/m^3	31

	Max
CT House	0.037
Res	0.055
Acute	0.033

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} (µg/m^3)				Acute Calculation, $\sum C_{TAC}$ /REL	
	UTM X	UTM Y	Arsenic	Mercury	Nickel	Vanadium	Total HI	Receptor Type
			0.2	0.61	0.2	31		
581336.22_4131207.48	581336.22	4131207.48	1.66E-04	1.86E-05	7.12E-03	2.52E-03	0.037	CT House
581554.22_4130688.06	581554.22	4130688.06	1.10E-04	1.23E-05	4.70E-03	1.66E-03	0.024	Res
579793.36_4131503.29	579793.36	4131503.29	8.18E-05	9.26E-06	3.48E-03	1.24E-03	0.018	Acute
580488.37_4131517.71	580488.37	4131517.71	8.52E-05	9.59E-06	3.66E-03	1.30E-03	0.019	Acute
581678.43_4131040.03	581678.43	4131040.03	1.74E-04	1.95E-05	7.48E-03	2.64E-03	0.038	Res
581635.43_4130978.54	581635.43	4130978.54	2.02E-04	2.27E-05	8.69E-03	3.07E-03	0.045	Res
581830.06_4131027.55	581830.06	4131027.55	2.03E-04	2.28E-05	8.73E-03	3.08E-03	0.045	Res
581727.48_4130976.54	581727.48	4130976.54	2.19E-04	2.46E-05	9.45E-03	3.33E-03	0.048	Res
581789.11_4130419.65	581789.11	4130419.65	1.07E-04	1.21E-05	4.60E-03	1.63E-03	0.024	Res
581700.32_4130781.89	581700.32	4130781.89	1.11E-04	1.25E-05	4.76E-03	1.69E-03	0.024	Res
581426.07_4131299.01	581426.07	4131299.01	1.49E-04	1.67E-05	6.38E-03	2.26E-03	0.033	Acute
582301.42_4129474.56	582301.42	4129474.56	6.99E-05	7.88E-06	3.00E-03	1.06E-03	0.015	Res
582357.99_4129474.56	582357.99	4129474.56	6.64E-05	7.49E-06	2.84E-03	1.01E-03	0.015	Res
582414.56_4129474.56	582414.56	4129474.56	6.37E-05	7.18E-06	2.73E-03	9.69E-04	0.014	Res
582471.13_4129474.56	582471.13	4129474.56	5.99E-05	6.76E-06	2.57E-03	9.11E-04	0.013	Res
582527.7_4129474.56	582527.7	4129474.56	5.61E-05	6.33E-06	2.40E-03	8.53E-04	0.012	Res
582584.27_4129474.56	582584.27	4129474.56	5.18E-05	5.84E-06	2.21E-03	7.87E-04	0.011	Res
582640.84_4129474.56	582640.84	4129474.56	4.88E-05	5.51E-06	2.09E-03	7.42E-04	0.011	Res
582244.85_4129558.47	582244.85	4129558.47	6.90E-05	7.77E-06	2.95E-03	1.05E-03	0.015	Res
582301.42_4129558.47	582301.42	4129558.47	6.42E-05	7.23E-06	2.75E-03	9.75E-04	0.014	Res
582357.99_4129558.47	582357.99	4129558.47	5.92E-05	6.68E-06	2.53E-03	9.00E-04	0.013	Res
582414.56_4129558.47	582414.56	4129558.47	5.59E-05	6.30E-06	2.39E-03	8.50E-04	0.012	Res
582471.13_4129558.47	582471.13	4129558.47	5.69E-05	6.42E-06	2.44E-03	8.65E-04	0.013	Res
582527.7_4129558.47	582527.7	4129558.47	5.79E-05	6.52E-06	2.48E-03	8.80E-04	0.013	Res
582584.27_4129558.47	582584.27	4129558.47	5.86E-05	6.60E-06	2.51E-03	8.91E-04	0.013	Res
582640.84_4129558.47	582640.84	4129558.47	5.92E-05	6.67E-06	2.54E-03	9.00E-04	0.013	Res
582697.41_4129558.47	582697.41	4129558.47	5.98E-05	6.74E-06	2.56E-03	9.09E-04	0.013	Res
582244.85_4129642.38	582244.85	4129642.38	6.70E-05	7.55E-06	2.87E-03	1.02E-03	0.015	Res
582301.42_4129642.38	582301.42	4129642.38	6.67E-05	7.52E-06	2.86E-03	1.01E-03	0.015	Res
582357.99_4129642.38	582357.99	4129642.38	6.64E-05	7.48E-06	2.84E-03	1.01E-03	0.015	Res
582414.56_4129642.38	582414.56	4129642.38	6.74E-05	7.59E-06	2.89E-03	1.02E-03	0.015	Res
582471.13_4129642.38	582471.13	4129642.38	6.82E-05	7.68E-06	2.92E-03	1.04E-03	0.015	Res
582527.7_4129642.38	582527.7	4129642.38	6.88E-05	7.75E-06	2.95E-03	1.05E-03	0.015	Res
582584.27_4129642.38	582584.27	4129642.38	6.88E-05	7.75E-06	2.95E-03	1.05E-03	0.015	Res
582640.84_4129642.38	582640.84	4129642.38	6.89E-05	7.76E-06	2.95E-03	1.05E-03	0.015	Res
582697.41_4129642.38	582697.41	4129642.38	6.92E-05	7.79E-06	2.97E-03	1.05E-03	0.015	Res
582753.98_4129642.38	582753.98	4129642.38	6.87E-05	7.74E-06	2.95E-03	1.04E-03	0.015	Res
582810.55_4129642.38	582810.55	4129642.38	6.77E-05	7.62E-06	2.90E-03	1.03E-03	0.015	Res
582867.12_4129642.38	582867.12	4129642.38	6.75E-05	7.60E-06	2.90E-03	1.03E-03	0.015	Res
582244.85_4129726.29	582244.85	4129726.29	8.02E-05	9.04E-06	3.44E-03	1.22E-03	0.018	Res

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)				Acute Calculation, $\sum C_{TAC}$ /REL	
	UTM X	UTM Y	Arsenic	Mercury	Nickel	Vanadium	Total HI	Receptor Type
582301.42_4129726.29	582301.42	4129726.29	8.04E-05	9.06E-06	3.45E-03	1.22E-03	0.018	Res
582357.99_4129726.29	582357.99	4129726.29	7.93E-05	8.93E-06	3.40E-03	1.21E-03	0.017	Res
582414.56_4129726.29	582414.56	4129726.29	7.83E-05	8.81E-06	3.36E-03	1.19E-03	0.017	Res
582471.13_4129726.29	582471.13	4129726.29	7.71E-05	8.68E-06	3.30E-03	1.17E-03	0.017	Res
582527.7_4129726.29	582527.7	4129726.29	7.56E-05	8.51E-06	3.24E-03	1.15E-03	0.017	Res
582584.27_4129726.29	582584.27	4129726.29	7.50E-05	8.44E-06	3.22E-03	1.14E-03	0.017	Res
582640.84_4129726.29	582640.84	4129726.29	7.43E-05	8.37E-06	3.19E-03	1.13E-03	0.016	Res
582697.41_4129726.29	582697.41	4129726.29	7.22E-05	8.13E-06	3.10E-03	1.10E-03	0.016	Res
582753.98_4129726.29	582753.98	4129726.29	6.99E-05	7.87E-06	3.00E-03	1.06E-03	0.015	Res
582810.55_4129726.29	582810.55	4129726.29	6.83E-05	7.68E-06	2.93E-03	1.04E-03	0.015	Res
582244.85_4129810.2	582244.85	4129810.2	8.87E-05	9.99E-06	3.81E-03	1.35E-03	0.020	Res
582301.42_4129810.2	582301.42	4129810.2	8.63E-05	9.72E-06	3.70E-03	1.31E-03	0.019	Res
582357.99_4129810.2	582357.99	4129810.2	8.36E-05	9.41E-06	3.59E-03	1.27E-03	0.018	Res
582414.56_4129810.2	582414.56	4129810.2	8.05E-05	9.06E-06	3.45E-03	1.22E-03	0.018	Res
582471.13_4129810.2	582471.13	4129810.2	7.74E-05	8.71E-06	3.32E-03	1.18E-03	0.017	Res
582527.7_4129810.2	582527.7	4129810.2	7.57E-05	8.52E-06	3.25E-03	1.15E-03	0.017	Res
582584.27_4129810.2	582584.27	4129810.2	7.35E-05	8.27E-06	3.15E-03	1.12E-03	0.016	Res
582640.84_4129810.2	582640.84	4129810.2	7.03E-05	7.92E-06	3.01E-03	1.07E-03	0.015	Res
582697.41_4129810.2	582697.41	4129810.2	6.77E-05	7.62E-06	2.90E-03	1.03E-03	0.015	Res
581905.43_4129894.11	581905.43	4129894.11	9.46E-05	1.06E-05	4.06E-03	1.44E-03	0.021	Res
581962_4129894.11	581962	4129894.11	9.47E-05	1.07E-05	4.06E-03	1.44E-03	0.021	Res
582131.71_4129894.11	582131.71	4129894.11	8.99E-05	1.01E-05	3.86E-03	1.37E-03	0.020	Res
582188.28_4129894.11	582188.28	4129894.11	8.69E-05	9.79E-06	3.73E-03	1.32E-03	0.019	Res
582244.85_4129894.11	582244.85	4129894.11	8.27E-05	9.31E-06	3.55E-03	1.26E-03	0.018	Res
582301.42_4129894.11	582301.42	4129894.11	7.93E-05	8.93E-06	3.40E-03	1.20E-03	0.017	Res
582357.99_4129894.11	582357.99	4129894.11	7.60E-05	8.56E-06	3.26E-03	1.16E-03	0.017	Res
582414.56_4129894.11	582414.56	4129894.11	7.67E-05	8.63E-06	3.29E-03	1.17E-03	0.017	Res
582471.13_4129894.11	582471.13	4129894.11	7.77E-05	8.75E-06	3.33E-03	1.18E-03	0.017	Res
582527.7_4129894.11	582527.7	4129894.11	7.72E-05	8.70E-06	3.31E-03	1.17E-03	0.017	Res
582584.27_4129894.11	582584.27	4129894.11	7.59E-05	8.54E-06	3.26E-03	1.15E-03	0.017	Res
582640.84_4129894.11	582640.84	4129894.11	7.59E-05	8.55E-06	3.26E-03	1.15E-03	0.017	Res
582697.41_4129894.11	582697.41	4129894.11	7.47E-05	8.41E-06	3.20E-03	1.14E-03	0.016	Res
581962_4129978.02	581962	4129978.02	9.20E-05	1.04E-05	3.95E-03	1.40E-03	0.020	Res
582018.57_4129978.02	582018.57	4129978.02	8.94E-05	1.01E-05	3.83E-03	1.36E-03	0.020	Res
582075.14_4129978.02	582075.14	4129978.02	9.27E-05	1.04E-05	3.98E-03	1.41E-03	0.020	Res
582131.71_4129978.02	582131.71	4129978.02	9.04E-05	1.02E-05	3.88E-03	1.37E-03	0.020	Res
582188.28_4129978.02	582188.28	4129978.02	8.89E-05	1.00E-05	3.82E-03	1.35E-03	0.020	Res
582244.85_4129978.02	582244.85	4129978.02	8.75E-05	9.85E-06	3.75E-03	1.33E-03	0.019	Res
582301.42_4129978.02	582301.42	4129978.02	8.54E-05	9.61E-06	3.66E-03	1.30E-03	0.019	Res
582357.99_4129978.02	582357.99	4129978.02	8.49E-05	9.56E-06	3.64E-03	1.29E-03	0.019	Res
582414.56_4129978.02	582414.56	4129978.02	8.48E-05	9.54E-06	3.64E-03	1.29E-03	0.019	Res
582471.13_4129978.02	582471.13	4129978.02	8.27E-05	9.31E-06	3.55E-03	1.26E-03	0.018	Res
582527.7_4129978.02	582527.7	4129978.02	8.08E-05	9.09E-06	3.47E-03	1.23E-03	0.018	Res
582584.27_4129978.02	582584.27	4129978.02	7.94E-05	8.94E-06	3.41E-03	1.21E-03	0.018	Res
582640.84_4129978.02	582640.84	4129978.02	7.73E-05	8.69E-06	3.32E-03	1.17E-03	0.017	Res
582697.41_4129978.02	582697.41	4129978.02	7.62E-05	8.57E-06	3.27E-03	1.16E-03	0.017	Res
582753.98_4129978.02	582753.98	4129978.02	7.40E-05	8.32E-06	3.18E-03	1.12E-03	0.016	Res

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)				Acute Calculation, $\sum C_{TAC}$ /REL	
	UTM X	UTM Y	Arsenic	Mercury	Nickel	Vanadium	Total HI	Receptor Type
582810.55_4129978.02	582810.55	4129978.02	7.08E-05	7.97E-06	3.04E-03	1.08E-03	0.016	Res
581905.43_4130061.93	581905.43	4130061.93	1.08E-04	1.21E-05	4.62E-03	1.64E-03	0.024	Res
581962_4130061.93	581962	4130061.93	1.05E-04	1.18E-05	4.52E-03	1.60E-03	0.023	Res
582018.57_4130061.93	582018.57	4130061.93	1.03E-04	1.16E-05	4.44E-03	1.57E-03	0.023	Res
582075.14_4130061.93	582075.14	4130061.93	1.01E-04	1.13E-05	4.32E-03	1.53E-03	0.022	Res
582131.71_4130061.93	582131.71	4130061.93	9.67E-05	1.09E-05	4.15E-03	1.47E-03	0.021	Res
582188.28_4130061.93	582188.28	4130061.93	9.32E-05	1.05E-05	4.01E-03	1.42E-03	0.021	Res
582244.85_4130061.93	582244.85	4130061.93	8.93E-05	1.00E-05	3.84E-03	1.36E-03	0.020	Res
582301.42_4130061.93	582301.42	4130061.93	8.75E-05	9.85E-06	3.76E-03	1.33E-03	0.019	Res
582357.99_4130061.93	582357.99	4130061.93	8.75E-05	9.84E-06	3.76E-03	1.33E-03	0.019	Res
582414.56_4130061.93	582414.56	4130061.93	8.53E-05	9.59E-06	3.66E-03	1.30E-03	0.019	Res
582471.13_4130061.93	582471.13	4130061.93	8.49E-05	9.55E-06	3.65E-03	1.29E-03	0.019	Res
582527.7_4130061.93	582527.7	4130061.93	8.34E-05	9.37E-06	3.58E-03	1.27E-03	0.018	Res
582584.27_4130061.93	582584.27	4130061.93	8.25E-05	9.28E-06	3.54E-03	1.25E-03	0.018	Res
582640.84_4130061.93	582640.84	4130061.93	8.07E-05	9.08E-06	3.47E-03	1.23E-03	0.018	Res
582697.41_4130061.93	582697.41	4130061.93	7.79E-05	8.76E-06	3.34E-03	1.18E-03	0.017	Res
582753.98_4130061.93	582753.98	4130061.93	7.58E-05	8.53E-06	3.26E-03	1.15E-03	0.017	Res
582810.55_4130061.93	582810.55	4130061.93	7.42E-05	8.35E-06	3.19E-03	1.13E-03	0.016	Res
581962_4130145.84	581962	4130145.84	1.05E-04	1.19E-05	4.53E-03	1.60E-03	0.023	Res
582018.57_4130145.84	582018.57	4130145.84	1.03E-04	1.15E-05	4.40E-03	1.56E-03	0.023	Res
582075.14_4130145.84	582075.14	4130145.84	1.01E-04	1.13E-05	4.32E-03	1.53E-03	0.022	Res
582131.71_4130145.84	582131.71	4130145.84	9.75E-05	1.10E-05	4.19E-03	1.48E-03	0.021	Res
582188.28_4130145.84	582188.28	4130145.84	9.37E-05	1.05E-05	4.02E-03	1.42E-03	0.021	Res
582244.85_4130145.84	582244.85	4130145.84	9.25E-05	1.04E-05	3.97E-03	1.41E-03	0.020	Res
582301.42_4130145.84	582301.42	4130145.84	9.04E-05	1.02E-05	3.88E-03	1.37E-03	0.020	Res
582357.99_4130145.84	582357.99	4130145.84	8.78E-05	9.87E-06	3.77E-03	1.33E-03	0.019	Res
582414.56_4130145.84	582414.56	4130145.84	8.62E-05	9.69E-06	3.70E-03	1.31E-03	0.019	Res
582471.13_4130145.84	582471.13	4130145.84	8.40E-05	9.45E-06	3.61E-03	1.28E-03	0.019	Res
582527.7_4130145.84	582527.7	4130145.84	8.23E-05	9.25E-06	3.53E-03	1.25E-03	0.018	Res
582584.27_4130145.84	582584.27	4130145.84	7.90E-05	8.88E-06	3.39E-03	1.20E-03	0.017	Res
582640.84_4130145.84	582640.84	4130145.84	7.55E-05	8.49E-06	3.24E-03	1.15E-03	0.017	Res
582697.41_4130145.84	582697.41	4130145.84	7.34E-05	8.26E-06	3.15E-03	1.12E-03	0.016	Res
582753.98_4130145.84	582753.98	4130145.84	7.22E-05	8.13E-06	3.10E-03	1.10E-03	0.016	Res
582810.55_4130145.84	582810.55	4130145.84	6.95E-05	7.82E-06	2.98E-03	1.06E-03	0.015	Res
582867.12_4130145.84	582867.12	4130145.84	6.40E-05	7.21E-06	2.75E-03	9.73E-04	0.014	Res
581962_4130229.75	581962	4130229.75	9.91E-05	1.11E-05	4.25E-03	1.51E-03	0.022	Res
582018.57_4130229.75	582018.57	4130229.75	9.49E-05	1.07E-05	4.08E-03	1.44E-03	0.021	Res
582075.14_4130229.75	582075.14	4130229.75	9.21E-05	1.04E-05	3.95E-03	1.40E-03	0.020	Res
582131.71_4130229.75	582131.71	4130229.75	8.95E-05	1.01E-05	3.84E-03	1.36E-03	0.020	Res
582188.28_4130229.75	582188.28	4130229.75	8.83E-05	9.93E-06	3.79E-03	1.34E-03	0.019	Res
582244.85_4130229.75	582244.85	4130229.75	8.47E-05	9.53E-06	3.64E-03	1.29E-03	0.019	Res
582301.42_4130229.75	582301.42	4130229.75	8.26E-05	9.29E-06	3.55E-03	1.26E-03	0.018	Res
582357.99_4130229.75	582357.99	4130229.75	8.03E-05	9.03E-06	3.45E-03	1.22E-03	0.018	Res
582414.56_4130229.75	582414.56	4130229.75	8.07E-05	9.08E-06	3.46E-03	1.23E-03	0.018	Res
582471.13_4130229.75	582471.13	4130229.75	7.87E-05	8.85E-06	3.38E-03	1.20E-03	0.017	Res
582527.7_4130229.75	582527.7	4130229.75	7.62E-05	8.57E-06	3.27E-03	1.16E-03	0.017	Res
582584.27_4130229.75	582584.27	4130229.75	7.54E-05	8.48E-06	3.24E-03	1.15E-03	0.017	Res
582640.84_4130229.75	582640.84	4130229.75	7.54E-05	8.49E-06	3.24E-03	1.15E-03	0.017	Res

Acute Calculation, $\sum C_{TAC}$ /REL

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)				Total HI	Receptor Type
	UTM X	UTM Y	Arsenic	Mercury	Nickel	Vanadium		
582697.41_4130229.75	582697.41	4130229.75	7.37E-05	8.29E-06	3.17E-03	1.12E-03	0.016	Res
582753.98_4130229.75	582753.98	4130229.75	7.07E-05	7.95E-06	3.04E-03	1.07E-03	0.016	Res
582810.55_4130229.75	582810.55	4130229.75	7.00E-05	7.88E-06	3.01E-03	1.06E-03	0.015	Res
582867.12_4130229.75	582867.12	4130229.75	7.03E-05	7.91E-06	3.02E-03	1.07E-03	0.015	Res
582018.57_4130313.66	582018.57	4130313.66	9.14E-05	1.03E-05	3.92E-03	1.39E-03	0.020	Res
582075.14_4130313.66	582075.14	4130313.66	9.22E-05	1.04E-05	3.96E-03	1.40E-03	0.020	Res
582131.71_4130313.66	582131.71	4130313.66	9.22E-05	1.04E-05	3.96E-03	1.40E-03	0.020	Res
582188.28_4130313.66	582188.28	4130313.66	8.94E-05	1.01E-05	3.84E-03	1.36E-03	0.020	Res
582244.85_4130313.66	582244.85	4130313.66	8.89E-05	1.00E-05	3.82E-03	1.35E-03	0.020	Res
582301.42_4130313.66	582301.42	4130313.66	8.80E-05	9.90E-06	3.78E-03	1.34E-03	0.019	Res
582357.99_4130313.66	582357.99	4130313.66	8.60E-05	9.68E-06	3.69E-03	1.31E-03	0.019	Res
582414.56_4130313.66	582414.56	4130313.66	8.26E-05	9.30E-06	3.55E-03	1.26E-03	0.018	Res
582471.13_4130313.66	582471.13	4130313.66	8.12E-05	9.14E-06	3.49E-03	1.23E-03	0.018	Res
582527.7_4130313.66	582527.7	4130313.66	8.12E-05	9.14E-06	3.49E-03	1.23E-03	0.018	Res
582584.27_4130313.66	582584.27	4130313.66	7.88E-05	8.86E-06	3.38E-03	1.20E-03	0.017	Res
582640.84_4130313.66	582640.84	4130313.66	7.51E-05	8.45E-06	3.22E-03	1.14E-03	0.017	Res
582697.41_4130313.66	582697.41	4130313.66	7.48E-05	8.42E-06	3.21E-03	1.14E-03	0.016	Res
582753.98_4130313.66	582753.98	4130313.66	7.42E-05	8.35E-06	3.18E-03	1.13E-03	0.016	Res
582810.55_4130313.66	582810.55	4130313.66	7.17E-05	8.07E-06	3.08E-03	1.09E-03	0.016	Res
582867.12_4130313.66	582867.12	4130313.66	6.81E-05	7.66E-06	2.92E-03	1.03E-03	0.015	Res
581848.86_4130397.57	581848.86	4130397.57	9.97E-05	1.12E-05	4.28E-03	1.52E-03	0.022	Res
581905.43_4130397.57	581905.43	4130397.57	9.71E-05	1.09E-05	4.16E-03	1.48E-03	0.021	Res
581962_4130397.57	581962	4130397.57	9.50E-05	1.07E-05	4.07E-03	1.44E-03	0.021	Res
582018.57_4130397.57	582018.57	4130397.57	9.57E-05	1.08E-05	4.10E-03	1.45E-03	0.021	Res
582075.14_4130397.57	582075.14	4130397.57	9.59E-05	1.08E-05	4.11E-03	1.46E-03	0.021	Res
582131.71_4130397.57	582131.71	4130397.57	9.48E-05	1.07E-05	4.07E-03	1.44E-03	0.021	Res
582188.28_4130397.57	582188.28	4130397.57	9.31E-05	1.05E-05	3.99E-03	1.42E-03	0.021	Res
582244.85_4130397.57	582244.85	4130397.57	9.29E-05	1.05E-05	3.99E-03	1.41E-03	0.020	Res
582301.42_4130397.57	582301.42	4130397.57	8.95E-05	1.01E-05	3.84E-03	1.36E-03	0.020	Res
582357.99_4130397.57	582357.99	4130397.57	8.79E-05	9.89E-06	3.77E-03	1.34E-03	0.019	Res
582414.56_4130397.57	582414.56	4130397.57	8.86E-05	9.98E-06	3.80E-03	1.35E-03	0.020	Res
582471.13_4130397.57	582471.13	4130397.57	8.67E-05	9.76E-06	3.72E-03	1.32E-03	0.019	Res
582527.7_4130397.57	582527.7	4130397.57	8.30E-05	9.34E-06	3.56E-03	1.26E-03	0.018	Res
582584.27_4130397.57	582584.27	4130397.57	8.40E-05	9.45E-06	3.61E-03	1.28E-03	0.019	Res
582640.84_4130397.57	582640.84	4130397.57	8.30E-05	9.34E-06	3.56E-03	1.26E-03	0.018	Res
582697.41_4130397.57	582697.41	4130397.57	7.97E-05	8.97E-06	3.42E-03	1.21E-03	0.018	Res
582753.98_4130397.57	582753.98	4130397.57	7.55E-05	8.50E-06	3.24E-03	1.15E-03	0.017	Res
582810.55_4130397.57	582810.55	4130397.57	7.19E-05	8.09E-06	3.08E-03	1.09E-03	0.016	Res
582867.12_4130397.57	582867.12	4130397.57	7.13E-05	8.02E-06	3.06E-03	1.08E-03	0.016	Res
581848.86_4130481.48	581848.86	4130481.48	1.13E-04	1.27E-05	4.86E-03	1.72E-03	0.025	Res
581905.43_4130481.48	581905.43	4130481.48	1.11E-04	1.25E-05	4.79E-03	1.69E-03	0.025	Res
581962_4130481.48	581962	4130481.48	1.10E-04	1.24E-05	4.74E-03	1.68E-03	0.024	Res
582018.57_4130481.48	582018.57	4130481.48	1.09E-04	1.23E-05	4.70E-03	1.66E-03	0.024	Res
582075.14_4130481.48	582075.14	4130481.48	1.09E-04	1.22E-05	4.67E-03	1.65E-03	0.024	Res
582131.71_4130481.48	582131.71	4130481.48	1.08E-04	1.22E-05	4.64E-03	1.64E-03	0.024	Res
582188.28_4130481.48	582188.28	4130481.48	1.05E-04	1.18E-05	4.49E-03	1.59E-03	0.023	Res
582244.85_4130481.48	582244.85	4130481.48	1.02E-04	1.14E-05	4.36E-03	1.54E-03	0.022	Res
582301.42_4130481.48	582301.42	4130481.48	1.02E-04	1.14E-05	4.37E-03	1.55E-03	0.022	Res
582357.99_4130481.48	582357.99	4130481.48	9.90E-05	1.11E-05	4.25E-03	1.51E-03	0.022	Res

Acute Calculation, $\sum C_{TAC}$ /REL

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)				Total HI	Receptor Type
	UTM X	UTM Y	Arsenic	Mercury	Nickel	Vanadium		
582414.56_4130481.48	582414.56	4130481.48	9.62E-05	1.08E-05	4.13E-03	1.46E-03	0.021	Res
582471.13_4130481.48	582471.13	4130481.48	9.71E-05	1.09E-05	4.17E-03	1.48E-03	0.021	Res
582527.7_4130481.48	582527.7	4130481.48	9.43E-05	1.06E-05	4.05E-03	1.43E-03	0.021	Res
582584.27_4130481.48	582584.27	4130481.48	8.97E-05	1.01E-05	3.85E-03	1.36E-03	0.020	Res
582640.84_4130481.48	582640.84	4130481.48	8.40E-05	9.46E-06	3.61E-03	1.28E-03	0.019	Res
582697.41_4130481.48	582697.41	4130481.48	8.20E-05	9.23E-06	3.52E-03	1.25E-03	0.018	Res
582753.98_4130481.48	582753.98	4130481.48	8.05E-05	9.06E-06	3.46E-03	1.22E-03	0.018	Res
582810.55_4130481.48	582810.55	4130481.48	7.83E-05	8.82E-06	3.36E-03	1.19E-03	0.017	Res
582867.12_4130481.48	582867.12	4130481.48	7.69E-05	8.66E-06	3.30E-03	1.17E-03	0.017	Res
581735.72_4130565.39	581735.72	4130565.39	1.15E-04	1.30E-05	4.96E-03	1.76E-03	0.025	Res
581792.29_4130565.39	581792.29	4130565.39	1.12E-04	1.26E-05	4.82E-03	1.71E-03	0.025	Res
581848.86_4130565.39	581848.86	4130565.39	1.12E-04	1.26E-05	4.82E-03	1.71E-03	0.025	Res
581905.43_4130565.39	581905.43	4130565.39	1.16E-04	1.30E-05	4.98E-03	1.76E-03	0.026	Res
581962_4130565.39	581962	4130565.39	1.14E-04	1.28E-05	4.88E-03	1.73E-03	0.025	Res
582018.57_4130565.39	582018.57	4130565.39	1.13E-04	1.27E-05	4.83E-03	1.71E-03	0.025	Res
582075.14_4130565.39	582075.14	4130565.39	1.11E-04	1.25E-05	4.77E-03	1.69E-03	0.024	Res
582131.71_4130565.39	582131.71	4130565.39	1.06E-04	1.20E-05	4.57E-03	1.62E-03	0.023	Res
582188.28_4130565.39	582188.28	4130565.39	1.07E-04	1.20E-05	4.60E-03	1.63E-03	0.024	Res
582244.85_4130565.39	582244.85	4130565.39	1.04E-04	1.17E-05	4.45E-03	1.57E-03	0.023	Res
582301.42_4130565.39	582301.42	4130565.39	1.03E-04	1.16E-05	4.41E-03	1.56E-03	0.023	Res
582357.99_4130565.39	582357.99	4130565.39	1.02E-04	1.15E-05	4.39E-03	1.55E-03	0.023	Res
582414.56_4130565.39	582414.56	4130565.39	9.80E-05	1.10E-05	4.21E-03	1.49E-03	0.022	Res
582471.13_4130565.39	582471.13	4130565.39	9.20E-05	1.04E-05	3.95E-03	1.40E-03	0.020	Res
582527.7_4130565.39	582527.7	4130565.39	8.75E-05	9.85E-06	3.76E-03	1.33E-03	0.019	Res
582584.27_4130565.39	582584.27	4130565.39	8.60E-05	9.68E-06	3.69E-03	1.31E-03	0.019	Res
582640.84_4130565.39	582640.84	4130565.39	8.32E-05	9.36E-06	3.57E-03	1.26E-03	0.018	Res
582697.41_4130565.39	582697.41	4130565.39	8.13E-05	9.15E-06	3.49E-03	1.24E-03	0.018	Res
582753.98_4130565.39	582753.98	4130565.39	7.85E-05	8.84E-06	3.37E-03	1.19E-03	0.017	Res
582810.55_4130565.39	582810.55	4130565.39	7.52E-05	8.47E-06	3.23E-03	1.14E-03	0.017	Res
582867.12_4130565.39	582867.12	4130565.39	7.17E-05	8.07E-06	3.08E-03	1.09E-03	0.016	Res
581735.72_4130649.3	581735.72	4130649.3	1.11E-04	1.25E-05	4.75E-03	1.68E-03	0.024	Res
581792.29_4130649.3	581792.29	4130649.3	1.09E-04	1.22E-05	4.66E-03	1.65E-03	0.024	Res
581905.43_4130649.3	581905.43	4130649.3	1.20E-04	1.35E-05	5.14E-03	1.82E-03	0.026	Res
581962_4130649.3	581962	4130649.3	1.20E-04	1.35E-05	5.14E-03	1.82E-03	0.026	Res
582018.57_4130649.3	582018.57	4130649.3	1.15E-04	1.29E-05	4.93E-03	1.74E-03	0.025	Res
582075.14_4130649.3	582075.14	4130649.3	1.15E-04	1.30E-05	4.96E-03	1.75E-03	0.025	Res
582131.71_4130649.3	582131.71	4130649.3	1.12E-04	1.26E-05	4.80E-03	1.70E-03	0.025	Res
582188.28_4130649.3	582188.28	4130649.3	1.12E-04	1.26E-05	4.83E-03	1.71E-03	0.025	Res
582244.85_4130649.3	582244.85	4130649.3	1.10E-04	1.24E-05	4.74E-03	1.68E-03	0.024	Res
582301.42_4130649.3	582301.42	4130649.3	1.04E-04	1.17E-05	4.47E-03	1.58E-03	0.023	Res
582357.99_4130649.3	582357.99	4130649.3	9.69E-05	1.09E-05	4.16E-03	1.47E-03	0.021	Res
582414.56_4130649.3	582414.56	4130649.3	9.55E-05	1.07E-05	4.10E-03	1.45E-03	0.021	Res
582471.13_4130649.3	582471.13	4130649.3	9.24E-05	1.04E-05	3.97E-03	1.40E-03	0.020	Res
582527.7_4130649.3	582527.7	4130649.3	8.97E-05	1.01E-05	3.85E-03	1.36E-03	0.020	Res
582584.27_4130649.3	582584.27	4130649.3	8.58E-05	9.65E-06	3.68E-03	1.30E-03	0.019	Res
582640.84_4130649.3	582640.84	4130649.3	8.13E-05	9.14E-06	3.49E-03	1.24E-03	0.018	Res
582697.41_4130649.3	582697.41	4130649.3	7.82E-05	8.81E-06	3.36E-03	1.19E-03	0.017	Res
582753.98_4130649.3	582753.98	4130649.3	7.79E-05	8.77E-06	3.35E-03	1.18E-03	0.017	Res
582810.55_4130649.3	582810.55	4130649.3	7.75E-05	8.72E-06	3.33E-03	1.18E-03	0.017	Res

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)				Acute Calculation, $\sum C_{TAC}$ /REL	
	UTM X	UTM Y	Arsenic	Mercury	Nickel	Vanadium	Total HI	Receptor Type
582867.12_4130649.3	582867.12	4130649.3	7.67E-05	8.63E-06	3.29E-03	1.17E-03	0.017	Res
581848.86_4130733.21	581848.86	4130733.21	1.20E-04	1.35E-05	5.16E-03	1.82E-03	0.026	Res
581905.43_4130733.21	581905.43	4130733.21	1.17E-04	1.31E-05	5.01E-03	1.77E-03	0.026	Res
581962_4130733.21	581962	4130733.21	1.17E-04	1.32E-05	5.05E-03	1.78E-03	0.026	Res
582018.57_4130733.21	582018.57	4130733.21	1.13E-04	1.27E-05	4.87E-03	1.72E-03	0.025	Res
582075.14_4130733.21	582075.14	4130733.21	1.16E-04	1.31E-05	5.00E-03	1.77E-03	0.026	Res
582131.71_4130733.21	582131.71	4130733.21	1.10E-04	1.24E-05	4.73E-03	1.67E-03	0.024	Res
582188.28_4130733.21	582188.28	4130733.21	1.03E-04	1.16E-05	4.44E-03	1.57E-03	0.023	Res
582244.85_4130733.21	582244.85	4130733.21	9.95E-05	1.12E-05	4.27E-03	1.51E-03	0.022	Res
582301.42_4130733.21	582301.42	4130733.21	9.64E-05	1.08E-05	4.14E-03	1.46E-03	0.021	Res
582357.99_4130733.21	582357.99	4130733.21	9.25E-05	1.04E-05	3.97E-03	1.41E-03	0.020	Res
582414.56_4130733.21	582414.56	4130733.21	8.65E-05	9.73E-06	3.72E-03	1.32E-03	0.019	Res
582471.13_4130733.21	582471.13	4130733.21	8.11E-05	9.12E-06	3.48E-03	1.23E-03	0.018	Res
582527.7_4130733.21	582527.7	4130733.21	8.11E-05	9.12E-06	3.48E-03	1.23E-03	0.018	Res
582584.27_4130733.21	582584.27	4130733.21	8.06E-05	9.07E-06	3.46E-03	1.22E-03	0.018	Res
582640.84_4130733.21	582640.84	4130733.21	7.94E-05	8.94E-06	3.41E-03	1.21E-03	0.018	Res
582697.41_4130733.21	582697.41	4130733.21	7.78E-05	8.75E-06	3.34E-03	1.18E-03	0.017	Res
582753.98_4130733.21	582753.98	4130733.21	7.55E-05	8.50E-06	3.24E-03	1.15E-03	0.017	Res
582810.55_4130733.21	582810.55	4130733.21	7.33E-05	8.24E-06	3.15E-03	1.11E-03	0.016	Res
582867.12_4130733.21	582867.12	4130733.21	7.08E-05	7.97E-06	3.04E-03	1.08E-03	0.016	Res
581735.72_4130817.12	581735.72	4130817.12	1.09E-04	1.23E-05	4.69E-03	1.66E-03	0.024	Res
581792.29_4130817.12	581792.29	4130817.12	1.19E-04	1.33E-05	5.11E-03	1.80E-03	0.026	Res
581848.86_4130817.12	581848.86	4130817.12	1.22E-04	1.37E-05	5.25E-03	1.86E-03	0.027	Res
581905.43_4130817.12	581905.43	4130817.12	1.21E-04	1.36E-05	5.19E-03	1.83E-03	0.027	Res
581962_4130817.12	581962	4130817.12	1.20E-04	1.34E-05	5.15E-03	1.82E-03	0.026	Res
582018.57_4130817.12	582018.57	4130817.12	1.12E-04	1.25E-05	4.80E-03	1.70E-03	0.025	Res
582075.14_4130817.12	582075.14	4130817.12	1.08E-04	1.21E-05	4.63E-03	1.64E-03	0.024	Res
582131.71_4130817.12	582131.71	4130817.12	1.05E-04	1.18E-05	4.51E-03	1.59E-03	0.023	Res
582188.28_4130817.12	582188.28	4130817.12	9.86E-05	1.11E-05	4.24E-03	1.50E-03	0.022	Res
582244.85_4130817.12	582244.85	4130817.12	8.94E-05	1.01E-05	3.84E-03	1.36E-03	0.020	Res
582301.42_4130817.12	582301.42	4130817.12	9.05E-05	1.02E-05	3.89E-03	1.38E-03	0.020	Res
582357.99_4130817.12	582357.99	4130817.12	9.00E-05	1.01E-05	3.87E-03	1.37E-03	0.020	Res
582414.56_4130817.12	582414.56	4130817.12	8.76E-05	9.85E-06	3.76E-03	1.33E-03	0.019	Res
582471.13_4130817.12	582471.13	4130817.12	8.44E-05	9.49E-06	3.63E-03	1.28E-03	0.019	Res
582527.7_4130817.12	582527.7	4130817.12	8.03E-05	9.03E-06	3.45E-03	1.22E-03	0.018	Res
582584.27_4130817.12	582584.27	4130817.12	7.82E-05	8.80E-06	3.36E-03	1.19E-03	0.017	Res
582640.84_4130817.12	582640.84	4130817.12	7.69E-05	8.65E-06	3.30E-03	1.17E-03	0.017	Res
582697.41_4130817.12	582697.41	4130817.12	7.52E-05	8.46E-06	3.23E-03	1.14E-03	0.017	Res
582753.98_4130817.12	582753.98	4130817.12	7.32E-05	8.24E-06	3.15E-03	1.11E-03	0.016	Res
582810.55_4130817.12	582810.55	4130817.12	7.14E-05	8.03E-06	3.07E-03	1.09E-03	0.016	Res
582867.12_4130817.12	582867.12	4130817.12	7.01E-05	7.89E-06	3.01E-03	1.07E-03	0.015	Res
581735.72_4130901.03	581735.72	4130901.03	1.49E-04	1.67E-05	6.42E-03	2.27E-03	0.033	Res
581792.29_4130901.03	581792.29	4130901.03	1.57E-04	1.76E-05	6.74E-03	2.38E-03	0.035	Res
581848.86_4130901.03	581848.86	4130901.03	1.41E-04	1.59E-05	6.08E-03	2.15E-03	0.031	Res
581905.43_4130901.03	581905.43	4130901.03	1.31E-04	1.47E-05	5.64E-03	1.99E-03	0.029	Res
581962_4130901.03	581962	4130901.03	1.27E-04	1.42E-05	5.46E-03	1.93E-03	0.028	Res
582018.57_4130901.03	582018.57	4130901.03	1.14E-04	1.28E-05	4.89E-03	1.73E-03	0.025	Res
582075.14_4130901.03	582075.14	4130901.03	1.13E-04	1.27E-05	4.87E-03	1.72E-03	0.025	Res
582131.71_4130901.03	582131.71	4130901.03	1.08E-04	1.21E-05	4.63E-03	1.63E-03	0.024	Res

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)				Acute Calculation, $\sum C_{TAC}$ /REL	
	UTM X	UTM Y	Arsenic	Mercury	Nickel	Vanadium	Total HI	Receptor Type
582188.28_4130901.03	582188.28	4130901.03	9.76E-05	1.10E-05	4.20E-03	1.48E-03	0.022	Res
582244.85_4130901.03	582244.85	4130901.03	8.96E-05	1.01E-05	3.85E-03	1.36E-03	0.020	Res
582301.42_4130901.03	582301.42	4130901.03	8.50E-05	9.56E-06	3.66E-03	1.29E-03	0.019	Res
582357.99_4130901.03	582357.99	4130901.03	8.11E-05	9.11E-06	3.48E-03	1.23E-03	0.018	Res
582414.56_4130901.03	582414.56	4130901.03	7.77E-05	8.74E-06	3.34E-03	1.18E-03	0.017	Res
582471.13_4130901.03	582471.13	4130901.03	7.50E-05	8.44E-06	3.22E-03	1.14E-03	0.017	Res
582527.7_4130901.03	582527.7	4130901.03	7.24E-05	8.14E-06	3.11E-03	1.10E-03	0.016	Res
582584.27_4130901.03	582584.27	4130901.03	6.99E-05	7.86E-06	3.00E-03	1.06E-03	0.015	Res
582640.84_4130901.03	582640.84	4130901.03	6.75E-05	7.60E-06	2.90E-03	1.03E-03	0.015	Res
582697.41_4130901.03	582697.41	4130901.03	6.52E-05	7.33E-06	2.80E-03	9.90E-04	0.014	Res
582753.98_4130901.03	582753.98	4130901.03	6.31E-05	7.10E-06	2.71E-03	9.59E-04	0.014	Res
582810.55_4130901.03	582810.55	4130901.03	6.21E-05	6.99E-06	2.67E-03	9.44E-04	0.014	Res
582867.12_4130901.03	582867.12	4130901.03	6.12E-05	6.89E-06	2.63E-03	9.30E-04	0.013	Res
581735.72_4130984.94	581735.72	4130984.94	2.43E-04	2.73E-05	1.05E-02	3.69E-03	0.054	Res
581792.29_4130984.94	581792.29	4130984.94	2.48E-04	2.78E-05	1.07E-02	3.77E-03	0.055	Res
581848.86_4130984.94	581848.86	4130984.94	2.50E-04	2.81E-05	1.08E-02	3.80E-03	0.055	Res
581905.43_4130984.94	581905.43	4130984.94	2.31E-04	2.59E-05	9.94E-03	3.50E-03	0.051	Res
581962_4130984.94	581962	4130984.94	1.82E-04	2.04E-05	7.83E-03	2.76E-03	0.040	Res
582018.57_4130984.94	582018.57	4130984.94	1.49E-04	1.67E-05	6.40E-03	2.26E-03	0.033	Res
582075.14_4130984.94	582075.14	4130984.94	1.28E-04	1.44E-05	5.51E-03	1.95E-03	0.028	Res
582131.71_4130984.94	582131.71	4130984.94	1.15E-04	1.29E-05	4.94E-03	1.75E-03	0.025	Res
582188.28_4130984.94	582188.28	4130984.94	1.06E-04	1.20E-05	4.58E-03	1.62E-03	0.024	Res
582244.85_4130984.94	582244.85	4130984.94	9.95E-05	1.12E-05	4.28E-03	1.51E-03	0.022	Res
582301.42_4130984.94	582301.42	4130984.94	9.33E-05	1.05E-05	4.02E-03	1.42E-03	0.021	Res
582357.99_4130984.94	582357.99	4130984.94	8.80E-05	9.89E-06	3.79E-03	1.34E-03	0.019	Res
582414.56_4130984.94	582414.56	4130984.94	8.33E-05	9.35E-06	3.58E-03	1.27E-03	0.018	Res
582471.13_4130984.94	582471.13	4130984.94	7.88E-05	8.85E-06	3.39E-03	1.20E-03	0.017	Res
582527.7_4130984.94	582527.7	4130984.94	7.48E-05	8.41E-06	3.22E-03	1.14E-03	0.017	Res
582584.27_4130984.94	582584.27	4130984.94	7.12E-05	8.01E-06	3.06E-03	1.08E-03	0.016	Res
582640.84_4130984.94	582640.84	4130984.94	6.81E-05	7.65E-06	2.93E-03	1.03E-03	0.015	Res
582697.41_4130984.94	582697.41	4130984.94	6.51E-05	7.31E-06	2.80E-03	9.89E-04	0.014	Res
582753.98_4130984.94	582753.98	4130984.94	6.23E-05	7.00E-06	2.68E-03	9.46E-04	0.014	Res
582810.55_4130984.94	582810.55	4130984.94	5.95E-05	6.69E-06	2.56E-03	9.05E-04	0.013	Res
582867.12_4130984.94	582867.12	4130984.94	5.73E-05	6.45E-06	2.46E-03	8.71E-04	0.013	Res
581735.72_4131068.85	581735.72	4131068.85	1.39E-04	1.57E-05	5.99E-03	2.12E-03	0.031	Res
581792.29_4131068.85	581792.29	4131068.85	1.39E-04	1.56E-05	5.97E-03	2.11E-03	0.031	Res
581848.86_4131068.85	581848.86	4131068.85	1.42E-04	1.60E-05	6.11E-03	2.16E-03	0.031	Res
581905.43_4131068.85	581905.43	4131068.85	1.39E-04	1.57E-05	5.99E-03	2.12E-03	0.031	Res
581962_4131068.85	581962	4131068.85	1.40E-04	1.57E-05	6.00E-03	2.12E-03	0.031	Res
582018.57_4131068.85	582018.57	4131068.85	1.29E-04	1.45E-05	5.56E-03	1.97E-03	0.029	Res
582075.14_4131068.85	582075.14	4131068.85	1.19E-04	1.34E-05	5.13E-03	1.81E-03	0.026	Res
582131.71_4131068.85	582131.71	4131068.85	1.13E-04	1.26E-05	4.84E-03	1.71E-03	0.025	Res
582188.28_4131068.85	582188.28	4131068.85	1.08E-04	1.21E-05	4.63E-03	1.64E-03	0.024	Res
582244.85_4131068.85	582244.85	4131068.85	1.03E-04	1.16E-05	4.44E-03	1.57E-03	0.023	Res
582301.42_4131068.85	582301.42	4131068.85	9.92E-05	1.11E-05	4.26E-03	1.51E-03	0.022	Res
582357.99_4131068.85	582357.99	4131068.85	9.50E-05	1.07E-05	4.09E-03	1.44E-03	0.021	Res
582414.56_4131068.85	582414.56	4131068.85	9.11E-05	1.02E-05	3.92E-03	1.38E-03	0.020	Res
582471.13_4131068.85	582471.13	4131068.85	8.73E-05	9.82E-06	3.75E-03	1.33E-03	0.019	Res
582527.7_4131068.85	582527.7	4131068.85	8.35E-05	9.39E-06	3.59E-03	1.27E-03	0.018	Res

Receptor Lookup	Receptor Location		TAC Concentration, C_{AIR} ($\mu g/m^3$)				Acute Calculation, $\sum C_{TAC}$ /REL	
	UTM X	UTM Y	Arsenic	Mercury	Nickel	Vanadium	Total HI	Receptor Type
582584.27_4131068.85	582584.27	4131068.85	7.99E-05	8.98E-06	3.43E-03	1.21E-03	0.018	Res
582640.84_4131068.85	582640.84	4131068.85	7.70E-05	8.66E-06	3.31E-03	1.17E-03	0.017	Res
582697.41_4131068.85	582697.41	4131068.85	7.40E-05	8.32E-06	3.18E-03	1.13E-03	0.016	Res
582753.98_4131068.85	582753.98	4131068.85	7.15E-05	8.04E-06	3.07E-03	1.09E-03	0.016	Res
582810.55_4131068.85	582810.55	4131068.85	6.89E-05	7.75E-06	2.96E-03	1.05E-03	0.015	Res
582867.12_4131068.85	582867.12	4131068.85	6.60E-05	7.42E-06	2.84E-03	1.00E-03	0.015	Res
582018.57_4131152.76	582018.57	4131152.76	1.07E-04	1.21E-05	4.62E-03	1.63E-03	0.024	Res
582244.85_4131152.76	582244.85	4131152.76	9.86E-05	1.11E-05	4.24E-03	1.50E-03	0.022	Res
582301.42_4131152.76	582301.42	4131152.76	9.58E-05	1.08E-05	4.12E-03	1.46E-03	0.021	Res
582357.99_4131152.76	582357.99	4131152.76	9.25E-05	1.04E-05	3.98E-03	1.41E-03	0.020	Res
582414.56_4131152.76	582414.56	4131152.76	8.92E-05	1.00E-05	3.83E-03	1.36E-03	0.020	Res
582471.13_4131152.76	582471.13	4131152.76	8.51E-05	9.57E-06	3.65E-03	1.29E-03	0.019	Res
582527.7_4131152.76	582527.7	4131152.76	8.14E-05	9.15E-06	3.50E-03	1.24E-03	0.018	Res
582584.27_4131152.76	582584.27	4131152.76	7.84E-05	8.82E-06	3.37E-03	1.19E-03	0.017	Res
582640.84_4131152.76	582640.84	4131152.76	7.65E-05	8.60E-06	3.28E-03	1.16E-03	0.017	Res
582697.41_4131152.76	582697.41	4131152.76	7.46E-05	8.39E-06	3.20E-03	1.13E-03	0.016	Res
582753.98_4131152.76	582753.98	4131152.76	7.30E-05	8.21E-06	3.13E-03	1.11E-03	0.016	Res
582810.55_4131152.76	582810.55	4131152.76	7.13E-05	8.01E-06	3.06E-03	1.08E-03	0.016	Res
582867.12_4131152.76	582867.12	4131152.76	6.89E-05	7.75E-06	2.96E-03	1.05E-03	0.015	Res

B-6 Aermod Output Plot Files by Source

*	AERMOD (191	91): C:\Lakes\P	CRP\PCRP.isc					
*	AERMET (141	34):						
*	MODELING OPT	IONS USED: Re	gDFAULT CONC					
*	PLOT	FILE OF ANNUAL	VALUES AVERA					
*	FOR	A TOTAL OF 1	0 RECEPTORS.					
*	FORM	AT: (3(1X,F13.5	),3(1X,F8.2),					
*	X	Y	AVERAGE CONC					
*	_____	_____	MATRMVL	CHAN_RCK	CONCRTE	UNPAVED	PAVED	CCP_UNPV
581336.22_4131207	581336.22	4131207.48	0.01546	0.02114	0.10034	0.02517	1.1474	0.32144
581554.22_413068	581554.22	4130688.06	0.01642	0.04303	0.17671	0.03208	0.75927	0.6034
579793.36_413150	579793.36	4131503.29	0.02495	0.03484	0.04993	0.042	0.03845	0.02634
580488.37_413151	580488.37	4131517.71	0.01365	0.02017	0.10858	0.02613	0.07249	0.17866
581678.43_413104	581678.43	4131040.03	0.01232	0.02584	0.10671	0.02166	3.68051	0.3229
581635.43_413097	581635.43	4130978.54	0.01275	0.02846	0.14556	0.02306	7.46525	0.47181
581830.06_413102	581830.06	4131027.55	0.01141	0.02275	0.08991	0.01975	3.39026	0.22463
581727.48_413097	581727.48	4130976.54	0.01215	0.02587	0.12164	0.02163	9.04165	0.33828
581789.11_413041	581789.11	4130419.65	0.01677	0.05525	0.18162	0.03094	0.56897	0.47297
581700.32_413078	581700.32	4130781.89	0.01388	0.03025	0.21366	0.02556	1.7784	0.53937
581426.07_413129	581426.07	4131299.01	0.01462	0.01865	0.07415	0.02172	0.40726	0.18495
582301.42_412947	582301.42	4129474.56	0.014	0.05076	0.16902	0.02326	0.17134	0.27119
582357.99_412947	582357.99	4129474.56	0.01369	0.04808	0.15121	0.02223	0.15989	0.24417
582414.56_412947	582414.56	4129474.56	0.01341	0.04567	0.13571	0.02129	0.14952	0.21821
582471.13_412947	582471.13	4129474.56	0.01313	0.04339	0.12161	0.02041	0.14018	0.19348
582527.7_4129474.	582527.7	4129474.56	0.01287	0.04139	0.11037	0.01963	0.13217	0.17315
582584.27_412947	582584.27	4129474.56	0.01259	0.03934	0.09859	0.01886	0.12407	0.15274
582640.84_412947	582640.84	4129474.56	0.01233	0.03746	0.08901	0.01816	0.11538	0.13636
582244.85_412955	582244.85	4129558.47	0.01468	0.0584	0.12054	0.02384	0.17277	0.26059
582301.42_412955	582301.42	4129558.47	0.01429	0.05306	0.15191	0.02269	0.17196	0.27813
582357.99_412955	582357.99	4129558.47	0.01392	0.04911	0.14808	0.02167	0.16323	0.24482
582414.56_412955	582414.56	4129558.47	0.01362	0.04645	0.13219	0.02082	0.15296	0.21483
582471.13_412955	582471.13	4129558.47	0.01329	0.04352	0.11315	0.01996	0.14297	0.18105
582527.7_4129558.	582527.7	4129558.47	0.013	0.04137	0.10183	0.01925	0.13352	0.16079
582584.27_412955	582584.27	4129558.47	0.01272	0.0394	0.09247	0.01859	0.12456	0.14417
582640.84_412955	582640.84	4129558.47	0.01247	0.03768	0.08503	0.01801	0.11705	0.13088
582697.41_412955	582697.41	4129558.47	0.01222	0.03605	0.07842	0.01747	0.10985	0.11933
582244.85_412964	582244.85	4129642.38	0.01496	0.06176	0.08853	0.02356	0.15017	0.1735
582301.42_412964	582301.42	4129642.38	0.01451	0.05512	0.11835	0.02245	0.16719	0.2408
582357.99_412964	582357.99	4129642.38	0.01409	0.04968	0.14225	0.02146	0.166	0.24022
582414.56_412964	582414.56	4129642.38	0.01374	0.04632	0.12459	0.02064	0.15675	0.20371
582471.13_412964	582471.13	4129642.38	0.01342	0.04364	0.10943	0.01992	0.14694	0.17582
582527.7_4129642.	582527.7	4129642.38	0.01311	0.04138	0.09828	0.01928	0.13788	0.15577
582584.27_412964	582584.27	4129642.38	0.01281	0.03929	0.08867	0.01868	0.12796	0.13903
582640.84_412964	582640.84	4129642.38	0.01255	0.03746	0.08121	0.01815	0.11938	0.12593
582697.41_412964	582697.41	4129642.38	0.01229	0.03582	0.07498	0.01766	0.11153	0.11504
582753.98_412964	582753.98	4129642.38	0.01203	0.03434	0.06963	0.01721	0.10389	0.10583
582810.55_412964	582810.55	4129642.38	0.01178	0.03303	0.06534	0.0168	0.09703	0.09846
582867.12_412964	582867.12	4129642.38	0.01156	0.03172	0.0609	0.0164	0.08956	0.09143
582244.85_412972	582244.85	4129726.29	0.01499	0.05993	0.09752	0.02338	0.16634	0.1927
582301.42_412972	582301.42	4129726.29	0.01461	0.05544	0.10272	0.02252	0.16253	0.20344
582357.99_412972	582357.99	4129726.29	0.01418	0.04963	0.13012	0.02161	0.16722	0.23202
582414.56_412972	582414.56	4129726.29	0.01381	0.04619	0.12059	0.02087	0.15994	0.20098
582471.13_412972	582471.13	4129726.29	0.01348	0.04353	0.10754	0.02021	0.15081	0.17508
582527.7_4129726.	582527.7	4129726.29	0.01315	0.04104	0.0953	0.01959	0.14169	0.15236
582584.27_412972	582584.27	4129726.29	0.01284	0.03898	0.08629	0.01903	0.13246	0.13626
582640.84_412972	582640.84	4129726.29	0.01256	0.03717	0.07915	0.01852	0.12334	0.12376
582697.41_412972	582697.41	4129726.29	0.01229	0.0355	0.07273	0.01803	0.11373	0.11291
582753.98_412972	582753.98	4129726.29	0.01201	0.03394	0.06702	0.01757	0.10423	0.10363
582810.55_412972	582810.55	4129726.29	0.01173	0.03238	0.06137	0.0171	0.09442	0.09497

582244.85_412981(	582244.85	4129810.2	0.01499	0.05947	0.08814	0.02371	0.16159	0.16554
582301.42_412981(	582301.42	4129810.2	0.01456	0.054	0.10103	0.02282	0.16517	0.19686
582357.99_412981(	582357.99	4129810.2	0.01416	0.04933	0.11581	0.02202	0.16495	0.21438
582414.56_412981(	582414.56	4129810.2	0.01377	0.04548	0.114	0.02126	0.16128	0.19446
582471.13_412981(	582471.13	4129810.2	0.0134	0.04246	0.10052	0.02057	0.15407	0.16574
582527.7_4129810.	582527.7	4129810.2	0.01307	0.04031	0.09093	0.01998	0.14422	0.14775
582584.27_412981(	582584.27	4129810.2	0.01275	0.03825	0.08212	0.0194	0.13399	0.13197
582640.84_412981(	582640.84	4129810.2	0.01245	0.03634	0.07435	0.01885	0.12206	0.11877
582697.41_412981(	582697.41	4129810.2	0.01216	0.03468	0.06826	0.01834	0.11128	0.10875
581905.43_412989(	581905.43	4129894.11	0.01782	0.05159	0.11215	0.03073	0.21448	0.22809
581962_4129894.11	581962	4129894.11	0.01716	0.06893	0.1076	0.02915	0.2149	0.21692
582131.71_412989(	582131.71	4129894.11	0.01569	0.06584	0.09214	0.02587	0.18639	0.17891
582188.28_412989(	582188.28	4129894.11	0.01524	0.06099	0.09168	0.02492	0.17971	0.17511
582244.85_412989(	582244.85	4129894.11	0.01479	0.05586	0.09721	0.02401	0.17672	0.19028
582301.42_412989(	582301.42	4129894.11	0.01438	0.05157	0.10417	0.02319	0.17109	0.20396
582357.99_412989(	582357.99	4129894.11	0.014	0.04793	0.10708	0.02241	0.16352	0.20185
582414.56_412989(	582414.56	4129894.11	0.01357	0.04347	0.10445	0.02156	0.16715	0.17843
582471.13_412989(	582471.13	4129894.11	0.0132	0.04073	0.0911	0.02083	0.15643	0.15214
582527.7_4129894.	582527.7	4129894.11	0.01287	0.03869	0.08257	0.02021	0.14364	0.1367
582584.27_412989(	582584.27	4129894.11	0.01256	0.03688	0.07559	0.01962	0.13097	0.12446
582640.84_412989(	582640.84	4129894.11	0.01227	0.0352	0.06939	0.01906	0.11892	0.11386
582697.41_412989(	582697.41	4129894.11	0.01199	0.03364	0.06388	0.01851	0.10772	0.10456
581962_4129978.02	581962	4129978.02	0.01694	0.06838	0.10294	0.02962	0.22462	0.20898
582018.57_412997(	582018.57	4129978.02	0.01643	0.06943	0.09464	0.02845	0.21086	0.18579
582075.14_412997(	582075.14	4129978.02	0.01586	0.0656	0.10185	0.02714	0.21896	0.20579
582131.71_412997(	582131.71	4129978.02	0.01537	0.05946	0.10879	0.02604	0.2197	0.22468
582188.28_412997(	582188.28	4129978.02	0.0149	0.05369	0.12874	0.02501	0.22058	0.26608
582244.85_412997(	582244.85	4129978.02	0.01451	0.05085	0.11709	0.02418	0.19859	0.23492
582301.42_412997(	582301.42	4129978.02	0.01407	0.04635	0.12056	0.02324	0.19687	0.2194
582357.99_412997(	582357.99	4129978.02	0.01367	0.04322	0.10538	0.0224	0.18617	0.18429
582414.56_412997(	582414.56	4129978.02	0.01332	0.04085	0.094	0.02165	0.17178	0.16176
582471.13_412997(	582471.13	4129978.02	0.01299	0.03876	0.08475	0.02095	0.1568	0.14441
582527.7_4129978.	582527.7	4129978.02	0.01266	0.03693	0.07741	0.02029	0.14209	0.13091
582584.27_412997(	582584.27	4129978.02	0.01234	0.03526	0.07106	0.01967	0.12844	0.11933
582640.84_412997(	582640.84	4129978.02	0.01205	0.03374	0.06569	0.01907	0.11618	0.10939
582697.41_412997(	582697.41	4129978.02	0.01178	0.03231	0.06094	0.01851	0.10492	0.10037
582753.98_412997(	582753.98	4129978.02	0.0115	0.0309	0.0563	0.01794	0.0939	0.0915
582810.55_412997(	582810.55	4129978.02	0.01121	0.02939	0.05128	0.01736	0.08199	0.08232
581905.43_413006(	581905.43	4130061.93	0.0169	0.06964	0.15888	0.03046	0.33096	0.38419
581962_4130061.93	581962	4130061.93	0.01641	0.06473	0.14652	0.02925	0.31208	0.3466
582018.57_413006(	582018.57	4130061.93	0.01601	0.06291	0.11437	0.02828	0.26342	0.24252
582075.14_413006(	582075.14	4130061.93	0.01558	0.05953	0.10119	0.02726	0.23395	0.20324
582131.71_413006(	582131.71	4130061.93	0.01509	0.05416	0.10839	0.02613	0.23041	0.22542
582188.28_413006(	582188.28	4130061.93	0.01464	0.0495	0.12153	0.02507	0.22572	0.25216
582244.85_413006(	582244.85	4130061.93	0.01419	0.04523	0.12467	0.02405	0.22174	0.2349
582301.42_413006(	582301.42	4130061.93	0.01381	0.04251	0.11091	0.02316	0.20557	0.20184
582357.99_413006(	582357.99	4130061.93	0.01344	0.04012	0.0987	0.02234	0.19026	0.17515
582414.56_413006(	582414.56	4130061.93	0.0131	0.03807	0.08888	0.02156	0.17383	0.15517
582471.13_413006(	582471.13	4130061.93	0.01277	0.03619	0.08053	0.02083	0.15702	0.13859
582527.7_4130061.	582527.7	4130061.93	0.01246	0.03455	0.07393	0.02014	0.14092	0.12542
582584.27_413006(	582584.27	4130061.93	0.01215	0.03306	0.06834	0.0195	0.12655	0.11398
582640.84_413006(	582640.84	4130061.93	0.01186	0.03165	0.06333	0.01888	0.11326	0.1035
582697.41_413006(	582697.41	4130061.93	0.01159	0.03037	0.0591	0.01829	0.10171	0.09433
582753.98_413006(	582753.98	4130061.93	0.01134	0.02918	0.05536	0.01773	0.09163	0.08602
582810.55_413006(	582810.55	4130061.93	0.01107	0.02801	0.05182	0.01719	0.08251	0.07824
581962_4130145.84	581962	4130145.84	0.01604	0.05557	0.18835	0.02895	0.36811	0.4519
582018.57_413014(	582018.57	4130145.84	0.01559	0.05192	0.17484	0.02778	0.34067	0.39389
582075.14_413014(	582075.14	4130145.84	0.01522	0.05041	0.13577	0.02682	0.28794	0.30061

582131.71_413014	582131.71	4130145.84	0.01479	0.04699	0.13335	0.02575	0.26644	0.28273
582188.28_413014	582188.28	4130145.84	0.01433	0.04306	0.12855	0.02463	0.2578	0.24641
582244.85_413014	582244.85	4130145.84	0.01394	0.04058	0.11397	0.02369	0.23458	0.21097
582301.42_413014	582301.42	4130145.84	0.01359	0.03854	0.10284	0.02283	0.21202	0.18613
582357.99_413014	582357.99	4130145.84	0.01324	0.03663	0.0931	0.02201	0.1924	0.16468
582414.56_413014	582414.56	4130145.84	0.01291	0.03488	0.08489	0.02124	0.1739	0.14672
582471.13_413014	582471.13	4130145.84	0.0126	0.03328	0.07784	0.02051	0.15574	0.13124
582527.7_4130145.	582527.7	4130145.84	0.01229	0.03181	0.07186	0.01981	0.13815	0.11787
582584.27_413014	582584.27	4130145.84	0.012	0.03045	0.06663	0.01916	0.12223	0.10604
582640.84_413014	582640.84	4130145.84	0.01171	0.02918	0.06202	0.01853	0.10855	0.09561
582697.41_413014	582697.41	4130145.84	0.01144	0.02802	0.05808	0.01794	0.09698	0.08663
582753.98_413014	582753.98	4130145.84	0.01119	0.02696	0.05468	0.01739	0.08739	0.0789
582810.55_413014	582810.55	4130145.84	0.01095	0.02596	0.0516	0.01686	0.07936	0.07214
582867.12_413014	582867.12	4130145.84	0.01067	0.02469	0.04692	0.01627	0.0692	0.06409
581962_4130229.75	581962	4130229.75	0.01585	0.05262	0.16018	0.02861	0.37712	0.37943
582018.57_413022	582018.57	4130229.75	0.01538	0.04827	0.16427	0.02734	0.3599	0.36778
582075.14_413022	582075.14	4130229.75	0.01493	0.04476	0.15161	0.02617	0.33437	0.30929
582131.71_413022	582131.71	4130229.75	0.01452	0.04201	0.13425	0.02511	0.30018	0.26178
582188.28_413022	582188.28	4130229.75	0.01414	0.03966	0.1201	0.02414	0.26672	0.22606
582244.85_413022	582244.85	4130229.75	0.01378	0.03753	0.10818	0.02323	0.23764	0.19695
582301.42_413022	582301.42	4130229.75	0.01343	0.0356	0.09824	0.02238	0.21302	0.17314
582357.99_413022	582357.99	4130229.75	0.01309	0.03383	0.08975	0.02157	0.19142	0.15292
582414.56_413022	582414.56	4130229.75	0.01277	0.03222	0.08248	0.02081	0.17002	0.13567
582471.13_413022	582471.13	4130229.75	0.01247	0.03075	0.07624	0.02009	0.1492	0.12086
582527.7_4130229.	582527.7	4130229.75	0.01217	0.02939	0.07074	0.01941	0.13086	0.10804
582584.27_413022	582584.27	4130229.75	0.01189	0.02813	0.0659	0.01877	0.1153	0.09702
582640.84_413022	582640.84	4130229.75	0.01162	0.02696	0.06163	0.01816	0.10232	0.08762
582697.41_413022	582697.41	4130229.75	0.01136	0.02592	0.05805	0.01759	0.09197	0.07989
582753.98_413022	582753.98	4130229.75	0.0111	0.02491	0.05457	0.01704	0.08317	0.07293
582810.55_413022	582810.55	4130229.75	0.01086	0.02398	0.05153	0.01652	0.07602	0.0671
582867.12_413022	582867.12	4130229.75	0.01063	0.02314	0.0489	0.01603	0.07004	0.0622
582018.57_413031	582018.57	4130313.66	0.0152	0.04611	0.15991	0.02671	0.38949	0.34087
582075.14_413031	582075.14	4130313.66	0.01475	0.04263	0.1411	0.02554	0.36052	0.27581
582131.71_413031	582131.71	4130313.66	0.01436	0.04016	0.1263	0.02454	0.31439	0.23624
582188.28_413031	582188.28	4130313.66	0.014	0.03794	0.11434	0.02361	0.27368	0.2053
582244.85_413031	582244.85	4130313.66	0.01364	0.03591	0.10425	0.02273	0.24052	0.17953
582301.42_413031	582301.42	4130313.66	0.0133	0.03403	0.09546	0.02191	0.21266	0.15747
582357.99_413031	582357.99	4130313.66	0.01297	0.0323	0.08781	0.02113	0.18594	0.13876
582414.56_413031	582414.56	4130313.66	0.01266	0.03072	0.08113	0.0204	0.16103	0.12297
582471.13_413031	582471.13	4130313.66	0.01236	0.02926	0.07528	0.0197	0.13968	0.10974
582527.7_4130313.	582527.7	4130313.66	0.01207	0.02791	0.07013	0.01905	0.12225	0.09868
582584.27_413031	582584.27	4130313.66	0.0118	0.02667	0.0655	0.01843	0.1079	0.08932
582640.84_413031	582640.84	4130313.66	0.01154	0.02553	0.06142	0.01784	0.09644	0.08151
582697.41_413031	582697.41	4130313.66	0.01128	0.02446	0.05769	0.01728	0.08694	0.07482
582753.98_413031	582753.98	4130313.66	0.01103	0.02349	0.05441	0.01676	0.07891	0.0692
582810.55_413031	582810.55	4130313.66	0.0108	0.02259	0.05143	0.01626	0.07183	0.06435
582867.12_413031	582867.12	4130313.66	0.01057	0.02176	0.04879	0.01579	0.06567	0.06023
581848.86_413039	581848.86	4130397.57	0.01633	0.05341	0.17882	0.02971	0.53782	0.45333
581905.43_413039	581905.43	4130397.57	0.01585	0.04971	0.18048	0.02837	0.52179	0.43154
581962_4130397.57	581962	4130397.57	0.01538	0.04631	0.1713	0.0271	0.49325	0.36042
582018.57_413039	582018.57	4130397.57	0.01495	0.04358	0.15116	0.02597	0.44128	0.2948
582075.14_413039	582075.14	4130397.57	0.01454	0.04109	0.13375	0.02491	0.38522	0.24529
582131.71_413039	582131.71	4130397.57	0.01417	0.03897	0.12106	0.02397	0.32783	0.21109
582188.28_413039	582188.28	4130397.57	0.01381	0.03697	0.11022	0.02308	0.28313	0.18294
582244.85_413039	582244.85	4130397.57	0.01348	0.03513	0.10149	0.02225	0.24261	0.16072
582301.42_413039	582301.42	4130397.57	0.01315	0.03337	0.09343	0.02147	0.20745	0.14161
582357.99_413039	582357.99	4130397.57	0.01283	0.03172	0.08629	0.02073	0.176	0.12577
582414.56_413039	582414.56	4130397.57	0.01252	0.03014	0.07977	0.02002	0.15092	0.11241

582471.13_413039	582471.13	4130397.57	0.01223	0.02871	0.07422	0.01936	0.13105	0.10164
582527.7_4130397.	582527.7	4130397.57	0.01195	0.02737	0.06928	0.01874	0.11498	0.09267
582584.27_413039	582584.27	4130397.57	0.01168	0.02611	0.06473	0.01815	0.10186	0.08495
582640.84_413039	582640.84	4130397.57	0.01143	0.02497	0.0608	0.01759	0.091	0.07857
582697.41_413039	582697.41	4130397.57	0.01118	0.02388	0.05705	0.01705	0.0814	0.07287
582753.98_413039	582753.98	4130397.57	0.01094	0.02289	0.05387	0.01655	0.07341	0.06815
582810.55_413039	582810.55	4130397.57	0.01071	0.02198	0.05098	0.01607	0.06658	0.06404
582867.12_413039	582867.12	4130397.57	0.01048	0.02112	0.04831	0.01562	0.06065	0.06038
581848.86_413048	581848.86	4130481.48	0.01585	0.04456	0.20657	0.02849	0.70241	0.46033
581905.43_413048	581905.43	4130481.48	0.01541	0.04297	0.18113	0.0273	0.65022	0.37157
581962_4130481.48	581962	4130481.48	0.01503	0.04179	0.16342	0.02627	0.55177	0.31757
582018.57_413048	582018.57	4130481.48	0.0146	0.0399	0.14364	0.02519	0.48423	0.25821
582075.14_413048	582075.14	4130481.48	0.01422	0.0383	0.12859	0.02422	0.40694	0.21836
582131.71_413048	582131.71	4130481.48	0.01386	0.03675	0.11627	0.02332	0.34309	0.18785
582188.28_413048	582188.28	4130481.48	0.01352	0.03528	0.10653	0.02249	0.28766	0.16469
582244.85_413048	582244.85	4130481.48	0.0132	0.03386	0.09835	0.02171	0.2373	0.1464
582301.42_413048	582301.42	4130481.48	0.01288	0.03242	0.09058	0.02097	0.19677	0.13079
582357.99_413048	582357.99	4130481.48	0.01258	0.03103	0.08385	0.02027	0.16571	0.11812
582414.56_413048	582414.56	4130481.48	0.01229	0.02967	0.07767	0.01961	0.14228	0.10732
582471.13_413048	582471.13	4130481.48	0.01201	0.02841	0.07269	0.01899	0.12349	0.09882
582527.7_4130481.	582527.7	4130481.48	0.01174	0.02717	0.0677	0.01839	0.10788	0.09099
582584.27_413048	582584.27	4130481.48	0.01149	0.026	0.06347	0.01783	0.09514	0.08451
582640.84_413048	582640.84	4130481.48	0.01123	0.02487	0.05937	0.01729	0.08425	0.07856
582697.41_413048	582697.41	4130481.48	0.01099	0.02381	0.05575	0.01678	0.07519	0.07341
582753.98_413048	582753.98	4130481.48	0.01076	0.02284	0.05267	0.0163	0.0678	0.06904
582810.55_413048	582810.55	4130481.48	0.01054	0.02192	0.0499	0.01585	0.06159	0.0652
582867.12_413048	582867.12	4130481.48	0.01033	0.02105	0.04736	0.01541	0.05628	0.06171
581735.72_413056	581735.72	4130565.39	0.01617	0.03966	0.2366	0.02979	0.85884	0.63705
581792.29_413056	581792.29	4130565.39	0.01572	0.03841	0.21641	0.02852	0.84619	0.51303
581848.86_413056	581848.86	4130565.39	0.01529	0.03738	0.19565	0.02734	0.80459	0.41418
581905.43_413056	581905.43	4130565.39	0.01484	0.03603	0.17007	0.02615	0.76831	0.32453
581962_4130565.39	581962	4130565.39	0.01444	0.03513	0.14927	0.0251	0.66085	0.26775
582018.57_413056	582018.57	4130565.39	0.01408	0.03443	0.13489	0.02417	0.53151	0.22961
582075.14_413056	582075.14	4130565.39	0.01373	0.03366	0.12189	0.02328	0.42863	0.1988
582131.71_413056	582131.71	4130565.39	0.01339	0.03284	0.11063	0.02246	0.34881	0.1744
582188.28_413056	582188.28	4130565.39	0.01307	0.03205	0.102	0.0217	0.27743	0.15626
582244.85_413056	582244.85	4130565.39	0.01277	0.0312	0.09407	0.02097	0.22283	0.14094
582301.42_413056	582301.42	4130565.39	0.01247	0.03025	0.08639	0.02027	0.18561	0.12733
582357.99_413056	582357.99	4130565.39	0.01218	0.02932	0.08	0.01962	0.15535	0.11633
582414.56_413056	582414.56	4130565.39	0.01191	0.02836	0.07436	0.019	0.13201	0.10696
582471.13_413056	582471.13	4130565.39	0.01165	0.0274	0.0693	0.01841	0.11369	0.09881
582527.7_4130565.	582527.7	4130565.39	0.01139	0.02643	0.06467	0.01786	0.099	0.09153
582584.27_413056	582584.27	4130565.39	0.01115	0.02551	0.06077	0.01734	0.08733	0.08544
582640.84_413056	582640.84	4130565.39	0.01091	0.02455	0.05678	0.01683	0.07723	0.07944
582697.41_413056	582697.41	4130565.39	0.01068	0.02365	0.05353	0.01635	0.06929	0.07449
582753.98_413056	582753.98	4130565.39	0.01047	0.02278	0.05061	0.0159	0.06275	0.07004
582810.55_413056	582810.55	4130565.39	0.01026	0.02195	0.04802	0.01547	0.05741	0.06611
582867.12_413056	582867.12	4130565.39	0.01006	0.02114	0.04565	0.01506	0.05295	0.06251
581735.72_413064	581735.72	4130649.3	0.01533	0.03482	0.1816	0.02823	0.93348	0.47623
581792.29_413064	581792.29	4130649.3	0.01493	0.03335	0.16947	0.02706	0.90355	0.40787
581905.43_413064	581905.43	4130649.3	0.01406	0.02994	0.15861	0.0247	0.9054	0.29645
581962_4130649.3	581962	4130649.3	0.01369	0.02916	0.13832	0.02372	0.74906	0.24817
582018.57_413064	582018.57	4130649.3	0.01336	0.02873	0.12535	0.02287	0.56505	0.2173
582075.14_413064	582075.14	4130649.3	0.01304	0.02831	0.11345	0.02206	0.43534	0.19154
582131.71_413064	582131.71	4130649.3	0.01274	0.02794	0.10342	0.0213	0.33492	0.17087
582188.28_413064	582188.28	4130649.3	0.01244	0.02756	0.09462	0.02058	0.26046	0.15362
582244.85_413064	582244.85	4130649.3	0.01216	0.0272	0.08738	0.01991	0.20678	0.13966
582301.42_413064	582301.42	4130649.3	0.01189	0.02676	0.08047	0.01927	0.16852	0.127

582357.99_413064	582357.99	4130649.3	0.01163	0.02631	0.07475	0.01867	0.1407	0.11656
582414.56_413064	582414.56	4130649.3	0.01138	0.02584	0.06988	0.01811	0.11994	0.10772
582471.13_413064	582471.13	4130649.3	0.01114	0.02527	0.0649	0.01756	0.10325	0.09909
582527.7_4130649.	582527.7	4130649.3	0.0109	0.02469	0.06068	0.01705	0.09022	0.09176
582584.27_413064	582584.27	4130649.3	0.01068	0.02409	0.05698	0.01657	0.08001	0.08535
582640.84_413064	582640.84	4130649.3	0.01046	0.02347	0.05369	0.01611	0.07192	0.07965
582697.41_413064	582697.41	4130649.3	0.01025	0.02282	0.05059	0.01566	0.06534	0.07439
582753.98_413064	582753.98	4130649.3	0.01005	0.02217	0.04793	0.01525	0.06009	0.06983
582810.55_413064	582810.55	4130649.3	0.00986	0.02154	0.0456	0.01485	0.05581	0.06584
582867.12_413064	582867.12	4130649.3	0.00967	0.02088	0.04333	0.01447	0.05206	0.06201
581848.86_413073	581848.86	4130733.21	0.0135	0.02701	0.16244	0.02393	1.35525	0.33279
581905.43_413073	581905.43	4130733.21	0.01315	0.02574	0.14095	0.02297	1.15487	0.27812
581962_4130733.21	581962	4130733.21	0.01283	0.02485	0.12525	0.0221	0.84513	0.2399
582018.57_413073	582018.57	4130733.21	0.01253	0.02424	0.11381	0.02132	0.5885	0.21206
582075.14_413073	582075.14	4130733.21	0.01225	0.02378	0.1039	0.02058	0.41178	0.18903
582131.71_413073	582131.71	4130733.21	0.01197	0.02343	0.09498	0.01988	0.29739	0.16931
582188.28_413073	582188.28	4130733.21	0.01171	0.02317	0.08724	0.01923	0.2274	0.1526
582244.85_413073	582244.85	4130733.21	0.01145	0.02295	0.08029	0.01861	0.18022	0.13809
582301.42_413073	582301.42	4130733.21	0.0112	0.02277	0.07431	0.01803	0.14767	0.12577
582357.99_413073	582357.99	4130733.21	0.01097	0.0226	0.06909	0.01749	0.12432	0.11515
582414.56_413073	582414.56	4130733.21	0.01074	0.02242	0.06427	0.01696	0.10706	0.1056
582471.13_413073	582471.13	4130733.21	0.01052	0.02221	0.06005	0.01646	0.09419	0.09733
582527.7_4130733.	582527.7	4130733.21	0.0103	0.02197	0.05621	0.01599	0.08428	0.08992
582584.27_413073	582584.27	4130733.21	0.0101	0.0217	0.05282	0.01555	0.0765	0.08344
582640.84_413073	582640.84	4130733.21	0.0099	0.02141	0.04982	0.01513	0.07017	0.07771
582697.41_413073	582697.41	4130733.21	0.00972	0.02108	0.04716	0.01474	0.0649	0.07271
582753.98_413073	582753.98	4130733.21	0.00953	0.02072	0.04473	0.01436	0.06035	0.06818
582810.55_413073	582810.55	4130733.21	0.00936	0.02036	0.04277	0.014	0.05661	0.06445
582867.12_413073	582867.12	4130733.21	0.00919	0.01996	0.04081	0.01366	0.0531	0.06084
581735.72_413081	581735.72	4130817.12	0.01328	0.02858	0.18488	0.02415	1.99892	0.46451
581792.29_413081	581792.29	4130817.12	0.0129	0.02645	0.15731	0.02308	2.25873	0.36698
581848.86_413081	581848.86	4130817.12	0.01258	0.02496	0.13974	0.02217	2.02531	0.31029
581905.43_413081	581905.43	4130817.12	0.01226	0.02355	0.12312	0.02129	1.52846	0.2627
581962_4130817.12	581962	4130817.12	0.01198	0.02246	0.11148	0.02051	0.92195	0.22923
582018.57_413081	582018.57	4130817.12	0.01171	0.02155	0.1019	0.01979	0.5472	0.20266
582075.14_413081	582075.14	4130817.12	0.01145	0.02084	0.09381	0.01911	0.35006	0.18106
582131.71_413081	582131.71	4130817.12	0.0112	0.02026	0.08632	0.01847	0.24902	0.16234
582188.28_413081	582188.28	4130817.12	0.01096	0.01982	0.07963	0.01786	0.19094	0.14632
582244.85_413081	582244.85	4130817.12	0.01073	0.01948	0.07353	0.01729	0.1545	0.13234
582301.42_413081	582301.42	4130817.12	0.0105	0.01925	0.06822	0.01675	0.13042	0.12046
582357.99_413081	582357.99	4130817.12	0.01028	0.01909	0.06342	0.01624	0.11343	0.11007
582414.56_413081	582414.56	4130817.12	0.01007	0.01898	0.05906	0.01575	0.1006	0.10087
582471.13_413081	582471.13	4130817.12	0.00987	0.01892	0.05537	0.0153	0.0908	0.09316
582527.7_4130817.	582527.7	4130817.12	0.00968	0.01885	0.0519	0.01487	0.08257	0.08611
582584.27_413081	582584.27	4130817.12	0.0095	0.0188	0.04894	0.01447	0.07586	0.08013
582640.84_413081	582640.84	4130817.12	0.00932	0.01874	0.04631	0.01408	0.07014	0.07489
582697.41_413081	582697.41	4130817.12	0.00915	0.01866	0.04393	0.01372	0.06514	0.07021
582753.98_413081	582753.98	4130817.12	0.00898	0.01854	0.04163	0.01337	0.06057	0.06582
582810.55_413081	582810.55	4130817.12	0.00883	0.0184	0.03966	0.01305	0.05661	0.06203
582867.12_413081	582867.12	4130817.12	0.00867	0.01824	0.0379	0.01273	0.05311	0.05868
581735.72_413090	581735.72	4130901.03	0.0125	0.02681	0.147	0.0225	3.99035	0.39064
581792.29_413090	581792.29	4130901.03	0.01216	0.02518	0.12991	0.0216	4.26291	0.32207
581848.86_413090	581848.86	4130901.03	0.01185	0.02378	0.1175	0.02077	3.79835	0.2741
581905.43_413090	581905.43	4130901.03	0.01155	0.02246	0.10643	0.01997	1.98839	0.23564
581962_4130901.03	581962	4130901.03	0.01128	0.02131	0.098	0.01926	0.79956	0.20696
582018.57_413090	582018.57	4130901.03	0.01102	0.02024	0.09009	0.01856	0.42352	0.18269
582075.14_413090	582075.14	4130901.03	0.01077	0.01935	0.08397	0.01793	0.28056	0.16411
582131.71_413090	582131.71	4130901.03	0.01053	0.01853	0.07787	0.01732	0.21243	0.14751

582188.28_4130901	582188.28	4130901.03	0.01031	0.01785	0.07246	0.01675	0.17238	0.13356
582244.85_4130901	582244.85	4130901.03	0.01009	0.01729	0.0674	0.0162	0.14526	0.12136
582301.42_4130901	582301.42	4130901.03	0.00987	0.01685	0.06274	0.01568	0.12524	0.11068
582357.99_4130901	582357.99	4130901.03	0.00967	0.01652	0.05861	0.0152	0.11	0.10154
582414.56_4130901	582414.56	4130901.03	0.00947	0.01628	0.05479	0.01474	0.09777	0.09344
582471.13_4130901	582471.13	4130901.03	0.00929	0.01613	0.05143	0.0143	0.08798	0.08645
582527.7_4130901.	582527.7	4130901.03	0.00911	0.01604	0.04833	0.01389	0.07979	0.0802
582584.27_4130901	582584.27	4130901.03	0.00894	0.01601	0.04564	0.01351	0.07312	0.07485
582640.84_4130901	582640.84	4130901.03	0.00877	0.01601	0.04326	0.01314	0.06751	0.07015
582697.41_4130901	582697.41	4130901.03	0.00861	0.01602	0.04109	0.0128	0.06266	0.06595
582753.98_4130901	582753.98	4130901.03	0.00846	0.01604	0.03906	0.01247	0.0584	0.06216
582810.55_4130901	582810.55	4130901.03	0.00831	0.01605	0.03717	0.01216	0.05454	0.05863
582867.12_4130901	582867.12	4130901.03	0.00817	0.01605	0.03552	0.01186	0.05122	0.05558
581735.72_4130984	581735.72	4130984.94	0.01207	0.02552	0.11682	0.02142	10.66172	0.32238
581792.29_4130984	581792.29	4130984.94	0.01173	0.02411	0.10612	0.02061	14.00216	0.27156
581848.86_4130984	581848.86	4130984.94	0.01141	0.02285	0.09756	0.01985	16.29253	0.23312
581905.43_4130984	581905.43	4130984.94	0.01112	0.02174	0.09127	0.01915	1.28529	0.20455
581962_4130984.94	581962	4130984.94	0.01084	0.02063	0.08468	0.01846	0.5449	0.17958
582018.57_4130984	582018.57	4130984.94	0.01057	0.01958	0.07883	0.0178	0.34689	0.15916
582075.14_4130984	582075.14	4130984.94	0.01032	0.01863	0.07391	0.01718	0.25291	0.14274
582131.71_4130984	582131.71	4130984.94	0.01008	0.01775	0.06949	0.0166	0.19785	0.12901
582188.28_4130984	582188.28	4130984.94	0.00985	0.01693	0.06529	0.01604	0.16134	0.11715
582244.85_4130984	582244.85	4130984.94	0.00963	0.01621	0.06136	0.01551	0.1355	0.10689
582301.42_4130984	582301.42	4130984.94	0.00942	0.01557	0.05771	0.015	0.11643	0.098
582357.99_4130984	582357.99	4130984.94	0.00921	0.01504	0.05434	0.01453	0.1019	0.09028
582414.56_4130984	582414.56	4130984.94	0.00902	0.01461	0.05119	0.01407	0.09044	0.08347
582471.13_4130984	582471.13	4130984.94	0.00884	0.01427	0.04827	0.01364	0.0812	0.07743
582527.7_4130984.	582527.7	4130984.94	0.00866	0.01402	0.04554	0.01323	0.07358	0.07204
582584.27_4130984	582584.27	4130984.94	0.00849	0.01386	0.04315	0.01285	0.06745	0.06741
582640.84_4130984	582640.84	4130984.94	0.00833	0.01377	0.04106	0.01249	0.06248	0.06345
582697.41_4130984	582697.41	4130984.94	0.00817	0.01373	0.03897	0.01215	0.05798	0.05968
582753.98_4130984	582753.98	4130984.94	0.00803	0.01374	0.03716	0.01182	0.0543	0.05649
582810.55_4130984	582810.55	4130984.94	0.00788	0.01376	0.03545	0.01151	0.05095	0.05347
582867.12_4130984	582867.12	4130984.94	0.00774	0.0138	0.03378	0.01122	0.04795	0.05068
581735.72_4131068	581735.72	4131068.85	0.01196	0.0242	0.09102	0.02067	1.7308	0.25597
581792.29_4131068	581792.29	4131068.85	0.0116	0.02301	0.08428	0.01994	1.37832	0.22396
581848.86_4131068	581848.86	4131068.85	0.01127	0.02193	0.07898	0.01926	0.73631	0.19799
581905.43_4131068	581905.43	4131068.85	0.01095	0.02087	0.074	0.0186	0.46486	0.17514
581962_4131068.85	581962	4131068.85	0.01066	0.01994	0.07033	0.01798	0.33372	0.15696
582018.57_4131068	582018.57	4131068.85	0.01038	0.01903	0.06664	0.01737	0.25042	0.14065
582075.14_4131068	582075.14	4131068.85	0.01011	0.01815	0.06324	0.01679	0.19657	0.12658
582131.71_4131068	582131.71	4131068.85	0.00986	0.01732	0.06024	0.01624	0.16035	0.11468
582188.28_4131068	582188.28	4131068.85	0.00962	0.01651	0.05733	0.0157	0.13409	0.10427
582244.85_4131068	582244.85	4131068.85	0.00939	0.01576	0.05468	0.01518	0.11477	0.09534
582301.42_4131068	582301.42	4131068.85	0.00917	0.01505	0.05211	0.01469	0.0999	0.08751
582357.99_4131068	582357.99	4131068.85	0.00896	0.0144	0.04963	0.01421	0.08817	0.08059
582414.56_4131068	582414.56	4131068.85	0.00876	0.01382	0.04728	0.01377	0.07888	0.07454
582471.13_4131068	582471.13	4131068.85	0.00857	0.01331	0.04499	0.01333	0.07127	0.06915
582527.7_4131068.	582527.7	4131068.85	0.00838	0.01288	0.04274	0.01292	0.06493	0.0643
582584.27_4131068	582584.27	4131068.85	0.0082	0.01253	0.04052	0.01253	0.05947	0.05987
582640.84_4131068	582640.84	4131068.85	0.00804	0.01228	0.03885	0.01216	0.05549	0.05643
582697.41_4131068	582697.41	4131068.85	0.00788	0.0121	0.03711	0.0118	0.05186	0.05317
582753.98_4131068	582753.98	4131068.85	0.00773	0.012	0.03566	0.01148	0.04893	0.05046
582810.55_4131068	582810.55	4131068.85	0.00759	0.01195	0.03427	0.01117	0.04632	0.04798
582867.12_4131068	582867.12	4131068.85	0.00744	0.0119	0.03255	0.01086	0.04358	0.04526
582018.57_4131152	582018.57	4131152.76	0.01041	0.01839	0.0546	0.01707	0.16394	0.12383
582244.85_4131152	582244.85	4131152.76	0.00935	0.01548	0.04672	0.01505	0.09551	0.0889
582301.42_4131152	582301.42	4131152.76	0.00911	0.01481	0.04517	0.01458	0.08525	0.08206

582357.99_413115	582357.99	4131152.76	0.00889	0.01416	0.04362	0.01413	0.07628	0.0758
582414.56_413115	582414.56	4131152.76	0.00868	0.01355	0.04223	0.0137	0.06889	0.07032
582471.13_413115	582471.13	4131152.76	0.00847	0.01295	0.04046	0.01327	0.06196	0.06486
582527.7_4131152.	582527.7	4131152.76	0.00827	0.01241	0.03894	0.01286	0.05649	0.06023
582584.27_413115	582584.27	4131152.76	0.00808	0.01192	0.0374	0.01246	0.05183	0.05601
582640.84_413115	582640.84	4131152.76	0.0079	0.01152	0.03602	0.01209	0.0481	0.05239
582697.41_413115	582697.41	4131152.76	0.00773	0.01118	0.0347	0.01173	0.04494	0.04916
582753.98_413115	582753.98	4131152.76	0.00758	0.01093	0.03375	0.01139	0.04261	0.04664
582810.55_413115	582810.55	4131152.76	0.00743	0.01075	0.03269	0.01108	0.04044	0.04425
582867.12_413115	582867.12	4131152.76	0.00728	0.01057	0.03123	0.01076	0.03813	0.04159

*	AERMOD (191	91): C:\Lakes\P	CRP\PCRP.isc					
*	AERMET (141	34):						
*	MODELING OPT	IONS USED: Re	gDFAULT CONC					
*	PLOT	FILE OF ANNUAL	VALUES AVERA					
*	FOR	A TOTAL OF 1	0 RECEPTORS.					
*	FORM	AT: (3(1X,F13.5	),3(1X,F8.2),					
*	X	Y	AVERAGE CONC					
*	_____	_____	MATRMVL	CHAN_RCK	CONCRTE	UNPAVED	PAVED	CCP_UNPV
58133	581336.22	4131207.48	57.09191	76.20496	302.36092	77.41213	290.9752	594.83419
58155	581554.22	4130688.06	47.97161	175.22527	42.90898	76.94998	64.03871	96.34793
57979	579793.36	4131503.29	80.12044	21.79723	17.77155	64.6571	7.66508	29.71855
58048	580488.37	4131517.71	37.84138	49.63809	28.08359	65.45945	22.18574	48.49792
58167	581678.43	4131040.03	46.1998	83.43209	193.19146	69.79188	364.1903	499.98746
58163	581635.43	4130978.54	43.45856	83.95915	267.30043	70.84095	474.1072	555.57861
58183	581830.06	4131027.55	41.42779	78.79922	187.83163	65.10715	506.2539	368.26775
58172	581727.48	4130976.54	40.53569	80.63016	237.83863	66.78055	565.9552	409.42597
58178	581789.11	4130419.65	50.31901	164.39326	78.42603	70.13251	88.53486	259.74389
58170	581700.32	4130781.89	41.0028	115.74497	266.28964	62.00052	144.3693	508.93389
58142	581426.07	4131299.01	55.65347	71.31808	250.32099	73.26407	241.6693	482.27922
58230	582301.42	4129474.56	39.22386	100.73061	147.70978	49.16282	39.85151	219.43663
58235	582357.99	4129474.56	38.44397	96.57674	132.46603	46.38902	39.22951	221.62473
58241	582414.56	4129474.56	37.56939	92.18279	124.18092	43.35442	43.27102	203.10324
58247	582471.13	4129474.56	36.65568	87.56428	119.99878	40.15559	43.62292	174.59731
58252	582527.7	4129474.56	35.66092	83.01269	115.82051	36.89733	44.30665	180.39844
58258	582584.27	4129474.56	34.66986	78.13337	105.63847	33.61993	42.59249	167.58492
58264	582640.84	4129474.56	33.62031	75.71267	96.56604	31.09311	43.01057	159.09466
58224	582244.85	4129558.47	39.04368	113.72203	71.94707	45.2103	55.41423	208.70454
58230	582301.42	4129558.47	37.78526	102.18067	145.78659	41.45396	54.47838	265.17306
58235	582357.99	4129558.47	36.51993	96.22876	144.91857	37.66681	52.96271	228.7212
58241	582414.56	4129558.47	35.2255	93.42625	136.79977	35.19361	51.77004	208.84728
58247	582471.13	4129558.47	33.90702	89.81737	115.06921	36.62507	49.04205	187.09731
58252	582527.7	4129558.47	32.61505	87.1729	105.17675	37.92425	46.62857	170.32648
58258	582584.27	4129558.47	32.43504	84.44433	100.00825	39.08205	43.92142	175.25681
58264	582640.84	4129558.47	32.44638	81.76069	100.36587	40.0876	41.46875	171.22947
58269	582697.41	4129558.47	32.38626	78.91171	99.20664	40.93546	39.77675	155.91252
58224	582244.85	4129642.38	37.03235	136.72771	37.23062	41.88868	63.94152	98.81403
58230	582301.42	4129642.38	36.968	114.55602	90.98319	43.27294	56.14877	248.60183
58235	582357.99	4129642.38	36.78958	100.33905	150.40235	44.48893	48.62181	250.10957
58241	582414.56	4129642.38	36.56739	95.18484	130.60547	45.4962	47.79977	217.2393
58247	582471.13	4129642.38	36.28551	91.60537	118.36362	46.29186	47.20287	197.94243
58252	582527.7	4129642.38	35.96448	88.46249	113.4186	46.87661	47.03917	193.27935
58258	582584.27	4129642.38	35.59021	85.41941	107.81229	47.23941	44.97855	176.09906
58264	582640.84	4129642.38	35.16404	82.51012	103.40824	47.3878	44.85791	151.59439
58269	582697.41	4129642.38	34.71587	79.58709	98.56659	47.31036	46.47258	139.79392
58275	582753.98	4129642.38	34.20379	76.83132	92.91856	47.02905	45.8502	144.40769
58281	582810.55	4129642.38	33.66379	74.12226	87.28959	46.5652	43.9588	152.31651
58286	582867.12	4129642.38	33.12297	71.46159	79.52289	45.92603	46.61719	151.10447
58224	582244.85	4129726.29	40.34288	129.39619	50.84879	52.63998	64.84739	138.41981
58230	582301.42	4129726.29	39.73553	117.19578	71.98721	53.05202	63.6672	215.08427
58235	582357.99	4129726.29	39.05829	99.98046	152.65063	53.17613	58.65155	258.65373
58241	582414.56	4129726.29	38.36951	92.41706	146.258	53.03633	55.04359	250.79188
58247	582471.13	4129726.29	37.64854	86.91455	135.34212	52.63404	52.09147	224.74459

58252	582527.7	4129726.29	36.9057	81.88908	120.4001	51.99649	49.40649	184.35346
58258	582584.27	4129726.29	36.17644	77.67446	110.28665	51.17871	50.82544	159.10883
58264	582640.84	4129726.29	35.37509	73.71283	101.6622	50.14476	53.37592	162.26529
58269	582697.41	4129726.29	34.55003	70.02926	91.83088	48.92902	50.83048	168.15934
58275	582753.98	4129726.29	33.76392	67.63293	81.5421	47.56244	48.06767	164.74655
58281	582810.55	4129726.29	32.93114	65.85292	77.10171	46.06776	48.92325	151.69681
58224	582244.85	4129810.2	40.29861	120.50102	39.46883	58.68443	69.89375	119.70709
58230	582301.42	4129810.2	39.27006	107.57979	76.62813	57.53822	65.69354	234.46716
58235	582357.99	4129810.2	38.31045	96.80518	137.82629	56.16581	61.30987	313.85097
58241	582414.56	4129810.2	37.86508	88.70735	148.25431	54.58659	56.62456	248.98048
58247	582471.13	4129810.2	37.39018	83.28203	127.44287	52.82423	52.57373	188.99009
58252	582527.7	4129810.2	36.88702	80.00114	113.90295	50.93214	55.07444	187.87839
58258	582584.27	4129810.2	36.36778	76.80098	98.56024	48.94941	55.66405	189.5301
58264	582640.84	4129810.2	35.81589	73.8231	88.71063	46.86169	53.06037	180.79266
58269	582697.41	4129810.2	35.23223	71.27058	85.80929	44.7301	52.96551	166.49463
58190	581905.43	4129894.11	45.58613	80.10465	19.87424	68.36795	45.38225	55.65882
58196	581962	4129894.11	44.91966	190.93557	21.31236	67.0045	52.84329	67.24095
58213	582131.71	4129894.11	42.7426	148.42799	32.71283	61.47993	60.53269	93.30912
58218	582188.28	4129894.11	41.95175	137.48228	39.64275	59.17845	59.76792	118.11145
58224	582244.85	4129894.11	41.15919	123.95917	61.74168	56.73626	54.57637	188.04041
58230	582301.42	4129894.11	40.35372	113.68564	98.40187	54.16303	53.29389	276.7808
58235	582357.99	4129894.11	39.53417	105.80266	131.00089	51.79452	51.68197	268.92332
58241	582414.56	4129894.11	38.73424	95.52731	126.10523	51.84535	54.25272	219.03871
58247	582471.13	4129894.11	37.93483	91.27389	100.62318	51.79538	58.91217	204.84931
58252	582527.7	4129894.11	37.07213	88.20546	96.13746	51.55442	58.29618	197.12828
58258	582584.27	4129894.11	36.22389	85.40041	92.11404	51.17947	54.64259	180.67524
58264	582640.84	4129894.11	35.41864	82.75253	87.84694	50.72693	57.07053	156.37478
58269	582697.41	4129894.11	34.58789	80.26166	84.6851	50.11823	55.08952	164.7093
58196	581962	4129978.02	45.47523	240.34259	23.89368	63.74064	57.78081	66.94065
58201	582018.57	4129978.02	44.30177	252.26952	25.25948	61.39466	58.75972	65.285
58207	582075.14	4129978.02	43.17392	160.17953	37.29535	61.26402	73.05657	107.57183
58213	582131.71	4129978.02	41.99302	140.78006	57.45925	60.90586	65.4798	172.56353
58218	582188.28	4129978.02	40.84959	123.30976	127.18673	60.39016	62.16136	350.27994
58224	582244.85	4129978.02	39.77251	118.55923	124.65426	59.70028	59.71964	298.05428
58230	582301.42	4129978.02	38.66892	107.03512	138.0336	58.83388	55.59334	258.4874
58235	582357.99	4129978.02	37.53569	101.0638	114.44313	57.89383	58.32186	238.05407
58241	582414.56	4129978.02	36.46542	96.89268	106.124	56.78044	63.61108	221.54799
58247	582471.13	4129978.02	35.46931	93.1842	99.51479	55.56307	61.03816	197.59475
58252	582527.7	4129978.02	34.40191	89.85117	95.28831	54.27431	59.60559	175.88979
58258	582584.27	4129978.02	33.36181	86.74876	90.73782	52.90727	60.96732	186.19735
58264	582640.84	4129978.02	32.37838	83.88104	86.2407	51.47385	59.1974	187.64002
58269	582697.41	4129978.02	31.47683	81.18559	81.19496	50.0053	62.04828	179.96992
58275	582753.98	4129978.02	30.50265	78.57175	74.50144	49.1302	57.51635	163.40514
58281	582810.55	4129978.02	29.55389	76.02897	65.43397	48.5544	47.5912	141.52812
58190	581905.43	4130061.93	43.16616	157.73523	55.92276	70.62034	87.90651	171.29101
58196	581962	4130061.93	41.69087	148.26104	62.0139	69.19175	85.04456	193.01076
58201	582018.57	4130061.93	40.32349	152.99431	42.55531	67.61586	85.55442	127.77116
58207	582075.14	4130061.93	38.96021	148.24446	40.87672	65.91037	83.27542	109.47008
58213	582131.71	4130061.93	37.55398	131.35828	67.04067	64.0643	76.26998	198.54145
58218	582188.28	4130061.93	36.25809	117.88455	118.43836	62.14351	71.68347	324.43284
58224	582244.85	4130061.93	35.06075	107.02568	130.54559	60.18976	65.43957	301.25827
58230	582301.42	4130061.93	33.84293	101.99838	122.73146	59.19268	63.11966	272.23834

58235	582357.99	4130061.93	33.26738	97.76868	113.8997	58.32275	67.26509	230.58261
58241	582414.56	4130061.93	32.81645	94.16354	105.6789	57.36659	62.85829	209.34872
58247	582471.13	4130061.93	32.38511	90.8391	97.15541	56.31587	66.74263	212.30518
58252	582527.7	4130061.93	31.93459	87.86233	90.15714	55.24091	65.68046	207.58907
58258	582584.27	4130061.93	31.48092	85.10545	83.36528	54.09375	67.8539	193.69215
58264	582640.84	4130061.93	31.0341	82.48575	80.63256	52.9167	66.35295	171.70567
58269	582697.41	4130061.93	30.59056	80.04671	80.64427	51.67604	60.92611	145.96703
58275	582753.98	4130061.93	30.15444	77.73663	80.29858	50.44657	58.52574	125.57144
58281	582810.55	4130061.93	29.71687	75.49856	78.88605	49.17572	58.41648	120.36658
58196	581962	4130145.84	39.97293	109.99755	162.73305	70.3441	80.69585	449.51153
58201	582018.57	4130145.84	39.22374	105.28259	169.56328	68.73855	76.80526	390.05785
58207	582075.14	4130145.84	38.48496	107.88385	108.68652	67.05416	77.15166	338.9956
58213	582131.71	4130145.84	37.76284	101.79759	132.36017	65.32018	73.24358	367.48648
58218	582188.28	4130145.84	37.05403	93.276	133.83305	63.52746	66.61857	309.77348
58224	582244.85	4130145.84	36.35262	89.65297	122.8077	61.72312	70.8198	259.40779
58230	582301.42	4130145.84	35.65748	86.88037	113.86122	59.90557	71.20481	249.52914
58235	582357.99	4130145.84	34.97744	84.0999	103.89503	58.06788	69.45788	247.11256
58241	582414.56	4130145.84	34.31725	81.47792	101.67558	56.22346	72.07006	232.66002
58247	582471.13	4130145.84	33.67062	79.03023	99.49553	54.40641	72.13979	208.39671
58252	582527.7	4130145.84	33.03264	76.74379	97.38777	52.5758	74.26577	178.28249
58258	582584.27	4130145.84	32.4076	74.54742	94.93257	50.76473	69.68742	145.62083
58264	582640.84	4130145.84	31.7978	72.44124	92.17867	48.99606	64.21044	139.0969
58269	582697.41	4130145.84	31.20587	70.47965	89.59392	47.27494	64.36827	137.84392
58275	582753.98	4130145.84	30.6315	68.6478	87.20486	45.55717	68.01752	133.70832
58281	582810.55	4130145.84	30.07376	66.86949	84.47382	43.87071	65.26738	126.68144
58286	582867.12	4130145.84	29.51558	64.64325	75.40689	42.23318	50.90845	114.94887
58196	581962	4130229.75	40.15185	130.9501	112.17313	67.16551	70.30964	362.62229
58201	582018.57	4130229.75	39.2038	117.29752	151.84776	64.51562	66.5845	395.3312
58207	582075.14	4130229.75	38.2905	107.13561	144.21208	61.88051	67.89089	359.39338
58213	582131.71	4130229.75	37.3912	99.483	133.8497	59.32697	70.16132	301.54398
58218	582188.28	4130229.75	36.50345	92.53477	130.22779	56.83605	77.47602	295.19058
58224	582244.85	4130229.75	35.64103	86.22037	126.02775	54.41514	74.90087	283.03664
58230	582301.42	4130229.75	34.81148	80.2677	121.86822	52.05048	78.06964	258.17908
58235	582357.99	4130229.75	34.01784	74.77554	117.32066	50.61824	75.73204	222.97266
58241	582414.56	4130229.75	33.25641	69.75136	112.67755	49.81614	81.41374	182.8928
58247	582471.13	4130229.75	32.52357	64.96882	108.05189	49.0123	77.23843	165.61787
58252	582527.7	4130229.75	31.80846	61.71566	103.08189	48.17135	71.09162	162.46519
58258	582584.27	4130229.75	31.09098	60.87981	98.13089	47.37603	71.97992	154.9626
58264	582640.84	4130229.75	30.38642	59.97009	93.21007	46.57861	76.17467	144.74276
58269	582697.41	4130229.75	29.70355	59.06705	89.03639	45.73335	73.44048	141.32528
58275	582753.98	4130229.75	29.20291	58.12921	85.87129	44.9361	64.90029	133.75618
58281	582810.55	4130229.75	28.83773	57.24932	83.84892	44.14886	66.17604	124.76727
58286	582867.12	4130229.75	28.4874	56.40829	82.21715	43.33804	71.25025	114.8836
58201	582018.57	4130313.66	41.63812	121.19392	160.84429	61.4942	66.80439	382.34522
58207	582075.14	4130313.66	40.91057	114.28943	150.56782	60.01733	77.42533	336.08736
58213	582131.71	4130313.66	40.19402	109.567	143.24247	58.54843	84.96148	312.56894
58218	582188.28	4130313.66	39.49536	104.93038	136.94559	57.11432	80.41451	278.14512
58224	582244.85	4130313.66	38.82091	100.19751	130.5552	55.74177	85.43337	233.13322
58230	582301.42	4130313.66	38.16839	95.49246	123.53608	54.38456	88.17662	198.67559
58235	582357.99	4130313.66	37.5382	90.78493	116.32975	53.04563	86.8187	193.52889
58241	582414.56	4130313.66	36.92686	86.27522	112.23679	51.7638	79.28029	182.83517
58247	582471.13	4130313.66	36.3348	81.82384	108.16807	50.49089	79.88302	171.70709

58252	582527.7	4130313.66	35.75974	77.55253	104.1993	49.21291	86.36812	163.85221
58258	582584.27	4130313.66	35.19855	73.46319	100.12949	47.99643	82.29256	152.53533
58264	582640.84	4130313.66	34.64754	69.50403	96.37845	46.82479	73.01305	139.58321
58269	582697.41	4130313.66	34.10522	65.81024	92.42369	45.67689	77.58863	125.00546
58275	582753.98	4130313.66	33.56987	62.209	88.88602	44.56123	80.57405	110.46531
58281	582810.55	4130313.66	33.04418	58.83941	86.09069	43.47393	75.78926	96.11818
58286	582867.12	4130313.66	32.53049	55.71447	83.95965	42.40698	66.36941	98.04054
58184	581848.86	4130397.57	48.69756	148.89076	114.44404	64.86929	83.58578	375.22293
58190	581905.43	4130397.57	47.65578	139.58476	162.91881	63.54225	79.33732	471.63254
58196	581962	4130397.57	46.64955	131.02559	173.576	62.24672	77.15737	425.68924
58201	582018.57	4130397.57	45.67584	124.21925	160.70929	60.99877	86.40833	358.51854
58207	582075.14	4130397.57	44.73409	117.43699	148.52675	59.80371	93.14941	288.86325
58213	582131.71	4130397.57	43.8247	110.78001	142.10007	58.65843	94.32211	234.6363
58218	582188.28	4130397.57	42.94628	104.00622	135.65304	57.51569	93.29388	227.31185
58224	582244.85	4130397.57	42.09807	97.30981	131.08025	56.41149	97.99556	215.7784
58230	582301.42	4130397.57	41.27851	91.87624	125.29577	55.3472	89.49791	204.25898
58235	582357.99	4130397.57	40.48628	89.87307	120.28768	54.32712	87.90535	191.52911
58241	582414.56	4130397.57	39.71949	87.55665	114.66604	53.34282	95.92103	173.93259
58247	582471.13	4130397.57	38.9777	85.08948	110.00997	52.37228	92.90807	155.59837
58252	582527.7	4130397.57	38.25964	82.47483	105.65526	51.41676	82.35972	136.44748
58258	582584.27	4130397.57	37.56374	79.73449	100.92316	50.48319	91.30705	120.42151
58264	582640.84	4130397.57	36.8892	76.96633	96.95991	49.58958	91.47703	125.049
58269	582697.41	4130397.57	36.23511	74.15792	92.50739	48.74437	82.18389	127.15907
58275	582753.98	4130397.57	35.60083	71.34579	88.92947	47.92711	69.41829	128.68142
58281	582810.55	4130397.57	34.98467	68.60386	85.4653	47.11674	58.39148	128.75361
58286	582867.12	4130397.57	34.38562	65.82738	82.08838	46.2988	59.95257	127.40385
58184	581848.86	4130481.48	48.50065	138.01071	195.63776	75.00294	88.43543	463.30357
58190	581905.43	4130481.48	47.40847	131.78157	183.29005	73.13489	91.0173	390.23679
58196	581962	4130481.48	46.35789	127.26931	179.94636	71.33932	95.81651	344.82538
58201	582018.57	4130481.48	45.34666	120.47868	161.96563	69.60141	100.1581	280.58148
58207	582075.14	4130481.48	44.37271	113.62946	150.11484	67.93222	105.9825	253.04396
58213	582131.71	4130481.48	43.43413	108.15237	140.53505	66.33239	111.1845	236.18385
58218	582188.28	4130481.48	42.52914	106.0284	133.95234	64.78804	104.5544	218.22089
58224	582244.85	4130481.48	41.65606	103.1927	128.46711	63.31677	99.30389	197.35814
58230	582301.42	4130481.48	40.81326	99.7002	121.41186	61.90607	107.2654	171.7507
58235	582357.99	4130481.48	39.99937	95.78636	114.97023	60.53118	102.9723	159.72828
58241	582414.56	4130481.48	39.21284	91.48652	108.18692	59.18617	98.06932	162.32903
58247	582471.13	4130481.48	38.45245	87.1201	103.43466	57.89654	108.4533	164.76505
58252	582527.7	4130481.48	37.71693	82.56433	97.21725	56.65768	103.0869	162.595
58258	582584.27	4130481.48	37.00525	77.94993	93.63007	55.45375	90.09243	159.73297
58264	582640.84	4130481.48	36.31627	73.38055	89.68954	54.30339	72.65784	153.8587
58269	582697.41	4130481.48	35.64895	71.16204	86.20145	53.20004	69.76441	147.20778
58275	582753.98	4130481.48	35.00237	69.98393	83.55761	52.13702	69.18438	140.44593
58281	582810.55	4130481.48	34.37565	68.64938	81.11565	51.10696	65.2945	133.23987
58286	582867.12	4130481.48	33.76786	67.16683	78.80716	50.09319	64.6057	125.44557
58173	581735.72	4130565.39	50.90415	103.87419	199.30291	77.80606	83.98865	567.22767
58179	581792.29	4130565.39	49.74719	109.98728	209.88048	75.62581	81.57509	499.31848
58184	581848.86	4130565.39	48.63437	114.27797	199.22646	73.55439	91.96951	389.63085
58190	581905.43	4130565.39	47.56287	115.41526	178.03488	71.56748	117.1191	322.10804
58196	581962	4130565.39	46.53079	116.00593	161.20407	69.67299	116.77	283.77462
58201	582018.57	4130565.39	45.53593	115.12148	154.35357	67.86671	121.5664	255.84449
58207	582075.14	4130565.39	44.57637	112.63627	146.06781	66.15756	124.0175	220.71951

58213	582131.71	4130565.39	43.65042	108.81525	138.2568	64.5443	113.1055	211.98137
58218	582188.28	4130565.39	42.75576	104.85381	134.28512	62.99353	123.5784	215.06153
58224	582244.85	4130565.39	41.89168	101.2623	129.50043	61.50108	116.6965	213.14441
58230	582301.42	4130565.39	41.05643	96.85486	122.85476	60.07316	120.4776	204.9812
58235	582357.99	4130565.39	40.24939	91.967	117.91888	58.70659	125.1252	196.44238
58241	582414.56	4130565.39	39.46927	88.27471	113.44782	57.38316	114.4133	186.23842
58247	582471.13	4130565.39	38.71491	87.03732	109.15123	56.10209	96.36622	174.71245
58252	582527.7	4130565.39	37.98502	85.24772	104.84631	54.86738	83.90062	161.81509
58258	582584.27	4130565.39	37.27859	83.05058	101.70188	53.67318	83.73032	153.80737
58264	582640.84	4130565.39	36.59449	80.47858	97.17432	52.51983	77.97826	149.54698
58269	582697.41	4130565.39	35.93161	77.68851	94.14948	51.40757	75.79306	146.25116
58275	582753.98	4130565.39	35.28917	74.68136	91.42702	50.33247	69.81396	142.32471
58281	582810.55	4130565.39	34.66609	71.60368	89.12033	49.29342	61.49123	138.18662
58286	582867.12	4130565.39	34.06168	68.38477	86.93757	48.29031	52.02485	133.5902
58173	581735.72	4130649.3	47.2263	86.64902	116.93209	76.0136	73.6084	334.395
58179	581792.29	4130649.3	46.28869	69.4647	135.37662	74.09599	74.43287	370.0592
58190	581905.43	4130649.3	44.512	79.97298	190.98671	70.46687	137.9313	313.66414
58196	581962	4130649.3	43.67105	85.99403	169.30702	68.76355	146.7393	286.38155
58201	582018.57	4130649.3	42.85449	90.857	162.18335	67.13086	134.3321	276.71069
58207	582075.14	4130649.3	42.06248	94.34525	153.08127	65.55267	145.2818	259.75366
58213	582131.71	4130649.3	41.29265	96.3782	145.46617	64.0351	137.3807	241.53108
58218	582188.28	4130649.3	40.54451	97.12302	138.21089	62.59583	147.808	221.56824
58224	582244.85	4130649.3	39.81541	96.70053	132.83332	61.2172	145.5392	213.28906
58230	582301.42	4130649.3	39.10479	95.0623	126.13796	59.8792	126.8403	204.83415
58235	582357.99	4130649.3	38.41316	92.54032	121.24131	58.5931	103.9389	197.13493
58241	582414.56	4130649.3	37.74185	89.27417	117.28544	57.35152	104.4409	189.46808
58247	582471.13	4130649.3	37.09042	86.87676	111.50547	56.14901	97.87352	178.21482
58252	582527.7	4130649.3	36.45869	83.99497	106.97224	54.98893	92.63589	168.55225
58258	582584.27	4130649.3	35.84481	80.63779	103.01353	53.84658	82.2392	163.02714
58264	582640.84	4130649.3	35.24861	76.95816	99.52793	52.7495	69.04291	157.27206
58269	582697.41	4130649.3	34.66819	74.33264	95.89987	51.70839	61.85986	150.79361
58275	582753.98	4130649.3	34.10359	73.66244	93.03696	50.69298	65.71623	144.90755
58281	582810.55	4130649.3	33.55341	72.62897	90.79479	49.71314	68.81407	139.47341
58286	582867.12	4130649.3	33.01749	71.19202	88.16095	48.77632	70.18845	133.22849
58184	581848.86	4130733.21	41.64533	76.26546	196.31023	63.80802	172.6148	359.56886
58190	581905.43	4130733.21	40.84168	63.14518	172.61108	62.3497	166.0525	319.64462
58196	581962	4130733.21	40.05606	51.72044	158.81342	60.94491	176.3586	295.45336
58201	582018.57	4130733.21	39.28792	58.37609	152.03676	59.57327	166.801	278.37886
58207	582075.14	4130733.21	38.54118	64.57806	145.65665	58.24238	185.9161	263.36794
58213	582131.71	4130733.21	37.81743	70.04597	138.75221	56.94207	166.4431	249.85955
58218	582188.28	4130733.21	37.11289	74.6631	132.53737	55.70459	145.0306	235.91916
58224	582244.85	4130733.21	36.42575	78.25848	126.32193	54.51077	134.9801	221.41568
58230	582301.42	4130733.21	35.75492	80.91142	121.03582	53.35044	128.116	207.72241
58235	582357.99	4130733.21	35.09964	82.5595	116.42673	52.21877	117.8376	194.71837
58241	582414.56	4130733.21	34.45949	83.24525	111.48459	51.08902	98.99984	181.34775
58247	582471.13	4130733.21	33.83683	83.05408	107.18407	50.00256	81.94142	168.9456
58252	582527.7	4130733.21	33.23112	82.02212	102.96343	48.96812	87.25505	156.99919
58258	582584.27	4130733.21	32.64199	80.29527	99.29833	47.97031	90.18961	146.00817
58264	582640.84	4130733.21	32.06795	77.99484	96.09372	47.00073	90.3814	139.65154
58269	582697.41	4130733.21	31.50851	75.94771	93.43266	46.03678	88.30515	135.30513
58275	582753.98	4130733.21	30.96209	74.07439	90.82632	45.09388	83.85996	131.07871
58281	582810.55	4130733.21	30.42608	71.8457	89.44341	44.28047	78.68275	128.21794

58286	582867.12	4130733.21	29.9021	69.21348	87.47518	43.55295	72.282	124.55686
58173	581735.72	4130817.12	37.88813	111.99594	262.27239	55.46	169.4913	494.17717
58179	581792.29	4130817.12	37.40391	103.2714	218.66058	54.67036	213.2475	385.19392
58184	581848.86	4130817.12	36.92116	94.16225	199.65121	53.81395	231.2931	343.31211
58190	581905.43	4130817.12	36.43538	83.66592	177.16896	53.06093	229.4388	299.50695
58196	581962	4130817.12	35.9493	72.78529	164.94968	52.30984	228.902	273.97312
58201	582018.57	4130817.12	35.46497	62.08018	154.80857	51.53682	199.5411	257.94665
58207	582075.14	4130817.12	34.97563	52.02857	146.42597	50.72087	187.1789	244.11253
58213	582131.71	4130817.12	34.50291	42.89299	136.99797	50.00112	179.858	229.68895
58218	582188.28	4130817.12	34.03657	47.97997	127.93211	49.28629	157.5824	215.82634
58224	582244.85	4130817.12	33.5673	53.18907	118.84063	48.5456	123.3702	202.11127
58230	582301.42	4130817.12	33.09922	57.96632	110.60971	47.7614	132.0564	192.64081
58235	582357.99	4130817.12	32.63018	62.15138	102.79977	47.02106	133.3582	184.04109
58241	582414.56	4130817.12	32.16843	65.71673	95.95866	46.33389	127.1801	175.65271
58247	582471.13	4130817.12	31.7166	68.59032	93.14445	45.65929	117.3804	168.91503
58252	582527.7	4130817.12	31.26983	70.6886	90.0258	44.96539	103.866	161.81138
58258	582584.27	4130817.12	30.83305	72.04871	87.59462	44.23884	99.2205	156.04946
58264	582640.84	4130817.12	30.40233	72.74327	85.60406	43.55187	97.07391	150.89405
58269	582697.41	4130817.12	29.97362	72.79584	83.75427	42.92105	93.543	146.20887
58275	582753.98	4130817.12	29.54859	72.19603	81.46462	42.29397	88.46064	141.0817
58281	582810.55	4130817.12	29.13274	71.03239	79.70566	41.6661	83.97402	136.97653
58286	582867.12	4130817.12	28.7262	69.43412	78.34112	41.01385	81.96363	133.47828
58173	581735.72	4130901.03	33.14782	100.27373	251.46019	58.85706	317.6474	444.58779
58179	581792.29	4130901.03	31.60725	100.69045	218.93563	56.21181	361.3062	392.22932
58184	581848.86	4130901.03	30.13971	98.43516	202.74213	53.77	310.7117	359.08172
58190	581905.43	4130901.03	29.66197	93.52377	186.12731	51.26722	281.6094	329.12378
58196	581962	4130901.03	29.48705	86.69283	174.64453	48.9452	275.3293	307.10235
58201	582018.57	4130901.03	29.29592	78.53157	161.58451	46.67472	232.4374	285.96926
58207	582075.14	4130901.03	29.08037	69.72147	152.09885	44.44639	241.9706	270.59413
58213	582131.71	4130901.03	28.88818	60.65992	144.93133	42.43294	228.7599	254.49449
58218	582188.28	4130901.03	28.68644	51.86001	139.04566	40.34505	198.142	240.34099
58224	582244.85	4130901.03	28.46909	43.71412	132.51082	38.37967	175.1193	226.66277
58230	582301.42	4130901.03	28.24211	36.2504	125.70558	37.3004	161.7326	213.79445
58235	582357.99	4130901.03	28.00812	40.03069	119.40426	37.11932	146.3572	202.42882
58241	582414.56	4130901.03	27.76377	44.44957	112.96873	36.91391	133.5139	191.75264
58247	582471.13	4130901.03	27.53203	48.62491	107.31166	36.62807	124.0509	182.35459
58252	582527.7	4130901.03	27.29831	52.48463	101.49071	36.41082	114.1546	173.53808
58258	582584.27	4130901.03	27.05215	55.83193	96.56232	36.16595	105.2616	166.18396
58264	582640.84	4130901.03	26.79844	58.70681	92.1142	35.91744	96.83742	159.65056
58269	582697.41	4130901.03	26.54916	61.04387	87.82833	35.60367	88.66422	153.68294
58275	582753.98	4130901.03	26.30056	62.83364	83.49975	35.31699	81.74844	148.20207
58281	582810.55	4130901.03	26.04731	64.03076	79.56443	35.0674	78.8971	142.75009
58286	582867.12	4130901.03	25.79352	64.70662	75.52845	34.80079	76.4743	138.36805
58173	581735.72	4130984.94	40.99446	79.29431	229.27421	66.93679	662.2798	413.19466
58179	581792.29	4130984.94	39.36184	85.33002	214.75514	64.64295	695.0566	356.89116
58184	581848.86	4130984.94	37.80617	89.0359	201.97955	62.39385	714.7421	310.84973
58190	581905.43	4130984.94	36.23669	90.31781	192.8947	60.13297	645.4449	278.51889
58196	581962	4130984.94	34.71665	89.04104	179.59954	57.93961	456.3143	261.14753
58201	582018.57	4130984.94	33.28692	85.5174	167.54839	55.77988	331.352	245.68301
58207	582075.14	4130984.94	31.89343	80.30577	156.66159	53.67218	256.833	233.09691
58213	582131.71	4130984.94	30.54042	73.86007	151.30361	51.60439	213.1165	221.86653
58218	582188.28	4130984.94	29.24156	66.54571	144.92984	49.55714	189.1259	210.97233

58224	582244.85	4130984.94	28.03331	58.91905	137.64934	47.64664	169.929	200.67866
58230	582301.42	4130984.94	26.84071	51.2497	130.0929	45.67597	154.5726	191.00485
58235	582357.99	4130984.94	25.68295	44.02413	122.61072	43.83732	142.0271	182.02404
58241	582414.56	4130984.94	24.58937	37.20913	115.05092	42.02894	131.3841	173.606
58247	582471.13	4130984.94	23.5745	31.16582	108.011	40.19749	122.2691	165.54409
58252	582527.7	4130984.94	22.56019	33.86578	104.37629	38.55798	114.1993	157.91798
58258	582584.27	4130984.94	22.13873	37.71755	101.46495	36.84358	107.9694	151.50052
58264	582640.84	4130984.94	22.06438	41.36633	98.78716	35.16686	103.2672	146.33487
58269	582697.41	4130984.94	21.98316	44.80022	95.6585	33.69433	98.16015	140.4777
58275	582753.98	4130984.94	21.91037	47.97658	92.90236	32.12103	94.45446	136.49734
58281	582810.55	4130984.94	21.82044	50.75218	89.98251	30.63519	90.57103	132.52955
58286	582867.12	4130984.94	21.72095	53.10501	86.4732	29.57207	86.87763	128.57298
58173	581735.72	4131068.85	45.94029	75.29341	173.49339	67.09992	235.7764	451.17598
58179	581792.29	4131068.85	44.54543	63.84149	150.78517	65.8131	240.2302	409.40963
58184	581848.86	4131068.85	43.17352	71.00515	159.05918	64.43905	260.5216	366.56362
58190	581905.43	4131068.85	41.76444	76.47328	161.946	63.01403	256.0047	322.7075
58196	581962	4131068.85	40.35649	80.12798	164.04316	61.55605	264.3251	303.95271
58201	582018.57	4131068.85	39.01488	81.61648	161.69685	59.99164	230.0722	284.04056
58207	582075.14	4131068.85	37.66309	81.04721	157.36063	58.44244	196.7628	263.63313
58213	582131.71	4131068.85	36.32113	78.59204	151.6196	56.80182	177.2387	244.06736
58218	582188.28	4131068.85	35.04291	74.65194	144.36227	55.22269	165.0651	224.81414
58224	582244.85	4131068.85	33.7903	69.45379	138.12696	53.56401	155.694	206.63591
58230	582301.42	4131068.85	32.54708	63.48754	131.15972	51.96217	146.8143	189.26214
58235	582357.99	4131068.85	31.3499	57.0279	123.41382	50.33866	137.9703	172.82248
58241	582414.56	4131068.85	30.22655	50.45882	119.64924	48.69746	130.0035	157.56901
58247	582471.13	4131068.85	29.09979	43.94183	115.45602	47.15816	122.3413	143.34882
58252	582527.7	4131068.85	27.99182	37.83209	110.60317	45.51786	114.9256	129.99386
58258	582584.27	4131068.85	26.95568	32.21324	105.26105	44.00511	107.56	117.52267
58264	582640.84	4131068.85	25.96695	27.0958	101.81338	42.40823	103.7694	115.35513
58269	582697.41	4131068.85	24.96933	29.0004	97.02905	40.8781	99.24722	113.46385
58275	582753.98	4131068.85	24.00235	32.38156	93.09904	39.42396	96.15088	112.53538
58281	582810.55	4131068.85	23.11153	35.65382	89.45095	37.91325	93.06158	111.49559
58286	582867.12	4131068.85	22.24978	38.65241	84.92493	36.52293	88.12906	108.18425
58201	582018.57	4131152.76	41.80675	69.22122	117.54256	56.9488	155.3221	290.15344
58224	582244.85	4131152.76	37.5934	72.6175	130.20788	54.13304	133.1691	215.66834
58230	582301.42	4131152.76	36.51525	69.60109	128.48863	53.16192	126.6844	200.63945
58235	582357.99	4131152.76	35.4818	65.46459	125.3728	52.20701	118.0184	193.93391
58241	582414.56	4131152.76	34.42664	60.5876	121.54683	51.1617	109.4584	186.84328
58247	582471.13	4131152.76	33.3715	55.10264	114.88028	50.08807	98.10712	176.57613
58252	582527.7	4131152.76	32.37057	49.35761	110.07426	48.92693	88.75288	167.22624
58258	582584.27	4131152.76	31.37266	43.60918	104.42008	47.76036	82.36156	157.37308
58264	582640.84	4131152.76	30.35511	38.1881	99.18718	46.56754	80.52131	148.27265
58269	582697.41	4131152.76	29.37383	32.9654	96.67243	45.38438	78.63665	139.41748
58275	582753.98	4131152.76	28.45019	28.19991	96.41887	44.13284	78.34121	132.55538
58281	582810.55	4131152.76	27.50547	23.96185	95.27361	42.94796	77.29049	125.4808
58286	582867.12	4131152.76	26.57334	25.05022	91.12903	41.6492	74.18563	115.90009

B-7 AERMOD Input File

```
**
**************************************
**
** AERMOD Input Produced by:
** AERMOD View Ver. 9.8.3
** Lakes Environmental Software Inc.
** Date: 6/23/2021
** File: C:\Lakes\PCRP\PCRP.ADI
**
**************************************
**
**
**************************************
** AERMOD Control Pathway
**************************************
**
**
CO STARTING
   TITLEONE C:\Lakes\PCRP\PCRP.isc
   MODELOPT DFAULT CONC
   AVERTIME 1 ANNUAL
   POLLUTID PM_10
   FLAGPOLE 1.80
   RUNORNOT RUN
   ERRORFIL PCRP.err
CO FINISHED
**
**************************************
** AERMOD Source Pathway
**************************************
**
**
SO STARTING
** Source Location **
** Source ID - Type - X Coord. - Y Coord. **
   LOCATION MATRMVL      AREAPOLY   578632.279  4130448.278      358.130
** DESCRSRC Material Removal
   LOCATION CHAN_RCK     AREAPOLY   580202.060  4129976.283      197.930
** DESCRSRC Channel Widening and Rock Pile
   LOCATION CONCRTE      AREAPOLY   581057.474  4130833.749      151.220
** DESCRSRC Concrete Channel Planting Area
** ------------------------------------------------------------------------
** Line Source Represented by Area Sources
** LINE AREA Source ID = UNPAVED
** DESCRSRC Unpaved Road
** PREFIX
** Length of Side = 16.00
** Ratio = 10
** Vertical Dimension = 2.37
** Emission Rate = 0.0000387657
** Nodes = 17
** 580018.939, 4130299.860, 291.35, 2.55
** 579980.203, 4130396.699, 307.22, 2.55
```

```
** 579935.012, 4130431.131, 313.77, 2.55
** 579831.717, 4130497.842, 323.68, 2.55
** 579758.549, 4130568.858, 332.31, 2.55
** 579706.902, 4130648.481, 334.13, 2.55
** 579605.759, 4130678.609, 338.65, 2.55
** 579526.136, 4130657.089, 344.94, 2.55
** 579442.208, 4130639.873, 352.07, 2.55
** 579328.154, 4130639.873, 361.23, 2.55
** 579310.938, 4130659.241, 359.64, 2.55
** 579272.202, 4130674.305, 358.08, 2.55
** 579242.074, 4130672.153, 355.32, 2.55
** 578968.773, 4130508.602, 343.56, 2.55
** 578869.782, 4130476.323, 347.33, 2.55
** 578751.423, 4130459.107, 349.76, 2.55
** 578648.128, 4130450.499, 357.31, 2.55
** ----------------------------------------------------------------------
   LOCATION A0000058     AREA     580026.367 4130302.831 292.70
   LOCATION A0000059     AREA     579985.052 4130403.063 306.99
   LOCATION A0000060     AREA     579939.352 4130437.851 314.26
   LOCATION A0000061     AREA     579837.288 4130503.583 332.50
   LOCATION A0000062     AREA     579765.261 4130573.211 335.97
   LOCATION A0000063     AREA     579709.186 4130656.148 343.39
   LOCATION A0000064     AREA     579603.672 4130686.331 348.64
   LOCATION A0000065     AREA     579524.528 4130664.926 348.65
   LOCATION A0000066     AREA     579442.208 4130647.873 361.38
   LOCATION A0000067     AREA     579334.133 4130645.188 361.52
   LOCATION A0000068     AREA     579313.837 4130666.697 359.77
   LOCATION A0000069     AREA     579271.632 4130682.284 356.71
   LOCATION A0000070     AREA     579237.966 4130679.017 350.53
   LOCATION A0000071     AREA     579101.316 4130597.242 340.58
   LOCATION A0000072     AREA     578966.293 4130516.208 341.93
   LOCATION A0000073     AREA     578868.631 4130484.239 346.98
   LOCATION A0000074     AREA     578750.759 4130467.079 351.45
** End of LINE AREA Source ID = UNPAVED
** ----------------------------------------------------------------------
** Line Source Represented by Area Sources
** LINE AREA Source ID = PAVED
** DESCRSRC Paved Road
** PREFIX
** Length of Side = 9.00
** Ratio = 10
** Vertical Dimension = 2.37
** Emission Rate = 0.0000420952
** Nodes = 32
** 581860.761, 4131004.678, 124.58, 2.55
** 581706.259, 4131008.510, 130.45, 2.55
** 581645.330, 4131015.641, 133.72, 2.55
** 581584.791, 4131034.708, 137.49, 2.55
** 581386.111, 4131122.290, 150.52, 0.00
** 581350.603, 4131125.518, 152.64, 0.00
** 581321.551, 4131119.062, 154.50, 0.00
** 581305.411, 4131110.992, 154.95, 0.00
** 581284.429, 4131098.080, 155.79, 0.00
```

```
** 581237.624, 4131036.749, 156.37, 0.00
** 581215.028, 4131014.153, 155.88, 0.00
** 581190.818, 4131006.083, 156.18, 0.00
** 581069.769, 4130978.645, 160.03, 0.00
** 581058.471, 4130968.961, 161.01, 0.00
** 580977.771, 4130873.736, 168.22, 0.00
** 580788.935, 4130565.464, 169.31, 0.00
** 580822.828, 4130429.889, 165.24, 0.00
** 580822.828, 4130405.679, 166.84, 0.00
** 580755.041, 4130229.754, 171.25, 0.00
** 580732.445, 4130184.563, 172.65, 0.00
** 580675.955, 4130100.635, 175.07, 0.00
** 580651.746, 4130097.407, 175.11, 0.00
** 580608.168, 4130069.969, 178.81, 0.00
** 580504.873, 4130039.304, 195.83, 0.00
** 580462.909, 4130045.759, 201.83, 0.00
** 580364.456, 4130076.425, 219.01, 0.00
** 580307.966, 4130100.635, 231.11, 0.00
** 580230.494, 4130107.091, 242.69, 0.00
** 580159.479, 4130111.933, 254.80, 0.00
** 580109.445, 4130144.213, 265.01, 0.00
** 580083.621, 4130186.177, 272.29, 0.00
** 580020.676, 4130291.086, 292.35, 0.00
** ----------------------------------------------------------------------
   LOCATION A0000123     AREA     581860.873 4131009.176 124.55
   LOCATION A0000124     AREA     581783.622 4131011.092 126.64
   LOCATION A0000125     AREA     581706.783 4131012.979 129.75
   LOCATION A0000126     AREA     581646.682 4131019.933 133.39
   LOCATION A0000127     AREA     581586.606 4131038.826 136.70
   LOCATION A0000128     AREA     581520.380 4131068.020 141.44
   LOCATION A0000129     AREA     581454.153 4131097.214 145.30
   LOCATION A0000130     AREA     581386.518 4131126.772 150.89
   LOCATION A0000131     AREA     581349.627 4131129.911 154.69
   LOCATION A0000132     AREA     581319.539 4131123.087 154.39
   LOCATION A0000133     AREA     581303.053 4131114.825 154.16
   LOCATION A0000134     AREA     581280.852 4131100.810 155.98
   LOCATION A0000135     AREA     581234.442 4131039.931 156.19
   LOCATION A0000136     AREA     581213.605 4131018.422 155.78
   LOCATION A0000137     AREA     581189.823 4131010.472 155.83
   LOCATION A0000138     AREA     581129.299 4130996.753 147.70
   LOCATION A0000139     AREA     581066.840 4130982.062 160.11
   LOCATION A0000140     AREA     581055.038 4130971.871 161.19
   LOCATION A0000141     AREA     581014.688 4130924.258 165.04
   LOCATION A0000142     AREA     580973.934 4130876.087 168.26
   LOCATION A0000143     AREA     580936.167 4130814.432 168.62
   LOCATION A0000144     AREA     580898.399 4130752.778 169.57
   LOCATION A0000145     AREA     580860.632 4130691.123 169.77
   LOCATION A0000146     AREA     580822.865 4130629.469 169.92
   LOCATION A0000147     AREA     580784.569 4130564.373 169.39
   LOCATION A0000148     AREA     580801.516 4130496.585 163.09
   LOCATION A0000149     AREA     580818.328 4130429.889 164.72
   LOCATION A0000150     AREA     580818.629 4130407.297 165.46
   LOCATION A0000151     AREA     580796.034 4130348.655 167.24
```

```
   LOCATION A0000152     AREA     580773.438 4130290.014 168.33
   LOCATION A0000153     AREA     580751.016 4130231.767 170.42
   LOCATION A0000154     AREA     580728.712 4130187.075 172.17
   LOCATION A0000155     AREA     580700.467 4130145.112 174.29
   LOCATION A0000156     AREA     580675.361 4130105.096 174.79
   LOCATION A0000157     AREA     580649.348 4130101.215 174.64
   LOCATION A0000158     AREA     580606.887 4130074.283 179.62
   LOCATION A0000159     AREA     580555.240 4130058.950 187.41
   LOCATION A0000160     AREA     580505.557 4130043.751 195.31
   LOCATION A0000161     AREA     580464.247 4130050.056 202.66
   LOCATION A0000162     AREA     580415.020 4130065.389 211.17
   LOCATION A0000163     AREA     580366.228 4130080.561 219.84
   LOCATION A0000164     AREA     580308.340 4130105.120 231.50
   LOCATION A0000165     AREA     580230.801 4130111.581 244.67
   LOCATION A0000166     AREA     580161.918 4130115.714 254.54
   LOCATION A0000167     AREA     580113.278 4130146.571 264.42
   LOCATION A0000168     AREA     580087.480 4130188.492 272.95
   LOCATION A0000169     AREA     580056.007 4130240.946 282.91
** End of LINE AREA Source ID = PAVED
** ------------------------------------------------------------------
** Line Source Represented by Area Sources
** LINE AREA Source ID = CCP_UNPV
** DESCRSRC Concrete Channel Planting Unpaved Road
** PREFIX
** Length of Side = 9.00
** Ratio = 10
** Vertical Dimension = 2.37
** Emission Rate = 0.0004578927
** Nodes = 7
** 581189.242, 4130998.911, 156.49, 2.55
** 581184.678, 4130979.514, 155.78, 2.55
** 581161.858, 4130928.169, 155.47, 2.55
** 581151.589, 4130915.618, 155.48, 2.55
** 581131.051, 4130897.362, 155.65, 2.55
** 581112.795, 4130846.018, 160.37, 2.55
** 581075.143, 4130788.968, 163.48, 2.55
** ------------------------------------------------------------------
   LOCATION A0000117     AREA     581184.862 4130999.941 156.45
   LOCATION A0000118     AREA     581180.566 4130981.341 156.01
   LOCATION A0000119     AREA     581158.375 4130931.019 155.43
   LOCATION A0000120     AREA     581148.600 4130918.982 155.53
   LOCATION A0000121     AREA     581126.811 4130898.870 155.47
   LOCATION A0000122     AREA     581109.040 4130848.497 158.43
** End of LINE AREA Source ID = CCP_UNPV
** Source Parameters **
   SRCPARAM MATRMVL      0.0000632236     5.000         8     1.400
   AREAVERT MATRMVL      578632.279 4130448.278 578595.156 4130493.356
   AREAVERT MATRMVL      578451.967 4130541.086 578377.720 4130535.783
   AREAVERT MATRMVL      578343.249 4130519.873 578303.474 4130506.614
   AREAVERT MATRMVL      578385.675 4130477.446 578478.483 4130464.188
   SRCPARAM CHAN_RCK     0.0000730653     5.000        12     1.400
   AREAVERT CHAN_RCK     580202.060 4129976.283 580196.756 4130005.451
   AREAVERT CHAN_RCK     580289.564 4130010.755 580499.045 4129970.980
```

```
   AREAVERT CHAN_RCK     580533.517 4129986.890 580586.550 4130026.665
   AREAVERT CHAN_RCK     580599.808 4130042.575 580605.111 4130016.058
   AREAVERT CHAN_RCK     580573.292 4129973.632 580514.955 4129941.812
   AREAVERT CHAN_RCK     580355.856 4129957.722 580281.609 4129981.587
   SRCPARAM CONCRTE      0.0001515202     5.000         6     1.400
   AREAVERT CONCRTE      581057.474 4130833.749 581068.904 4130826.414
   AREAVERT CONCRTE      580867.455 4130533.014 580837.452 4130443.527
   AREAVERT CONCRTE      580820.308 4130449.395 580850.311 4130530.080
** LINE AREA Source ID = UNPAVED
   SRCPARAM A0000058     0.0000387657     2.550   104.299    16.000  -111.801
    2.372
   SRCPARAM A0000059     0.0000387657     2.550    56.814    16.000  -142.696
    2.372
   SRCPARAM A0000060     0.0000387657     2.550   122.964    16.000  -147.144
    2.372
   SRCPARAM A0000061     0.0000387657     2.550   101.964    16.000  -135.855
    2.372
   SRCPARAM A0000062     0.0000387657     2.550    94.907    16.000  -122.969
    2.372
   SRCPARAM A0000063     0.0000387657     2.550   105.535    16.000  -163.413
    2.372
   SRCPARAM A0000064     0.0000387657     2.550    82.480    16.000   164.876
    2.372
   SRCPARAM A0000065     0.0000387657     2.550    85.675    16.000   168.408
    2.372
   SRCPARAM A0000066     0.0000387657     2.550   114.055    16.000   180.000
    2.372
   SRCPARAM A0000067     0.0000387657     2.550    25.913    16.000  -131.634
    2.372
   SRCPARAM A0000068     0.0000387657     2.550    41.562    16.000  -158.749
    2.372
   SRCPARAM A0000069     0.0000387657     2.550    30.204    16.000   175.914
    2.372
   SRCPARAM A0000070     0.0000387657     2.550   159.250    16.000   149.103
    2.372
   SRCPARAM A0000071     0.0000387657     2.550   159.250    16.000   149.103
    2.372
   SRCPARAM A0000072     0.0000387657     2.550   104.121    16.000   161.940
    2.372
   SRCPARAM A0000073     0.0000387657     2.550   119.604    16.000   171.724
    2.372
   SRCPARAM A0000074     0.0000387657     2.550   103.653    16.000   175.236
    2.372
** ------------------------------------------------------------------
** LINE AREA Source ID = PAVED
   SRCPARAM A0000123     0.0000420952     2.550    77.275     9.000  -178.579
    2.372
   SRCPARAM A0000124     0.0000420952     2.550    77.275     9.000  -178.579
    2.372
   SRCPARAM A0000125     0.0000420952     2.550    61.345     9.000  -173.324
    2.372
   SRCPARAM A0000126     0.0000420952     2.550    63.471     9.000  -162.518
    2.372
```

```
SRCPARAM A0000127     0.0000420952     2.125    72.376     9.000  -156.211
 2.372
SRCPARAM A0000128     0.0000420952     1.275    72.376     9.000  -156.211
 2.372
SRCPARAM A0000129     0.0000420952     0.425    72.376     9.000  -156.211
 2.372
SRCPARAM A0000130     0.0000420952     0.000    35.654     9.000  -174.806
 2.372
SRCPARAM A0000131     0.0000420952     0.000    29.760     9.000   167.471
 2.372
SRCPARAM A0000132     0.0000420952     0.000    18.045     9.000   153.435
 2.372
SRCPARAM A0000133     0.0000420952     0.000    24.636     9.000   148.392
 2.372
SRCPARAM A0000134     0.0000420952     0.000    77.151     9.000   127.349
 2.372
SRCPARAM A0000135     0.0000420952     0.000    31.955     9.000   135.000
 2.372
SRCPARAM A0000136     0.0000420952     0.000    25.519     9.000   161.565
 2.372
SRCPARAM A0000137     0.0000420952     0.000    62.060     9.000   167.229
 2.372
SRCPARAM A0000138     0.0000420952     0.000    62.060     9.000   167.229
 2.372
SRCPARAM A0000139     0.0000420952     0.000    14.880     9.000   139.399
 2.372
SRCPARAM A0000140     0.0000420952     0.000    62.410     9.000   130.280
 2.372
SRCPARAM A0000141     0.0000420952     0.000    62.410     9.000   130.280
 2.372
SRCPARAM A0000142     0.0000420952     0.000    72.302     9.000   121.490
 2.372
SRCPARAM A0000143     0.0000420952     0.000    72.302     9.000   121.490
 2.372
SRCPARAM A0000144     0.0000420952     0.000    72.302     9.000   121.490
 2.372
SRCPARAM A0000145     0.0000420952     0.000    72.302     9.000   121.490
 2.372
SRCPARAM A0000146     0.0000420952     0.000    72.302     9.000   121.490
 2.372
SRCPARAM A0000147     0.0000420952     0.000    69.874     9.000    75.964
 2.372
SRCPARAM A0000148     0.0000420952     0.000    69.874     9.000    75.964
 2.372
SRCPARAM A0000149     0.0000420952     0.000    24.210     9.000    90.000
 2.372
SRCPARAM A0000150     0.0000420952     0.000    62.844     9.000   111.073
 2.372
SRCPARAM A0000151     0.0000420952     0.000    62.844     9.000   111.073
 2.372
SRCPARAM A0000152     0.0000420952     0.000    62.844     9.000   111.073
 2.372
SRCPARAM A0000153     0.0000420952     0.000    50.526     9.000   116.565
```

```
    2.372
   SRCPARAM A0000154     0.0000420952     0.000    50.584     9.000   123.944
    2.372
   SRCPARAM A0000155     0.0000420952     0.000    50.584     9.000   123.944
    2.372
   SRCPARAM A0000156     0.0000420952     0.000    24.424     9.000   172.405
    2.372
   SRCPARAM A0000157     0.0000420952     0.000    51.496     9.000   147.804
    2.372
   SRCPARAM A0000158     0.0000420952     0.000    53.876     9.000   163.465
    2.372
   SRCPARAM A0000159     0.0000420952     0.000    53.876     9.000   163.465
    2.372
   SRCPARAM A0000160     0.0000420952     0.000    42.457     9.000  -171.254
    2.372
   SRCPARAM A0000161     0.0000420952     0.000    51.559     9.000  -162.699
    2.372
   SRCPARAM A0000162     0.0000420952     0.000    51.559     9.000  -162.699
    2.372
   SRCPARAM A0000163     0.0000420952     0.000    61.459     9.000  -156.801
    2.372
   SRCPARAM A0000164     0.0000420952     0.000    77.740     9.000  -175.236
    2.372
   SRCPARAM A0000165     0.0000420952     0.000    71.180     9.000  -176.100
    2.372
   SRCPARAM A0000166     0.0000420952     0.000    59.543     9.000  -147.171
    2.372
   SRCPARAM A0000167     0.0000420952     0.000    49.273     9.000  -121.608
    2.372
   SRCPARAM A0000168     0.0000420952     0.000    61.172     9.000  -120.964
    2.372
   SRCPARAM A0000169     0.0000420952     0.000    61.172     9.000  -120.964
    2.372
** ------------------------------------------------------------------
** LINE AREA Source ID = CCP_UNPV
   SRCPARAM A0000117     0.0004578927     2.550    19.927     9.000   103.241
    2.372
   SRCPARAM A0000118     0.0004578927     2.550    56.187     9.000   113.962
    2.372
   SRCPARAM A0000119     0.0004578927     2.550    16.217     9.000   129.289
    2.372
   SRCPARAM A0000120     0.0004578927     2.550    27.479     9.000   138.366
    2.372
   SRCPARAM A0000121     0.0004578927     2.550    54.494     9.000   109.573
    2.372
   SRCPARAM A0000122     0.0004578927     2.550    68.355     9.000   123.425
    2.372
** ------------------------------------------------------------------

** Variable Emissions Type: "By Hour / Seven Days (HRDOW7)"
** Variable Emission Scenario: "Scenario 2"
   EMISFACT A0000117     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
   EMISFACT A0000117     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
```

```
EMISFACT A0000117     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000118     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000118     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000118     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000119     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000119     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000119     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000120     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000120     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000120     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000121     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000121     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000121     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000122     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000122     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000122     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000117     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000117     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000117     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000118     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000118     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000118     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000119     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000119     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000119     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000120     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000120     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000120     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000121     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000121     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000121     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000122     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000122     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000122     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000117     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000117     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000117     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000118     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000118     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000118     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000119     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000119     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000119     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000120     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000120     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000120     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000121     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000121     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000121     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000122     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000122     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000122     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000117     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
```

```
EMISFACT A0000117     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000117     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000118     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000118     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000118     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000119     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000119     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000119     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000120     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000120     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000120     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000121     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000121     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000121     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000122     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000122     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000122     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000117     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000117     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000117     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000118     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000118     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000118     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000119     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000119     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000119     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000120     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000120     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000120     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000121     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000121     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000121     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000122     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000122     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000122     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000117     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000117     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000117     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000118     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000118     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000118     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000119     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000119     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000119     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000120     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000120     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000120     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000121     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000121     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000121     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000122     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000122     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000122     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
```

```
EMISFACT A0000117     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000117     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000117     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000118     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000118     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000118     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000119     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000119     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000119     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000120     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000120     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000120     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000121     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000121     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000121     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000122     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000122     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000122     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT CHAN_RCK     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT CHAN_RCK     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT CHAN_RCK     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT CHAN_RCK     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT CHAN_RCK     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT CHAN_RCK     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT CHAN_RCK     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT CHAN_RCK     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT CHAN_RCK     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT CHAN_RCK     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT CHAN_RCK     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT CHAN_RCK     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT CHAN_RCK     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT CHAN_RCK     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT CHAN_RCK     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT CHAN_RCK     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT CHAN_RCK     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT CHAN_RCK     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT CHAN_RCK     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT CHAN_RCK     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT CONCRTE      HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT CONCRTE      HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT CONCRTE      HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT CONCRTE      HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT CONCRTE      HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT CONCRTE      HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT CONCRTE      HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT CONCRTE      HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT CONCRTE      HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT CONCRTE      HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT CONCRTE      HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
```

```
EMISFACT CONCRTE      HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT CONCRTE      HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT CONCRTE      HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT CONCRTE      HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT CONCRTE      HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT CONCRTE      HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT CONCRTE      HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT MATRMVL      HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT MATRMVL      HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT MATRMVL      HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT MATRMVL      HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT MATRMVL      HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT MATRMVL      HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT MATRMVL      HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT MATRMVL      HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT MATRMVL      HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT MATRMVL      HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT MATRMVL      HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT MATRMVL      HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT MATRMVL      HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT MATRMVL      HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT MATRMVL      HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT MATRMVL      HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT MATRMVL      HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT MATRMVL      HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT MATRMVL      HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT MATRMVL      HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000123     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000123     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000123     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000124     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000124     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000124     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000125     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000125     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000125     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000126     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000126     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000126     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000127     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000127     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000127     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000128     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000128     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000128     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000129     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000129     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000129     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000130     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000130     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000130     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000131     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
```

```
EMISFACT A0000131     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000131     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000132     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000132     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000132     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000133     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000133     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000133     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000134     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000134     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000134     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000135     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000135     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000135     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000136     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000136     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000136     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000137     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000137     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000137     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000138     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000138     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000138     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000139     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000139     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000139     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000140     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000140     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000140     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000141     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000141     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000141     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000142     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000142     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000142     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000143     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000143     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000143     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000144     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000144     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000144     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000145     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000145     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000145     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000146     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000146     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000146     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000147     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000147     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000147     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000148     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000148     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000148     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
```

```
EMISFACT A0000149     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000149     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000149     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000150     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000150     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000150     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000151     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000151     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000151     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000152     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000152     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000152     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000153     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000153     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000153     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000154     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000154     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000154     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000155     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000155     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000155     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000156     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000156     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000156     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000157     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000157     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000157     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000158     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000158     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000158     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000159     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000159     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000159     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000160     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000160     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000160     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000161     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000161     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000161     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000162     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000162     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000162     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000163     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000163     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000163     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000164     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000164     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000164     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000165     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000165     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000165     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000166     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000166     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
```

```
EMISFACT A0000166     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000167     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000167     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000167     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000168     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000168     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000168     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000169     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000169     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000169     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000123     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000123     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000123     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000124     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000124     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000124     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000125     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000125     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000125     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000126     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000126     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000126     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000127     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000127     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000127     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000128     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000128     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000128     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000129     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000129     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000129     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000130     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000130     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000130     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000131     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000131     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000131     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000132     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000132     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000132     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000133     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000133     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000133     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000134     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000134     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000134     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000135     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000135     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000135     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000136     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000136     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000136     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000137     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
```

```
EMISFACT A0000137     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000137     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000138     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000138     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000138     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000139     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000139     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000139     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000140     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000140     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000140     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000141     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000141     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000141     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000142     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000142     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000142     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000143     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000143     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000143     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000144     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000144     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000144     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000145     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000145     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000145     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000146     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000146     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000146     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000147     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000147     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000147     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000148     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000148     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000148     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000149     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000149     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000149     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000150     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000150     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000150     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000151     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000151     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000151     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000152     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000152     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000152     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000153     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000153     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000153     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000154     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000154     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000154     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
```

```
EMISFACT A0000155     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000155     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000155     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000156     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000156     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000156     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000157     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000157     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000157     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000158     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000158     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000158     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000159     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000159     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000159     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000160     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000160     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000160     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000161     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000161     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000161     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000162     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000162     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000162     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000163     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000163     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000163     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000164     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000164     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000164     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000165     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000165     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000165     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000166     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000166     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000166     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000167     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000167     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000167     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000168     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000168     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000168     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000169     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000169     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000169     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000123     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000123     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000123     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000124     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000124     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000124     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000125     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000125     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
```

```
EMISFACT A0000125     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000126     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000126     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000126     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000127     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000127     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000127     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000128     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000128     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000128     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000129     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000129     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000129     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000130     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000130     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000130     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000131     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000131     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000131     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000132     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000132     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000132     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000133     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000133     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000133     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000134     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000134     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000134     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000135     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000135     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000135     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000136     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000136     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000136     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000137     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000137     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000137     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000138     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000138     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000138     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000139     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000139     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000139     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000140     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000140     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000140     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000141     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000141     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000141     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000142     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000142     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000142     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000143     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
```

```
EMISFACT A0000143     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000143     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000144     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000144     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000144     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000145     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000145     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000145     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000146     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000146     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000146     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000147     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000147     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000147     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000148     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000148     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000148     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000149     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000149     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000149     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000150     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000150     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000150     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000151     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000151     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000151     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000152     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000152     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000152     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000153     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000153     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000153     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000154     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000154     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000154     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000155     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000155     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000155     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000156     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000156     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000156     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000157     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000157     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000157     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000158     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000158     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000158     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000159     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000159     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000159     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000160     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000160     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000160     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
```

```
EMISFACT A0000161     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000161     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000161     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000162     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000162     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000162     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000163     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000163     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000163     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000164     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000164     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000164     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000165     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000165     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000165     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000166     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000166     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000166     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000167     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000167     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000167     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000168     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000168     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000168     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000169     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000169     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000169     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000123     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000123     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000123     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000124     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000124     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000124     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000125     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000125     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000125     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000126     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000126     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000126     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000127     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000127     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000127     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000128     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000128     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000128     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000129     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000129     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000129     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000130     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000130     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000130     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000131     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000131     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
```

```
EMISFACT A0000131     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000132     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000132     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000132     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000133     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000133     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000133     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000134     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000134     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000134     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000135     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000135     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000135     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000136     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000136     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000136     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000137     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000137     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000137     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000138     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000138     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000138     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000139     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000139     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000139     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000140     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000140     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000140     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000141     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000141     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000141     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000142     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000142     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000142     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000143     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000143     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000143     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000144     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000144     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000144     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000145     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000145     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000145     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000146     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000146     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000146     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000147     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000147     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000147     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000148     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000148     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000148     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000149     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
```

```
EMISFACT A0000149     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000149     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000150     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000150     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000150     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000151     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000151     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000151     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000152     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000152     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000152     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000153     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000153     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000153     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000154     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000154     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000154     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000155     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000155     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000155     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000156     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000156     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000156     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000157     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000157     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000157     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000158     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000158     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000158     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000159     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000159     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000159     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000160     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000160     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000160     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000161     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000161     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000161     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000162     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000162     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000162     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000163     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000163     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000163     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000164     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000164     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000164     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000165     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000165     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000165     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000166     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000166     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000166     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
```

```
EMISFACT A0000167     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000167     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000167     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000168     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000168     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000168     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000169     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000169     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000169     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000123     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000123     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000123     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000124     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000124     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000124     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000125     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000125     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000125     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000126     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000126     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000126     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000127     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000127     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000127     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000128     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000128     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000128     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000129     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000129     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000129     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000130     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000130     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000130     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000131     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000131     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000131     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000132     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000132     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000132     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000133     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000133     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000133     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000134     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000134     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000134     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000135     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000135     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000135     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000136     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000136     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000136     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000137     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000137     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
```

```
EMISFACT A0000137     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000138     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000138     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000138     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000139     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000139     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000139     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000140     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000140     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000140     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000141     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000141     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000141     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000142     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000142     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000142     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000143     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000143     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000143     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000144     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000144     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000144     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000145     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000145     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000145     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000146     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000146     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000146     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000147     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000147     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000147     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000148     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000148     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000148     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000149     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000149     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000149     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000150     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000150     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000150     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000151     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000151     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000151     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000152     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000152     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000152     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000153     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000153     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000153     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000154     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000154     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000154     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000155     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
```

```
EMISFACT A0000155     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000155     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000156     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000156     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000156     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000157     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000157     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000157     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000158     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000158     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000158     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000159     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000159     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000159     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000160     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000160     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000160     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000161     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000161     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000161     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000162     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000162     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000162     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000163     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000163     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000163     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000164     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000164     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000164     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000165     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000165     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000165     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000166     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000166     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000166     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000167     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000167     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000167     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000168     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000168     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000168     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000169     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000169     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000169     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000123     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000123     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000123     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000124     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000124     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000124     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000125     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000125     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000125     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
```

```
EMISFACT A0000126     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000126     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000126     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000127     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000127     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000127     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000128     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000128     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000128     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000129     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000129     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000129     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000130     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000130     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000130     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000131     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000131     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000131     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000132     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000132     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000132     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000133     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000133     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000133     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000134     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000134     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000134     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000135     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000135     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000135     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000136     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000136     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000136     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000137     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000137     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000137     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000138     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000138     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000138     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000139     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000139     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000139     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000140     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000140     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000140     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000141     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000141     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000141     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000142     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000142     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000142     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000143     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000143     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
```

```
EMISFACT A0000143     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000144     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000144     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000144     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000145     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000145     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000145     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000146     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000146     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000146     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000147     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000147     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000147     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000148     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000148     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000148     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000149     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000149     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000149     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000150     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000150     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000150     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000151     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000151     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000151     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000152     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000152     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000152     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000153     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000153     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000153     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000154     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000154     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000154     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000155     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000155     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000155     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000156     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000156     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000156     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000157     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000157     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000157     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000158     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000158     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000158     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000159     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000159     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000159     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000160     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000160     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000160     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000161     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
```

```
EMISFACT A0000161     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000161     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000162     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000162     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000162     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000163     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000163     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000163     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000164     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000164     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000164     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000165     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000165     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000165     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000166     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000166     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000166     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000167     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000167     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000167     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000168     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000168     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000168     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000169     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000169     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000169     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000123     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000123     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000123     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000124     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000124     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000124     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000125     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000125     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000125     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000126     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000126     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000126     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000127     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000127     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000127     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000128     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000128     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000128     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000129     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000129     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000129     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000130     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000130     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000130     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000131     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000131     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000131     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
```

```
EMISFACT A0000132     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000132     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000132     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000133     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000133     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000133     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000134     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000134     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000134     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000135     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000135     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000135     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000136     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000136     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000136     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000137     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000137     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000137     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000138     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000138     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000138     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000139     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000139     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000139     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000140     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000140     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000140     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000141     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000141     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000141     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000142     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000142     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000142     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000143     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000143     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000143     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000144     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000144     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000144     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000145     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000145     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000145     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000146     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000146     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000146     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000147     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000147     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000147     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000148     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000148     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000148     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000149     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000149     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
```

```
EMISFACT A0000149     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000150     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000150     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000150     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000151     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000151     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000151     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000152     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000152     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000152     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000153     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000153     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000153     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000154     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000154     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000154     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000155     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000155     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000155     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000156     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000156     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000156     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000157     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000157     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000157     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000158     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000158     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000158     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000159     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000159     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000159     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000160     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000160     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000160     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000161     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000161     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000161     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000162     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000162     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000162     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000163     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000163     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000163     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000164     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000164     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000164     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000165     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000165     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000165     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000166     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000166     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000166     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000167     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
```

```
EMISFACT A0000167     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000167     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000168     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000168     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000168     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000169     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000169     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000169     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000058     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000058     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000058     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000059     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000059     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000059     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000060     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000060     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000060     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000061     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000061     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000061     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000062     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000062     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000062     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000063     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000063     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000063     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000064     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000064     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000064     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000065     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000065     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000065     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000066     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000066     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000066     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000067     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000067     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000067     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000068     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000068     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000068     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000069     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000069     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000069     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000070     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000070     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000070     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000071     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000071     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000071     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000072     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000072     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000072     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
```

```
EMISFACT A0000073     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000073     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000073     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000074     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000074     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000074     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000058     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000058     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000058     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000059     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000059     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000059     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000060     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000060     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000060     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000061     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000061     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000061     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000062     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000062     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000062     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000063     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000063     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000063     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000064     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000064     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000064     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000065     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000065     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000065     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000066     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000066     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000066     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000067     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000067     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000067     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000068     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000068     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000068     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000069     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000069     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000069     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000070     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000070     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000070     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000071     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000071     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000071     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000072     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000072     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000072     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000073     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000073     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
```

```
EMISFACT A0000073     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000074     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000074     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000074     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000058     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000058     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000058     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000059     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000059     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000059     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000060     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000060     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000060     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000061     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000061     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000061     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000062     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000062     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000062     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000063     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000063     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000063     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000064     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000064     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000064     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000065     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000065     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000065     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000066     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000066     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000066     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000067     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000067     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000067     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000068     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000068     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000068     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000069     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000069     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000069     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000070     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000070     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000070     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000071     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000071     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000071     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000072     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000072     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000072     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000073     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000073     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000073     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000074     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
```

```
EMISFACT A0000074     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000074     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000058     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000058     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000058     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000059     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000059     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000059     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000060     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000060     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000060     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000061     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000061     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000061     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000062     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000062     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000062     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000063     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000063     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000063     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000064     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000064     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000064     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000065     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000065     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000065     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000066     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000066     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000066     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000067     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000067     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000067     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000068     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000068     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000068     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000069     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000069     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000069     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000070     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000070     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000070     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000071     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000071     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000071     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000072     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000072     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000072     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000073     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000073     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000073     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000074     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000074     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000074     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
```

```
EMISFACT A0000058     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000058     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000058     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000059     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000059     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000059     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000060     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000060     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000060     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000061     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000061     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000061     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000062     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000062     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000062     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000063     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000063     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000063     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000064     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000064     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000064     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000065     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000065     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000065     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000066     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000066     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000066     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000067     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000067     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000067     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000068     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000068     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000068     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000069     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000069     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000069     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000070     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000070     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000070     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000071     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000071     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000071     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000072     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000072     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000072     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000073     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000073     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000073     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000074     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000074     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000074     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000058     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000058     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
```

```
EMISFACT A0000058     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000059     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000059     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000059     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000060     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000060     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000060     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000061     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000061     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000061     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000062     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000062     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000062     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000063     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000063     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000063     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000064     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000064     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000064     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000065     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000065     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000065     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000066     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000066     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000066     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000067     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000067     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000067     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000068     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000068     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000068     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000069     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000069     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000069     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000070     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000070     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000070     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000071     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000071     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000071     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000072     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000072     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000072     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000073     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000073     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000073     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000074     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000074     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000074     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000058     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000058     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000058     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000059     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
```

```
EMISFACT A0000059     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000059     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000060     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000060     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000060     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000061     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000061     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000061     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000062     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000062     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000062     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000063     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000063     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000063     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000064     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000064     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000064     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000065     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000065     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000065     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000066     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000066     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000066     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000067     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000067     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000067     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000068     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000068     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000068     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000069     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000069     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000069     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000070     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000070     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000070     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000071     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000071     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000071     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000072     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000072     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000072     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000073     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000073     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000073     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000074     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000074     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000074     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
SRCGROUP CCP_UNPV A0000117 A0000118 A0000119 A0000120 A0000121 A0000122
SRCGROUP CHAN_RCK CHAN_RCK
SRCGROUP CONCRTE  CONCRTE
SRCGROUP MATRMVL  MATRMVL
SRCGROUP PAVED    A0000123 A0000124 A0000125 A0000126 A0000127 A0000128
SRCGROUP PAVED    A0000129 A0000130 A0000131 A0000132 A0000133 A0000134
```

```
   SRCGROUP PAVED    A0000135 A0000136 A0000137 A0000138 A0000139 A0000140
   SRCGROUP PAVED    A0000141 A0000142 A0000143 A0000144 A0000145 A0000146
   SRCGROUP PAVED    A0000147 A0000148 A0000149 A0000150 A0000151 A0000152
   SRCGROUP PAVED    A0000153 A0000154 A0000155 A0000156 A0000157 A0000158
   SRCGROUP PAVED    A0000159 A0000160 A0000161 A0000162 A0000163 A0000164
   SRCGROUP PAVED    A0000165 A0000166 A0000167 A0000168 A0000169
   SRCGROUP UNPAVED  A0000058 A0000059 A0000060 A0000061 A0000062 A0000063
   SRCGROUP UNPAVED  A0000064 A0000065 A0000066 A0000067 A0000068 A0000069
   SRCGROUP UNPAVED  A0000070 A0000071 A0000072 A0000073 A0000074
   SRCGROUP ALL
SO FINISHED
**
**************************************
** AERMOD Receptor Pathway
**************************************
**
**
RE STARTING
   INCLUDED PCRP.rou
RE FINISHED
**
**************************************
** AERMOD Meteorology Pathway
**************************************
**
**
ME STARTING
   SURFFILE "Moffett Field Met\745090.SFC"
   PROFFILE "Moffett Field Met\745090.PFL"
   SURFDATA 23244 2009
   UAIRDATA 23230 2009 OAKLAND/WSO_AP
   PROFBASE 11.9 METERS
ME FINISHED
**
**************************************
** AERMOD Output Pathway
**************************************
**
**
OU STARTING
   RECTABLE ALLAVE 1ST
   RECTABLE 1 1ST
** Auto-Generated Plotfiles
   PLOTFILE 1 ALL 1ST PCRP.AD\01H1GALL.PLT 31
   PLOTFILE 1 CCP_UNPV 1ST PCRP.AD\01H1G001.PLT 32
   PLOTFILE 1 CHAN_RCK 1ST PCRP.AD\01H1G002.PLT 33
   PLOTFILE 1 CONCRTE 1ST PCRP.AD\01H1G003.PLT 34
   PLOTFILE 1 MATRMVL 1ST PCRP.AD\01H1G004.PLT 35
   PLOTFILE 1 PAVED 1ST PCRP.AD\01H1G005.PLT 36
   PLOTFILE 1 UNPAVED 1ST PCRP.AD\01H1G006.PLT 37
   PLOTFILE ANNUAL ALL PCRP.AD\AN00GALL.PLT 38
   PLOTFILE ANNUAL CCP_UNPV PCRP.AD\AN00G001.PLT 39
   PLOTFILE ANNUAL CHAN_RCK PCRP.AD\AN00G002.PLT 40
```

```
   PLOTFILE ANNUAL CONCRTE PCRP.AD\AN00G003.PLT 41
   PLOTFILE ANNUAL MATRMVL PCRP.AD\AN00G004.PLT 42
   PLOTFILE ANNUAL PAVED PCRP.AD\AN00G005.PLT 43
   PLOTFILE ANNUAL UNPAVED PCRP.AD\AN00G006.PLT 44
   SUMMFILE PCRP.sum
OU FINISHED
**
**************************************
** Project Parameters
**************************************
** PROJCTN  CoordinateSystemUTM
** DESCPTN  UTM: Universal Transverse Mercator
** DATUM    World Geodetic System 1984
** DTMRGN   Global Definition
** UNITS    m
** ZONE     10
** ZONEINX  0
**
```

B-8 Health Risk Summary

HRA Permanente Creek Restoration Project

Health Risk Assessment Summary of Results - OEHHA 2003 Guidance

Risk Impact	Residence near Stevens Creek Blvd.	Caretaker's House	Year
Cancer (per million)	0.5098	0.0365	2024-2029
$PM_{2.5}$ Impact ($\mu g/m^3$)	0.0014	0.0001	2025/2026
Chronic Hazard Index	0.0080	0.0006	2025
Acute Hazard Index	0.0553	0.0365	2029

Chronic Hazard Index	Residence near Stevens Creek Blvd.	Caretaker's House
2024	0.008	0.001
2025	0.008	0.001
2026	0.008	0.001
2027	0.008	0.001
2028	0.008	0.001
2029	0.008	0.001

Acute Hazard Index	Residence near Stevens Creek Blvd.	Caretaker's House
2024	0.041	0.019
2025	0.039	0.016
2026	0.039	0.016
2027	0.039	0.016
2028	0.055	0.036
2029	0.055	0.037

HRA Permanente Creek Restoration Project

Health Risk Assessment Summary of Results - OEHHA 2015 Guidance

Risk Impact	Residence near Stevens Creek Blvd.	Caretaker's House	Year
Cancer (per million)	0.7797	0.0559	2024-2029
$PM_{2.5}$ Impact ($\mu g/m^3$)	0.0014	0.0001	2025/2026
Chronic Hazard Index	0.01	0.0006	2025
Acute Hazard Index	0.06	0.0365	2029

Chronic Hazard Index	Residence near Stevens Creek Blvd.	Caretaker's House
2024	0.008	0.001
2025	0.008	0.001
2026	0.008	0.001
2027	0.008	0.001
2028	0.008	0.001
2029	0.008	0.001

Acute Hazard Index	Residence near Stevens Creek Blvd.	Caretaker's House
2024	0.041	0.019
2025	0.039	0.016
2026	0.039	0.016
2027	0.039	0.016
2028	0.055	0.036
2029	0.055	0.037

Paved road

Unpaved road

Paved road

Concrete Channel
and Planting

Unpaved road

Material Removal

Rock Pile and
Channel Widening

PG&E Trail

Canyon Oak Way

Madrone Ct

Hammond-Snyder Loop Trail

Stevens Creek Blvd

Longdown Rd

Voss Ave

Avenida Ln

Permanente Rd

Permanente

El Cerrito Rd

Google Earth

Majstrpm25: 0.003121
Railpm25: 0.001608
Railcan: 1.007598
Majstrcancer: 0.145183
Highpm25: 0.107606
Highcancer: 3.847426

Appendix E
Biological Resources

E1. Revised Draft Biological Assessment (GEI Consultants, Inc., May 2016)

Revised Draft Biological Assessment
for the

Permanente Creek Restoration Project

Prepared for:

Lehigh Southwest Cement Company

GEI Consultants
in association with
AECOM

May 2016

Revised Draft Biological Assessment
for the

Permanente Creek Restoration Project

Prepared for:

Lehigh Southwest Cement Company
12667 Alcosta Blvd., Suite 400
San Ramon, CA 94583

Contact:

Gregory Knapp
(925) 244-6507

Prepared by:

GEI Consultants, Inc.
2868 Prospect Park Drive, Suite 400
Rancho Cordova, CA 95670

In association with

AECOM
2020 L Street, Suite 400
Sacramento, CA 95811

Contact:

Cindy Davis
Project Manager
916/631-4515

1603200
5.24.16

May 2016

TABLE OF CONTENTS

Section **Page**

1 BACKGROUND 1-1
1.1 Introduction 1-1
1.2 Action Area 1-1
1.3 Species and Habitats Evaluated in the Biological Assessment 1-2

2 PROJECT DESCRIPTION 2-1
2.1 Project Location 2-1
2.2 Project Purpose and Objectives 2-1
2.3 Proposed Project 2-1

3 ENVIRONMENTAL BASELINE CONDITIONS 3-1
3.1 Upland Habitats 3-3
3.2 Aquatic Habitats 3-4

4 BASIC BIOLOGY, LIFE HISTORY, AND BASELINE FOR CALIFORNIA RED-LEGGED FROG 4-1
4.1 Species Description 4-1
4.2 Habitat Requirements and Range 4-1
4.3 Potential to Occur in the Action Area 4-2
4.4 Critical Habitat 4-2

5 POTENTIAL PROJECT EFFECTS 5-1
5.1 Introduction 5-1
5.2 Direct and Indirect Effects on California Red-Legged Frog in the Action Area 5-1
5.3 Effects on Critical Habitat and Essential Fish Habitat 5-4
5.4 Interrelated and Interdependent Actions 5-4
5.5 Cumulative Effects 5-4

6 AVOIDANCE AND MINIMIZATION MEASURES 6-1
6.1 Standard Environmental Commitments 6-1
6.2 Compliance with Permit Terms and Conditions 6-1
6.3 Species-Specific Avoidance and Minimization and Habitat Conservation Measures 6-2

7 CONCLUSIONS 7-1

8 REFERENCES 8-1

9 LIST OF PREPARERS 9-1

Appendices

Appendix A U.S. Fish and Wildlife Service Species List
Appendix B Project Design Drawings
Appendix C Representative Photographs of Aquatic Habitat for California Red-Legged Frog

TABLE OF CONTENTS

Section **Page**

Exhibits

Exhibit 1. Regional Location 2-2
Exhibit 2. Action Area 2-3
Exhibit 3. Permanente Creek Drainage Upstream of Pond 13 3-1
Exhibit 4. Permanente Creek Canyon and Drainage in Middle Reaches of the Action Area 3-2
Exhibit 5. Channelized Portion of Permanente Creek Immediately Downstream of Pond 13 3-2
Exhibit 6. Lower Elevation Reaches of Permanente Creek, East of Pond 9 3-3
Exhibit 7. Location of Ponds in Action Area 3-6
Exhibit 8. Designated Restoration Plan Area 5-3

Tables

Table 1. Federally Listed or Candidate Species that May Be Affected by the Project 1-2
Table 2. Federally Listed or Candidate Species that Are Not Expected to be Affected by the Project 1-2
Table 3. Consultation with U.S. Fish and Wildlife Service 1-4
Table 4. Species List 2-6
Table 5. Direct Effects by Community 5-2
Table 6. Effects on Suitable California Red-Legged Frog Habitats 5-2

ACRONYMS AND OTHER ABBREVIATIONS

BA	biological assessment
BO	biological opinion
CFR	Code of Federal Regulations
CRLF	California red-legged frog
ESA	Endangered Species Act
FR	*Federal Register*
Lehigh	Lehigh Southwest Cement Company
MMP	mitigation and monitoring plan
NMFS	National Marine Fisheries Service
Project	Permanente Creek Restoration Project
RWQCB	Regional Water Quality Control Board
Service	U.S. Fish and Wildlife Service
SWPPP	storm water pollution prevention plan
USACE	U.S. Army Corps of Engineers
USC	U.S. Code

This page intentionally left blank.

1 BACKGROUND

1.1 INTRODUCTION

The purpose of this draft biological assessment (BA) is to review the Permanente Creek Restoration Project (Project) in sufficient detail to determine the extent to which it may affect any of the federally listed species described in Section 1.3, "Species Evaluated in the Biological Assessment." The species evaluated in this BA were derived from the federal endangered species list for species that may occur in the Action Area, as provided by the U.S. Fish and Wildlife Service (Service) on April 26, 2016 (Appendix A).

This BA has been prepared in accordance with requirements set forth under Section 7 of the federal Endangered Species Act (ESA) (16 U.S. Code [USC] 1536[c]). It initiates consultation with the Service and the National Marine Fisheries Service (NMFS) regarding effects of the Project on federally listed species.

Under provisions of ESA Section 7(a)(2), a federal agency that permits, licenses, funds, or otherwise authorizes activities must consult with NMFS and/or the Service, as appropriate, to prevent its action from jeopardizing the continued existence of any listed species or adversely modifying critical habitat (16 USC 1536[c]). A federal agency is required to consult if an action "may affect" listed species or designated critical habitat.

As defined in 50 Code of Federal Regulations (CFR) 402.2, the term "biological assessment" refers to the information prepared by, or under the direction of, the federal agency regarding listed species, species proposed for listing, and the designated and proposed critical habitat that may be present in the Action Area (see Section 1.2, "Action Area"), and the evaluation of a project's potential effects on those species and habitat. A BA must be prepared if listed species or critical habitat may be present in an area that would be affected by a "major construction activity." When a federal agency determines, through a BA or other review, that its action is "likely to adversely affect" a listed species or designated critical habitat, the agency must submit a request for formal consultation to NMFS and/or the Service. This consultation must take place within 90 days, then NMFS and the Service must prepare biological opinions (BOs) within the subsequent 45 days. The BOs present determinations by NMFS and the Service regarding whether the project would be likely to jeopardize the species or adversely modify its critical habitat. If a "jeopardy" or "adverse modification" determination is made, the BO must identify any reasonable and prudent alternative actions that could satisfy the purpose of and need for the project.

1.2 ACTION AREA

As defined by ESA guidelines, the "Action Area" is "all areas to be affected directly or indirectly by the federal action and not merely the immediate area involved in the action" (50 CFR 402.02). The Action Area includes all areas that would be directly or indirectly affected by project components. The Action Area for the Project consists of the 127.19-acre wetland delineation study area (see Exhibit 1), which is the area of potential direct effect, plus adjacent areas extending out to 500 feet, which compose the extent of potential indirect effects on water quality or wildlife dispersal that may occur outside of the construction area. The Action Area totals approximately 662.4 acres (see Exhibit 2). The Action Area focuses on a portion of Permanente Creek located south of the Lehigh Southwest Cement Company (Lehigh) Cement Plant, and is situated within the U.S. Geological Survey Mindego Hill and Cupertino Quadrangles. Elevations range from approximately 470 feet above mean sea level at the eastern boundary of the Action Area to 1,870 feet above mean sea level at the western boundary.

1.3 SPECIES AND HABITATS EVALUATED IN THE BIOLOGICAL ASSESSMENT

The Service provided an automated list to GEI Consultants on April 26, 2016, showing the federally listed and candidate species that potentially could be affected by the Project. All species on that list were analyzed for their potential occurrence within the Action Area and for the Project to affect those species. The species shown in Table 1 could be affected by the Project. The species listed in Table 2 are not anticipated to be affected by the Project. For the species in Table 2, a rationale for the "no effect" determination is provided.

1.3.1 SPECIES INCLUDED IN THE ANALYSIS

Based on the list provided by the Service (Appendix A) and the anticipated effects of the Project on listed species and their habitats in the Action Area, one species shown in Table 1—California red-legged frog (CRLF) (*Rana draytonii*), federally listed as threatened—is carried forward for effects analysis in this BA. This species is known to occur in the Action Area and may be affected by the Project.

Table 1. Federally Listed or Candidate Species that May Be Affected by the Project

Species	ESA Listing Status	Critical Habitat Designated in the Action Area (Yes/No)	Potential to Occur in the Action Area
Wildlife			
California red-legged frog *Rana draytonii*	Threatened	No	This species is found in permanent and semi-permanent ponds or backwaters of streams. California red-legged frog is known to occur in Ponds 9, 21, and 22 (and adjacent to the Action Area at Pond 14), based on a series of focused surveys (WRA 2011). Permanente Creek in the Action Area contains suitable aquatic and upland habitat.

Notes: BA = biological assessment; ESA = federal Endangered Species Act; Project = Permanente Creek Restoration Project
Source: Data compiled by AECOM in 2015

1.3.2 SPECIES ELIMINATED FROM FURTHER ANALYSIS

The species shown in Table 2 were eliminated from further analysis in this BA because their known range does not overlap with the Action Area, the Action Area does not contain suitable habitat for the species, or Project activities are not expected to affect the species or its habitat in the Action Area.

Table 2. Federally Listed or Candidate Species that Are Not Expected to be Affected by the Project

Species	ESA Listing Status	Reasoning for No Effect Determination
Plant Species		
San Mateo woolly sunflower *Eriophyllum latilobum*	Endangered	San Mateo woolly sunflower is restricted to shaded moist sites on steep grassy or sparsely wooded slopes of serpentine soils in San Mateo County. There is marginally suitable habitat for this species in the Action Area; however, the species was not detected during 2008 protocol floristic surveys and no occurrences are documented within 4.5 miles. Thus, this species is not expected to be affected by the Project.

Table 2. Federally Listed or Candidate Species that Are Not Expected to be Affected by the Project		
Species	ESA Listing Status	Reasoning for No Effect Determination
Fish and Wildlife Species		
Tidewater goby *Eucyclogobius newberryi*	Endangered	Tidewater goby is found in the Sacramento and San Joaquin Rivers and associated tributaries. Permanente Creek does not provide suitable habitat for this species and the species is not known to occur in the Action Area.
San Bruno elfin butterfly *Incisalia mossii bayensis*	Endangered	San Bruno elfin butterfly is found in coastal mountains near San Francisco Bay, in the fog belt of steep north-facing slopes that receive little direct sunlight. There is no suitable habitat for this species in the Action Area, and thus, this species is not expected to be affected by the Project.
California clapper [Ridgway's] rail *Rallus longirostris obsoletus*	Endangered	California clapper rail occurs in emergent marsh habitat in the San Francisco Bay region. The Action Area does not contain suitable habitat for this species. Therefore, this species is not expected to be affected by the Project.
California least tern *Sternula antillarum (=Sterna, =albifrons) browni*	Endangered	California least tern occurs in beach and scrub habitats along the Pacific Coast from San Francisco to Baja California, Mexico. The Action Area does not contain suitable habitat for this species. Therefore, this species is not expected to be affected by the Project.
San Francisco garter snake *Thamnophis sirtalis tetrataenia*	Endangered	San Francisco garter snake occurs in pond habitats and feeds primarily on California red-legged frogs. The species' historical range was the San Francisco Peninsula south to Santa Cruz County. This species is not known to occur in the Action Area. Therefore, this species is not expected to be affected by the Project.
California tiger salamander *Ambystoma californiense*	Threatened	California tiger salamander breeds in vernal pool habitat and spends the majority of the year in upland refugia habitat (burrows) up to 1.5 miles from breeding ponds. There is no suitable breeding habitat for this species in the Action Area and the Action Area is not within 1.5 miles of known breeding locations. The nearest known occurrences of tiger salamander to the Action Area are approximately 12 miles to the southeast. Therefore, this species is not expected to be affected by the Project.
Marbled murrelet *Brachyramphus marmoratus*	Threatened	Marbled murrelet breeds in coniferous forests near coasts, nesting on large horizontal branches high up in trees. This species is not known to occur in the Action Area and is not expected to be affected by the Project.
Bay checkerspot butterfly *Euphydryas editha bayensis*	Threatened	Bay checkerspot butterfly is found in areas with serpentine soils. There is no suitable habitat for this species in the Action Area, and thus, this species is not expected to be affected by the Project.
Delta smelt *Hypomesus transpacificus*	Threatened	Delta smelt is found in the Sacramento–San Joaquin Delta and associated tributaries. Permanente Creek does not provide suitable habitat for this species and the species is not known to occur in the Action Area.
Central California Coastal steelhead DPS *Oncorhynchus mykiss*	Threatened	Central California coastal steelhead are found in coastal drainages from the Russian River south to Aptos Creek, including drainages of San Francisco and San Pablo Bays east to the confluence of the Sacramento and San Joaquin Rivers. Although steelhead occur in Stevens Creek, which is hydrologically connected to Permanente Creek by the Permanente Creek Diversion Channel, the diversion channel is impassable for steelhead, which do not occur in Permanente Creek. Further, depending on rainfall and drought conditions, flows in upper Permanente Creek may not reach Stevens Creek through the diversion channel (Permanente Creek is typically dry upstream of the diversion structure). In addition, Stevens Creek is over 4 miles downstream of the Action Area and is unlikely to experience increased sedimentation or other adverse conditions as a result of the proposed action. Therefore, this species is unlikely to be affected by the Project.

Notes: DPS = Distinct Population Segment; ESA = federal Endangered Species Act; Project = Permanente Creek Restoration Project
Source: Data compiled by AECOM in 2015

1.3.3 CRITICAL HABITAT IN THE ACTION AREA

ESA Section 3(5)A defines "critical habitat" as the specific areas in the geographical area occupied by the species where physical or biological features are found that are essential to the conservation of the species and may require special management considerations or protection. Designations of critical habitat also may include specific areas outside the geographical area occupied by the species, based on a determination that such areas are essential to the conservation of the species.

The Action Area does not contain designated critical habitat for any federally listed species. The closest designated critical habitat to the Action Area is for Central California Coastal Steelhead, approximately 4 miles downstream of the Action Area, in Stevens Creek. Critical habitat for CRLF in Unit SNM-2, is present approximately 2 miles southwest of the Action Area.

1.3.4 ESSENTIAL FISH HABITAT IN THE ACTION AREA

Section 305(b)(2) of the Magnuson Stevens Fishery Conservation and Management Act, as amended by the Sustainable Fisheries Act of 1996 (Public Law 104 267), requires that Essential Fish Habitat (EFH) be identified and described in federal fishery management plans and that federal agencies consult with NMFS on any activity that they fund, permit, or carry out that may adversely affect EFH for federally managed fish species. EFH includes those waters and substrate necessary for fish spawning, breeding, feeding, or growth to maturity.

The Pacific Fishery Management Council has identified and described EFH, adverse impacts, and recommended conservation measures for salmon in Amendment 14 to the Pacific Coast Salmon Plan. Freshwater EFH for Pacific salmon includes all currently viable waters and most of the habitat historically accessible to salmon. The Action Area is within the Coyote Creek U.S. Geologic Survey Hydrologic Unit, which is designated EFH for Chinook Salmon (*Oncorhynchus tshawytscha*). Permanente Creek is not currently viable habitat for Chinook Salmon, because it is inaccessible to salmon.

1.3.5 CONSULTATION TO DATE

Table 3 summarizes consultation that has occurred to date between the U.S. Army Corps of Engineers (USACE) and the Service.

Table 3. Consultation with U.S. Fish and Wildlife Service

Date	Consultation	Summary of Topics
November 18, 2014	Meeting at SFBRWQCB office	Interagency meeting at the SFBRWQCB office to discuss the project. USFWS, as well as CDFW and RWQCB staff were in attendance.
June 3, 2015	Federal species list	AECOM received automated list from the Service of federally listed species that may occur in the Action Area.
July 8, 2015	Pre-application meeting (USACE)	Pre-application meeting with USACE and USFWS to discuss the proposed action.
April 26, 2016	Federal species list update	GEI Consultants received automated list from the Service of federally listed species that may occur in the Action Area.

Note: Service = U.S. Fish and Wildlife Service
Source: Data compiled by GEI in 2016

2 PROJECT DESCRIPTION

2.1 PROJECT LOCATION

The Project site is located in unincorporated Santa Clara County west of Cupertino and in the eastern foothills of the Santa Cruz Mountains, a part of the California Coast Ranges between the San Francisco Bay Area and the Pacific Ocean (Exhibit 1). The Action Area consists of Permanente Creek and its floodplain adjacent to the southern boundary of the Permanente Quarry. Exhibit 2 depicts the Project location next to the Permanente Quarry. Most of the area around the creek is undeveloped and includes natural areas such as the Rancho San Antonio Open Space to the north. Areas downstream of the Action Area are highly urbanized and include the cities of Cupertino, Los Altos, Palo Alto, and Saratoga.

2.2 PROJECT PURPOSE AND OBJECTIVES

Pursuant to a negotiated consent decree in *Sierra Club v. Lehigh Southwest Cement Company and Hanson Permanente Cement, Inc.* (U.S. District Court, Northern District, Case No. 5:11-cv-06392-HRL) and a cleanup and abatement order issued by the San Francisco Bay Regional Water Quality Control Board (RWQCB) (CAO No. 99-018:Section 9), Lehigh, the current facility operator, and Hanson Permanente Cement, Inc., the landowner, propose to restore portions of the Permanente Creek streambed, banks, and floodplain.

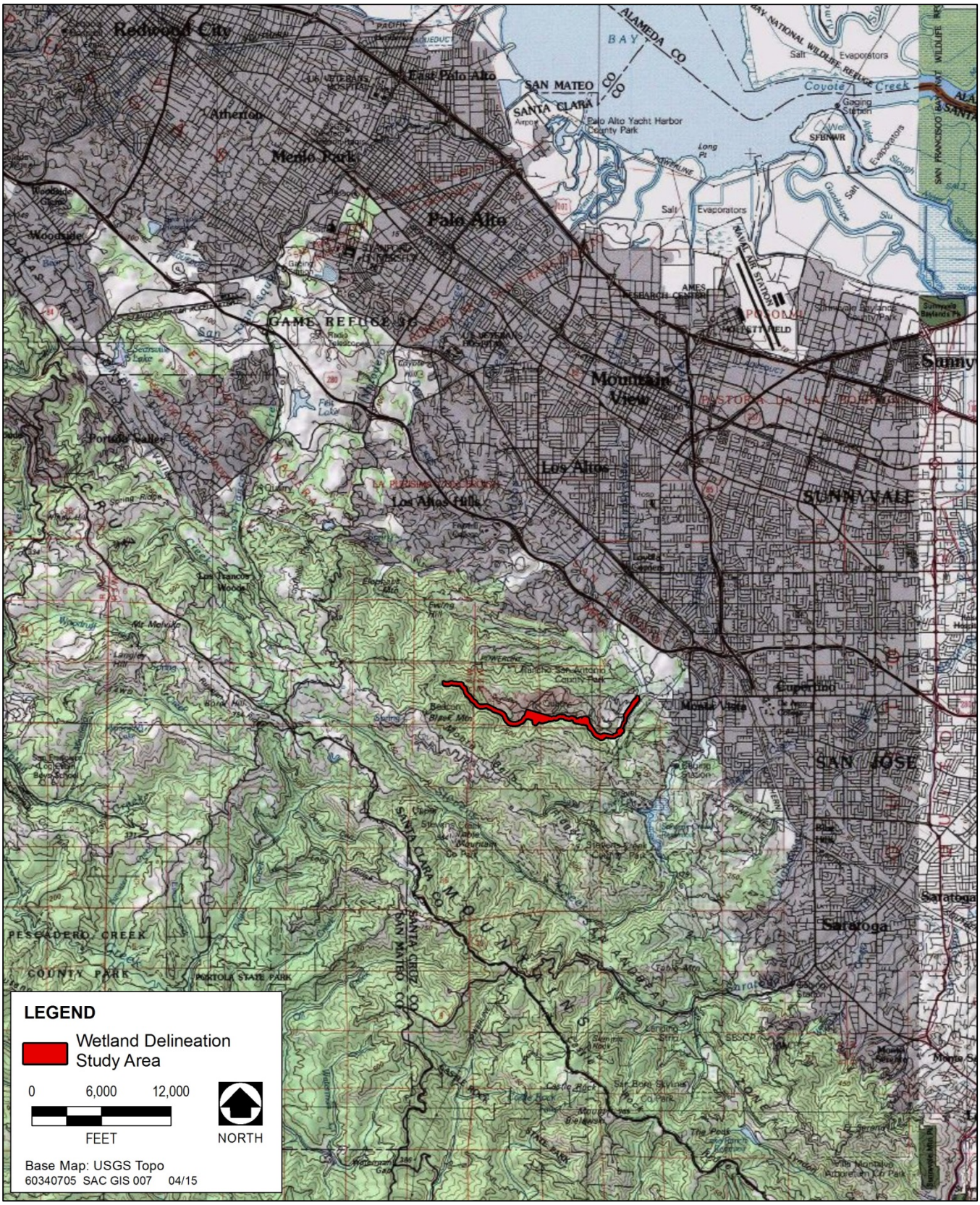
As part of the Project, Lehigh would remove a substantial volume of rock material (e.g., riprap, soil, debris) from specified areas in and/or adjacent to the creek, restore adjacent floodplain areas, and contour the stream to recreate meanders and match elevation controls created by bedrock. This may require removing an existing instream settling pond (Pond 13) and associated dam infrastructure. Second, to address additional downstream areas, Lehigh would remove culverts to create additional "daylighted" stream reaches, remove other concrete structures, remove an adjacent rock pile to provide additional space for meanders, and plant riparian vegetation along an existing concrete channel. Additional details regarding the restoration activities are provided below.

The proposed restoration of Permanente Creek has the following objectives:

- Remove mine-related materials from banks, and adjacent slopes of Permanente Creek.
- Restore streambed and floodplain hydraulics.
- Restore streambed hydrology and geomorphology, including stream meanders within the floodplain.
- Increase the quantity and quality of resident rainbow trout habitat.
- Improve and maintain riparian habitat on the banks and floodplain.
- Layback creek banks and adjacent hill slopes to provide stable slopes sufficient to prevent fill from entering the creek
- Remove or alter culverts and concrete structures to expose and create new streambed habitat.

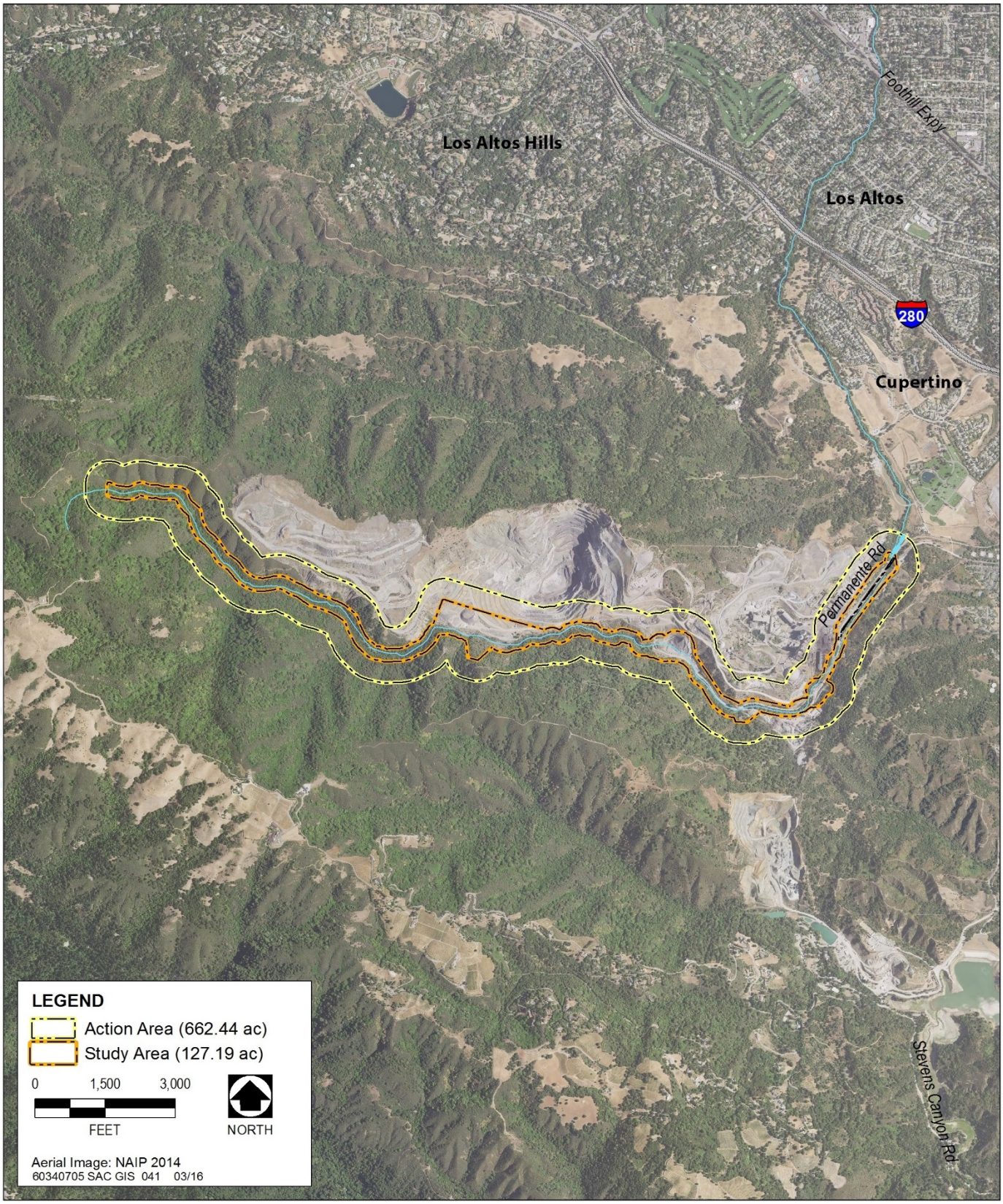
2.3 PROPOSED PROJECT

The Project would involve stream restoration on approximately 9,000 feet of Permanente Creek. In this length of the creek, portions of the streambed naturally achieve steep gradients (e.g., between 5% and >10%) and areas of exposed bedrock act as grade control points. The restoration would attempt to establish approximate pre-disturbance creek alignment and slopes in certain areas (*e.g.*, Reaches 17 and 18), and improve riparian habitat, including improvement to channel and stream bank stability and ecological/geomorphic function, based on current stream restoration approaches and engineering.



Source: Data compiled by AECOM in 2015

Exhibit 1. Regional Location



Source: Data compiled by AECOM in 2015, adapted by GEI 2016

Exhibit 2. Action Area

The Project, as fully depicted in the Project Design Drawings (Appendix B), would include realignment of the creek in several areas affected by rock material (*e.g*., riprap, soil, debris) from the adjacent mining operation. For example, rock material would be excavated in the "Material Removal Area" near Reach 17. The Project would involve removing this material, realigning the stream, and providing a floodplain bench area to restore natural geomorphic processes, allowing the stream to overtop its banks and meander within the stream corridor. Where Permanente Creek is incised in some areas, the restored streambed would be relatively shallow, allowing the stream to overflow its banks during substantial rainfall and inundate the floodplain. This beneficial stream process does not occur now in areas where the creek is channelized or constrained by fill or human-made structures in the floodplain. Restoring this process would provide natural removal of sediment and may provide some improvements in downstream water quality.

The proposed creek restoration plan has been developed over the last several years in consultation with the Sierra Club, and state, and federal agencies. In 2013, Lehigh and the Sierra Club signed a Consent Decree, outlining creek modifications that were based on certain assumptions. As actual design plans were prepared and consultation occurred with the California Department of Fish and Wildlife, the San Francisco Bay RWQCB, the U.S. Fish & Wildlife Service, and the U.S. Army Corps of Engineers, the project was modified as reflected in the enclosed design plans (Appendix B), and an amended Consent Decree was executed by the Sierra Club and Lehigh. Therefore, more recently, Lehigh and the Sierra Club developed a stream restoration plan that focuses on stream hydraulics, streambank and floodplain habitat, protection of resident/local fish populations, and improved wildlife habitat.

The Project would include the following components:

- establishing temporary access roads and staging areas for construction equipment and materials,
- completing a geotechnical investigation to support final design of the stream alignment,
- removing rock material from the adjacent quarry operation from the creek banks and bed,
- constructing new stream channel and floodplain areas,
- preparing stable side slopes,
- planting streambank and floodplain areas with riparian vegetation,
- removing human-made structures adjacent to the creek, and
- generally restoring the site.

The construction contractor would access the site through the main entrance off Permanente Road and would establish temporary access roadways that complement existing roadways in the area. This access would allow the contractor to drill geotechnical borings needed to inform the channel design, and to access the floodplain and stream channel during construction and habitat restoration. The construction contractor also would establish several construction staging areas for equipment storage, materials laydown, office trailers, and employee parking. During restoration, these areas would be used to store and prepare containerized plants before planting. Both the construction access roadways and the staging areas would be located to minimize erosion and loss of trees and other vegetation. It is anticipated that restoration activities would occur during the dry season, approximately May through September, over approximately five (5) consecutive seasons immediately after receipt of all necessary permits and approvals.

2.3.1 PROPOSED RESTORATION COMPONENTS

The subsections below describe the proposed features, construction methods, and measures Lehigh would use to minimize construction effects, and the required permits and approvals. Appendix B provides several design drawings and shows the overall layout of the proposed features and upgrades: the construction access roads and

staging area, culverts and other structures to be removed, locations of rock removal and slope stabilization, location and topographical design of the stream channel and floodplain improvements, and vegetation restoration location and components.

2.3.2 PROJECT CONSTRUCTION

Construction would be completed in the following steps as described in greater detail below:

- establishment of temporary access roads and staging areas for construction equipment and materials,
- geotechnical investigations to support final design of the stream alignment,
- removal of fallen rock material from the adjacent quarry,
- construction of new stream channel and floodplain areas,
- preparation of stable side slopes,
- planting of streambank and floodplain areas with riparian vegetation,
- removal of human-made structures adjacent to the creek, and
- general site restoration.

SITE PREPARATION—ACCESS ROADS AND STAGING AREAS

Before construction, crews would establish access roads and staging areas at the Project site. The crews would access the site through the main entrance and would establish temporary construction-access roadways that would be designed to be a minimum of 14 feet wide. Establishing these roadways would allow the contractor to drill the geotechnical borings needed to inform final channel design and would provide access to the Project site during construction. The staging areas are required for storage of equipment and construction materials, office trailers, and employee parking. Seven staging areas are proposed. From west to east, two staging areas would be located near Culvert 10/11, one at Culvert 9, two at Culvert 8, one at Culvert 2, and one at Culvert 1. The access roads and staging areas would be located to minimize erosion and loss of trees and other vegetation.

ROCK MATERIAL REMOVAL

The contractor would excavate rock material from affected stream reaches to move the toe of the slope to the north and restore the floodplain. Rock material would be removed within Reaches 8–12 (see the Project Design Drawings in Appendix B) by reducing the width of the adjacent roadway and removing rock material. Additional rock material would be removed within Reaches 17 and 18, and the toe of the north slope would be moved approximately 25 feet to the north. The material would be loaded into dump trucks, transported to an area within the adjacent Permanente Quarry, and used to support the future quarry reclamation process. Trees or stumps removed during excavation would be stored and used for habitat creation and restoration. The excavated areas would be graded to provide a level surface for channel excavation and planting. Brush, timber, and removed stumps not used for habitat restoration would be disposed of in accordance with local restrictions and regulatory requirements. Non-limestone rock would be used for streambank stabilization.

CONSTRUCTION OF STREAM CHANNEL

The principal restoration action would be construction of a new stream channel within the newly restored floodplain areas created by removing rock material. The new channel would be designed to use the underlying bedrock where present to guide the channel's alignment and profile. The stream restoration would be designed to protect water quality by diverting stream flow around the construction area. The contractor would then excavate

the new stream channel within the floodplain area according to design specifications for channel depth that would allow overbanking at the desired interval while providing bank stability and adequate cover and shading. The stream channel would be excavated by heavy equipment such as excavators. The walls of the new channel would be shored or sloped to prevent collapse. The excavated material (non-limestone) would be used to backfill the old channel in areas where a new stream channel is constructed in a more desirable location. Generally, any removed limestone would be transported out of the stream channel and used in cement plant manufacturing and/or quarry reclamation. Based on current estimates, approximately 420,000 cubic yards of fill would be removed from the channel during rock removal and stream channel construction. The final volume is pending geotechnical excavations.

Pond 13 is an instream settling pond in Reach 13, created by a steel and concrete dam and associated steel half-culvert supported by concrete. These human-made structures would be removed. Based on bedrock locations to be determined during construction, the final design profile could allow Pond 13 to remain, and the dam would be replaced with a boulder grade control structure. However, if so dictated by bedrock, construction of the new channel would necessitate removal of the Pond 13 dam and the pond would be replaced by a new reach of the creek.

STREAM HABITAT RESTORATION

Before allowing flow in the new channel, the contractor would plant native vegetation to stabilize the streambanks and to provide shading and bank habitat. Woody debris and instream vegetation would be placed to enhance instream cover habitat. Barriers would be removed and/or new passage routes would be established to enhance movement by local fish.

The contractor would then plant riparian vegetation along the new streambanks and in the floodplain in accordance with restoration design specifications. This would stabilize the new banks, reduce erosion, enhance riparian habitat, and enhance aquatic habitat. Planting locations would be selected to provide shade for the stream and cover for fish and other aquatic species. Table 4 provides a preliminary list of riparian plantings.

Table 4. Species List

Scientific Name	Common Name
Acer macrophyllum	Big leaf maple
Aesculus californica	California buckeye
Alnus rhombifolia	White alder
Baccharis pilularis	Coyote brush
Heteromeles arbutifolia	Toyon
Quercus agrifolia	Coast live oak
Rosa californica	California wild rose
Rubus ursinus	California blackberry
Salix laevigata	Red willow
Salix lasiolepis	Arroyo willow
Salvia mellifera	Black sage
Sambucus nigra spp. *caerulea*	Blue elderberry
Schoenoplectus californicus	Tule

Source: Data provided by WRA, Inc. in 2011 and updated by AECOM 2015 site surveys

After construction, the contractor would restore the areas used for staging and access roads to approximate preconstruction conditions by applying a hydroseed mix and installing permanent erosion and sedimentation controls. Hydroseeding would occur between September 1 and December 1. The success of the hydroseeded habitat would be judged based on performance standards including percent cover and species richness. Surface soils would be stabilized with mulch consisting of straw or erosion-control fabric that complies with storm water pollution prevention plan (SWPPP) standards. This process would be completed approximately 1 month after final grading is complete.

2.3.3 CONSTRUCTION SCHEDULE

Stream restoration would be completed over a period of approximately five dry/work seasons years, after permit procurement. The physical setting, mitigation, and schedule constraints would prohibit work in the rainy season. The proposed construction schedule also incorporates work windows to avoid or minimize effects on sensitive species. Each year, the initial activity would be to construct site access roads, install stream diversions and sediment controls, and perform geotechnical investigations as needed for design. The second activity would be to excavate rock material, create a new stream channel in those areas, and truck the excavated material to the quarry. Next, the stream would be prepared to receive streamflow by planting bank vegetation and allowing the streambed sediments to consolidate. In the final phase, flow would be diverted into the new channel. These activities would likely occur in each year during the work season over the life of the project.

The phasing of restoration activities in discrete segments of the stream would be planned to allow mitigation of sediment transport that may be caused by the work. Consideration in phasing would also be given to minimize the amount of stream area undergoing active disturbance at any one time.

Lehigh hopes to initiate construction at the start of the first work season following receipt of all authorizations. Construction activities would comply with all applicable local ordinances and would remain within the constraints established during the permitting and California Environmental Quality Act processes.

This page intentionally left blank.

3 ENVIRONMENTAL BASELINE CONDITIONS

Permanente Creek in the Action Area begins in the west at higher elevations. The creek flows easterly to lower elevations through a narrow corridor for approximately 3.25 miles, with the quarry to the north and steep mountain slopes (Exhibit 3) to the south, until it reaches Pond 13. In May 2015, portions of this area were observed to be dry (Exhibit 4). The creek then becomes more channelized (Exhibit 5) and flows through flatter terrain (Exhibit 6) for the remaining 1.15 miles until it exits the Action Area. Most of the wetland features mapped in the 662.4-acre Action Area are in the lower third of the drainage.

Source: Photograph taken by AECOM in May 2015

Exhibit 3. Permanente Creek Drainage Upstream of Pond 13

Plant community names present in the Action Area conform to *Preliminary Descriptions of the Terrestrial Natural Communities of California* (Holland 1986), where applicable. Community names from *A Manual of California Vegetation* (Sawyer et al. 2009) are provided in the text where applicable. Wetland community names conforming to *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin et al. 1979) are also given where appropriate. Vegetation communities identified in the Action Area consist primarily of upland mixed oak woodland and forest, ruderal grasslands, and a mix of native and nonnative trees composing a riparian corridor along Permanente Creek.

Source: Photograph taken by AECOM in May 2015

Exhibit 4. Permanente Creek Canyon and Drainage in Middle Reaches of the Action Area

Source: Photograph taken by AECOM in May 2015

Exhibit 5. Channelized Portion of Permanente Creek Immediately Downstream of Pond 13

Source: Photograph taken by AECOM in May 2015

Exhibit 6. Lower Elevation Reaches of Permanente Creek, East of Pond 9

3.1 UPLAND HABITATS

3.1.1 OAK WOODLANDS AND FOREST

Oak woodlands and forest habitats (including California bay forest) make up the majority of the Action Area, and generally occur on the north-facing slopes above the Permanente Creek riparian zone. However, a narrow band of this habitat type also is present on the south-facing slope, above the riparian zone and below the chamise scrub habitat. The dominant tree species in this community include coast live oak (*Quercus agrifolia*), California bay (*Umbellularia californica*), and tanoak (*Notholithocarpus densiflorus*). Shrubs are prevalent and include poison oak (*Toxicodendron diversilobum*), western raspberry (*Rubus leucodermis*), creeping snowberry (*Symphoricarpos mollis*), and ocean spray (*Holodiscus discolor*). Forbs generally are sparse because little light penetrates to the forest floor; however, hillside woodland star (*Lithophragma heterophyllum*) was observed blooming during the May 2015 field reconnaissance survey. Approximately 0.80 acre of oak woodland forest and California bay forest is subject to potential direct effects as part of the Project (see Table 5 in Section 5, "Potential Project Effects").

3.1.2 RIPARIAN FOREST

Riparian forest habitat in the Action Area is restricted to a narrow band along Permanente Creek that includes California buckeye woodland, white alder riparian forest, and willow riparian forest. Dominant vegetation in the riparian forest communities along Permanente Creek includes Goodding's willow (*Salix gooddingii*), red willow (*S. laevigata*), arroyo willow (*S. lasiolepis*), white alder (*Alnus rhombifolia*), big leaf maple (*Acer macrophyllum*), western creek dogwood (*Cornus sericea* ssp. *occidentalis*), and California buckeye (*Aesculus californica*). Stinging nettle (*Urtica diotica*) and poison oak are abundant close to the creek channel. False Solomon's seal

(*Maianthemum racemosum*) and sweet cicely (*Osmorhiza berteroi*) were observed scattered along the creek channel in upstream areas of Permanente Creek. Approximately 3.57 acres of riparian forest are subject to potential direct effects as part of the Project (see Table 5 in Section 5, "Potential Project Effects").

3.1.3 MIXED SCRUB AND CHAPARRAL

Mixed scrub and chaparral (including chamise chaparral, mixed scrub, northern mixed chaparral, oak chaparral, and poison oak scrub) habitats typically are present in the Action Area on the south-facing slopes. These habitats are dominated by species with thick, waxy leaves and include coyote brush (*Baccharis pilularis*), chamise (*Adenostoma fasciculatum*), California sagebrush (*Artemisia californica*), and white-leaf manzanita (*Arctostaphylos viscida*). Other species include California buckwheat (*Eriogonum fasciculatum*) and naked buckwheat (*E. nudum*). Approximately 0.12 acre of mixed scrub and chaparral is subject to potential direct effects as part of the Project (see Table 5 in Section 5, "Potential Project Effects").

3.1.4 RUDERAL GRASSLAND/DISTURBED AND NONNATIVE ANNUAL GRASSLAND

Small portions of the eastern part of the Action Area are previously disturbed and support primarily ruderal (disturbance-related) species and nonnative grasses. These species include wild oats (*Avena* spp.), ripgut brome (*Bromus diandrus*), soft chess (*B. hordeaceus*), Italian ryegrass (*Festuca perennis*), filaree (*Erodium botrys* and *E. cicutarium*), small fescue (*Festuca microstachys*), California poppy (*Eschscholzia californica*), bird vetch (*Vicia cracca*), and birdsfoot trefoil (*Lotus corniculatus*) (WRA 2011). Approximately 5.12 acres of ruderal grassland and disturbed areas are subject to potential direct effects as part of the Project (see Table 5 in Section 5, "Potential Project Effects").

3.1.5 ROCK OUTCROP AND ACTIVE QUARRY

A rock outcrop is located south of Permanente Creek and the active quarry pit. Approximately 12.81 acres of rock outcrop and active quarry are subject to potential direct effects as part of the Project (see Table 5 in Section 5, "Potential Project Effects").

3.2 AQUATIC HABITATS

3.2.1 PERENNIAL STREAMS

Perennial waterways in the Action Area consist of approximately 5 miles of Permanente Creek. The creek's headwaters are located approximately 0.6 mile west of the western boundary of the Action Area. Permanente Creek is located in the Santa Cruz Mountains, and steep slopes constrain the channel through much of the Action Area. In the western portion of the Action Area, the channel is relatively narrow as the channel flows east, then widens as ephemeral tributaries contribute flow to Permanente Creek. Historic quarry operations affected portions of Permanente Creek upstream of Pond 13. Downstream, the creek is affected by rock material (*e.g.*, riprap, concrete debris), an alluvial fan of gravel, artificial fill narrowing the channel for roads, etc. In addition, portions of the Permanente Creek were realigned into a straight channel or placed into underground culverts. The creek flows east for approximately 5 miles and then north for approximately 8 miles until it enters Mountain View Slough, which drains directly into the southern portion of San Francisco Bay. Approximately 1.44 acre of perennial stream is subject to potential direct effects as part of the Project (see Table 5 in Section 5, "Potential Project Effects").

3.2.2 EPHEMERAL STREAMS OR DRAINAGES

A total of 15 unnamed ephemeral drainages are present in the Action Area. All but two of these ephemeral drainages form outside of the Action Area, high in the surrounding mountains. Approximately 0.02 acre of ephemeral stream and drainage is subject to potential direct effects as part of the Project (Table 5).

3.2.3 OFF-CHANNEL SETTLING PONDS/SEDIMENTATION BASINS

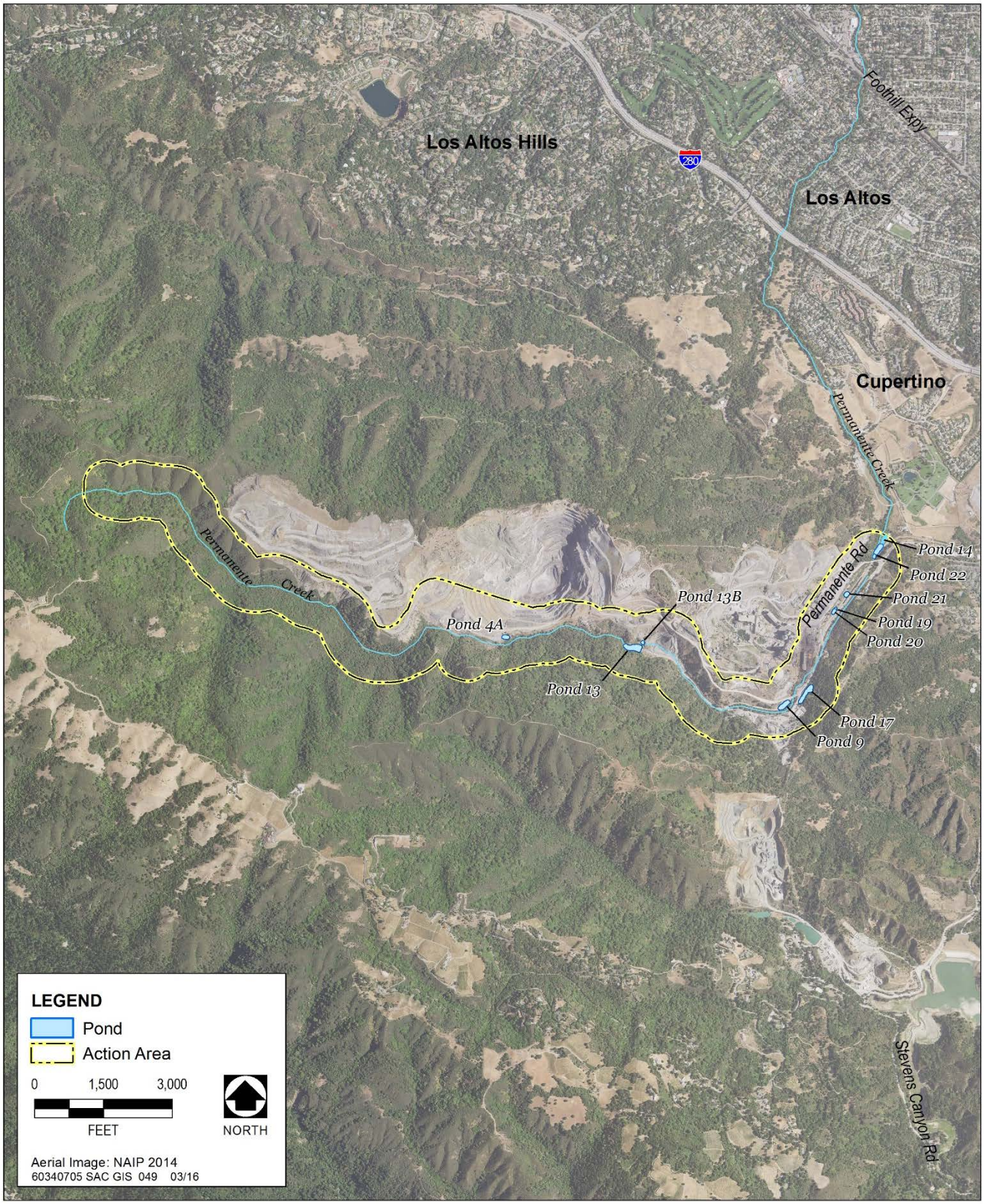
Several non-jurisdictional storm water sedimentation basins are present in the Action Area (Ponds 4A, 13B, 9, 17, 19, and 20). They were excavated in uplands and receive process water and storm water from the quarry pit (Pond 4A), or storm water from other areas of operations, to settle suspended solids. These ponds are actively managed as part of ongoing quarry operations. No settling ponds/sedimentation basins are subject to potential direct effects as part of the Project.

3.2.4 IN-STREAM/JURISDICTIONAL PONDS AND IMPOUNDMENTS

There are four in-stream or otherwise jurisdictional ponds or impoundments in the Action Area: Ponds 13, 14, 21, and 22 (Exhibit 7). A significant amount of riparian vegetation, including Gooding's black willow (*Salix gooddingii*), white alder (*Alnus rhombifolia*), and big leaf maple (*Acer macrophyllum*) is growing around the margins of the ponds. Dense growth of narrowleaf cattail (*Typha angustifolia*) surrounds Ponds 21 and 22. Approximately 0.50 acre of in-stream pond and impoundment is subject to potential direct effects as part of the Project (see Table 5 in Section 5, "Potential Project Effects").

3.2.5 WETLANDS AND MARSHES

Several wetlands and marshes are present in the Action Area. Most of the features are contiguous with Permanente Creek, but a few are connected via culvert. These wetlands are dominated by Pampas grass (*Cortaderia selloana*) and willow species, including arroyo willow (*Salix lasiolepis*), stinging nettle (*Urtica dioica*), mugwort (*Artemisia douglasiana*), water cress (*Nasturtium officinale*), and tall flat sedge (*Cyperus eragrostis*). Approximately 0.09 acre of wetland and marsh is subject to potential direct and indirect effects as part of the Project (see Table 5 in Section 5, "Potential Project Effects").



Source: AECOM 2015, adapted by GEI

Exhibit 7. Location of Ponds in Action Area

4 BASIC BIOLOGY, LIFE HISTORY, AND BASELINE FOR CALIFORNIA RED-LEGGED FROG

CRLF was federally listed as threatened in May 1996 (61 *Federal Register* [FR] 25813, May 23, 1996). Critical habitat has been designated for this species and is discussed in further detail below. The *Recovery Plan for the California Red-Legged Frog* was also developed for CRLF in September 2002 (USFWS 2002).

4.1 SPECIES DESCRIPTION

CRLF is the largest native frog in the western United States (Wright and Wright 1949). The abdomen and hind legs of adults are often a red or salmon color. The back of a CRLF is characterized by small black flecks and larger dark blotches with indistinct outlines on a brown, gray, olive, or reddish-brown background color (Stebbins 2003). Dorsolateral folds are prominent. Tadpoles range from 0.6 inch to 3.1 inches long, and a line of very small, gold-colored spots becomes the dorsolateral fold (USFWS 2002). Adults are highly aquatic and are most active at night (USFWS 2002). CRLF also uses terrestrial habitat, especially after precipitation events, for nonmigratory forays into adjacent upland habitats and migratory overland movements to breeding sites. Movement of up to 1 mile from breeding to aestivation sites is typical (Stebbins 2003); however, CRLF has been reported to travel up to 2 miles between habitats (Bulger et al. 2003).

Breeding typically begins between November and mid-December and continues through April in most years, but is dictated by winter rainfall (Jennings and Hayes 1994). At breeding sites, males call in groups of three to seven individuals to attract females (Jennings and Hayes 1994). During amplexus (breeding posture), eggs are fertilized by the male while the female deposits the egg mass (Jennings and Hayes 1994). Larvae typically hatch in 6–22 days, and metamorphosis is usually completed in 4–5 months (Jennings and Hayes 1994; Bobzien et al. 2000). Males and females usually attain sexual maturity at 2 years and 3 years, respectively (Jennings and Hayes 1994).

4.2 HABITAT REQUIREMENTS AND RANGE

The CRLF historically ranged from Redding and Marin County in the north, south to northern Baja California, Mexico, and essentially throughout lowland California (Jennings and Hayes 1994). Since then, its range has been reduced to mostly isolated drainages within the Coast Ranges and near-coastal foothills. The Service notes that although the CRLF once occupied 46 counties, it now is known from only 22, with the greatest concentrations in Monterey, San Luis Obispo, and Santa Barbara Counties (USFWS 2002).

Optimal habitat for CRLF includes ponds, stream courses, permanent pools, and intermittent streams fed by drainage areas no larger than 115 square miles (USFWS 2002). This species occurs at elevations between sea level and 5,000 feet (USFWS 2002). Typical habitat characteristics include water depth of at least 2.5 feet, largely intact emergent or shoreline vegetation, and absence of competitors/predators such as bullfrogs (*Rana catesbeiana*) and largemouth bass (*Micropterus salmoides*) (Hayes and Jennings 1988). CRLF uses a wide variety of habitats in the absence of optimal conditions, such as temporary pools and streams and stock ponds. However, permanent aquatic habitat is essential to the survival of local CRLF populations. CRLF is threatened by potential degradation and loss of its habitat from agriculture, urbanization, mining, overgrazing, recreation, timber harvesting, nonnative-plant invasions, impoundments, water diversions, degraded water quality, use of pesticides, and introduced predators (USFWS 2002).

4.3 POTENTIAL TO OCCUR IN THE ACTION AREA

CRLF is known to occur in the Action Area. This species has been documented during repeated focused surveys and habitat assessments conducted from 1997 to 2014, protocol-level surveys performed in 2006 and 2007 (Jennings 2006, 2007), and incidental observations while conducting surveys unrelated to CRLF. Incidental observations of presumed CRLF in Pond 22 occurred in 2000 during fish surveys (WRA 2011). CRLF was detected in 2006 and 2007 during the protocol-level surveys in in-stream or adjacent wetlands, at Ponds 14, 21 (adjacent wetlands), and 22, on the eastern edge of the Action Area. CRLF was observed in Pond 9 during an August 2014 pre-construction survey conducted in anticipation of potential vegetation and silt removal (vegetation and sediment removal ceased after this observation). Breeding has been documented in Permanente Creek in Ponds 14 and 21 (WRA 2011). Aquatic habitat for CRLF was delineated and characterized in wetland delineations conducted for the Project in 2008 (WRA 2008) and again in 2015 (AECOM 2015).

Suitable aquatic breeding habitat for CRLF is present in several of the ponds created as impoundments along Permanente Creek, as well as ponds and wetlands adjacent to the creek (Appendix C). Surface water was observed in all ponds during field surveys in May 2015. Pond 9 was previously used as a settling basin for localized storm water and now only receives upwelling groundwater contributions; Pond 9 has suitable aquatic habitat that could potentially support breeding CRLF. This pond is approximately 3 feet deep and has a thick layer of green algae coating the bottom surface. Dense growth of narrowleaf cattail surrounds Ponds 9, 14, and 21. Instead of cattail, common horsetail (*Equisetum arvense*) is the dominant emergent vegetation present at Pond 13, mostly upstream of the pond. Pond 13 itself has relatively steep, vegetated sides and a maximum depth of 5 feet. Ponds 9, 21, and 14 are cattail marshes with open water that is approximately 3–4 feet deep. CRLF has not been documented in Pond 13. Cattail vegetation is absent at Pond 22 and the typical vegetation there is riparian species such as black willow and white alder.

Upstream of these ponds, aquatic habitat is generally not present in Permanente Creek in the Action Area because of lack of deep pools. The stream corridor, however, could still function as upland and dispersal habitat. CRLF are unlikely to occur in heavily disturbed portions on the north side of Permanente Creek adjacent to the quarry because of lack of cover, exposure to predation, and frequent vehicle traffic.

4.4 CRITICAL HABITAT

Critical habitat was first designated for CRLF in April 2006 (71 FR 19244, April 13, 2006) and was revised in March 2010 (75 FR 12816, March 17, 2010). In designating critical habitat for CRLF, the Service evaluated the following specific primary constituent elements of habitat:

> **Aquatic breeding habitat**: Low-gradient freshwater habitats, such as pools and marshes that should hold water for a minimum of 20 weeks in most years and have salinity less than 7.0 parts per thousand.
>
> **Nonbreeding aquatic habitat**: This habitat that could be defined as aquatic breeding habitat and also includes intermittent creeks, seeps, or springs that could provide refuge or foraging habitat during drought periods.

Upland habitat: Terrestrial habitat within 200 feet of aquatic habitat and could include riparian, grassland, or woodland habitats. Upland habitat considered suitable includes features that provide refuge for the species, such as active mammal burrows.

Dispersal habitat: This habitat can be a variety of upland habitat types, provided that it is free of barriers such as highways. The Service considers 1 mile a dispersal distance that in most cases will provide for connectivity between breeding habitats and nonbreeding aquatic and upland habitats.

The Action Area does not include designated critical habitat for CRLF. The closest designated critical-habitat unit to the Action Area is SNM-2 in San Mateo County, approximately 1.5 miles southwest of the Action Area.

This page intentionally left blank.

5 POTENTIAL PROJECT EFFECTS

5.1 INTRODUCTION

This section discusses potential effects of Project construction and operation on federally listed species and any designated critical habitat(s) or EFH that may occur.

The 24.47-acre Designated Restoration Plan Area lies within the 662.4-acre Action Area, and encompasses the portion of upland and aquatic habitats in the Action Area where potential direct effects to listed species could occur from construction activities (see Exhibit 8). Construction and restoration activities within each designated phase of restoration would be completed within a single season. Completion of all restoration phases would require several seasons to complete. Potential effects on listed species that may occur in the Designated Restoration Plan Area are estimated based on the maximum acreages of suitable habitat that could be affected by Project construction and maintenance. Potentially suitable habitat is classified based on literature review, site surveys, and/or desktop research. Under the ESA, direct effects are those that would be caused by the Project and would occur at the same time as the action (e.g., construction-related effects). Indirect effects are those that would be caused by the Project later in time, but would be reasonably certain to occur (e.g., operational effects). Avoidance and minimization measures for both direct and indirect effects are presented in Section 6, "Avoidance and Minimization Measures."

5.2 DIRECT AND INDIRECT EFFECTS ON CALIFORNIA RED-LEGGED FROG IN THE ACTION AREA

5.2.1 DIRECT EFFECTS

CRLF is known to occur within the Action Area. Suitable aquatic habitat for this species is present in the Action Area, associated with cattail marsh and stock ponds at Ponds 9, 13, 14, 21, and 22. Breeding has been documented at Ponds 14 and 21. Pond 13 is the only pond located within the Designated Restoration Plan Area and would be the only pond directly affected by Project construction. Although the Project would result in a net benefit for CRLF by expanding the available aquatic and upland refugia habitat, occupied aquatic and associated upland refugia and movement corridors may be affected temporarily during construction. Table 5 provides a breakdown of this direct effect acreage by community.

Of the 24.47 acres subject to direct effects, (the Designated Restoration Plan Area), construction activities associated with the Project would affect up to 11.66 total acres of potential CRLF aquatic and upland habitat (Table 6). Of these 11.66 acres of direct effect, at least 11.16 acres would include temporary effects, and up to 0.5 acre of habitat at Pond 13 may be permanently altered at. To date, CRLF has not been documented within Pond 13 (WRA 2011). As described in Section 2.3.2, *Project Construction*, a pond may remain in this location if bedrock conditions allow the dam to be replaced with a boulder grade control structure. Alternatively, the dam would be removed permanently, and a new reach of the creek would be constructed at the location. Under the latter scenario, the 0.5-acre pond would be converted to stream channel and associated riparian upland habitat.

Table 5. Direct Effects by Community		
Vegetation Community	Acres	Temporary or Permanent
Oak woodlands and forest	0.30	Temporary
California bay forest	0.50	Temporary
White alder riparian	2.32	Temporary
Willow riparian forest and scrub	1.25	Temporary
Northern mixed chaparral	0.04	Temporary
Mixed scrub	0.03	Temporary
Poison oak scrub	0.05	Temporary
Disturbed	0.33	Temporary
Ruderal grassland	4.79	Temporary
Rock outcrop	0.07	Temporary
Active quarry	12.74	Temporary
Perennial streams	1.44	Temporary
Ephemeral streams/drainage	0.02	Temporary
Instream ponds and impoundments	0.50	Permanent
Wetlands and marshes	0.09	Temporary
Total	24.47	
Source: Data compiled by AECOM in 2015		

Table 6. Effects on Suitable California Red-Legged Frog Habitats		
	Acres of Directly Affected Suitable Habitat	Permanent or Temporary Effect
Aquatic habitat[1]	1.55	Temporary
Pond 13 (Conversion of pond habitat to stream channel and associated riparian upland habitat)	0.5	Permanent
Riparian forest and scrub, grassland, scrub/chaparral, disturbed, and oak woodland for upland refugia and dispersal habitat[2]	9.61	Temporary
Total	11.66	

Notes:

[1] Includes jurisdictional wetlands, potential waters of the United States, and sedimentation basin.

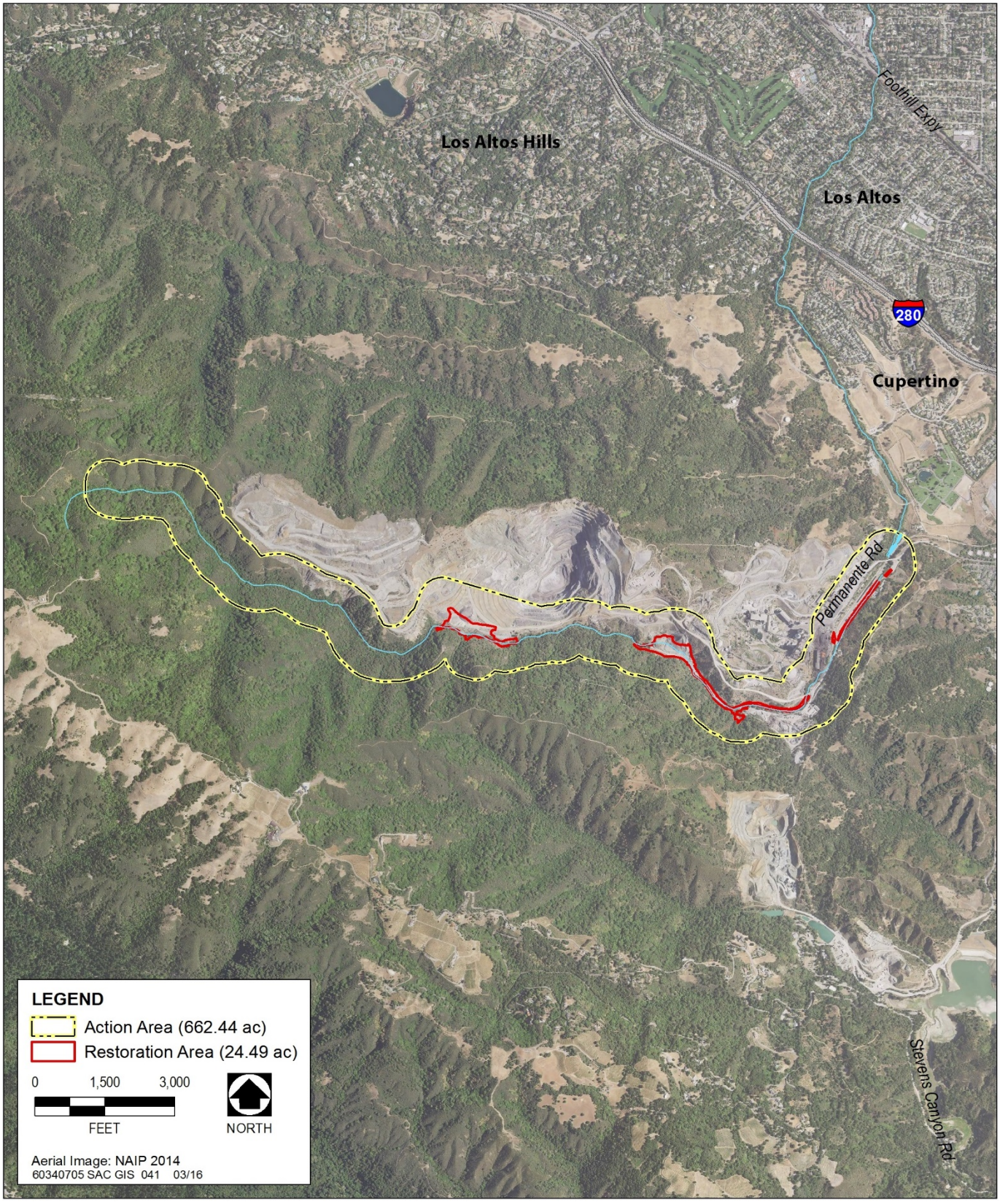
[2] All upland habitat within 200 feet of the area of direct disturbance was considered suitable for California red-legged frog with the exception of active quarry areas and rock outcrops.

Source: Data compiled by AECOM in 2015

Direct mortality of frogs may occur during ground disturbance activities in the suitable wetland and riparian woodland as a result of restoration activities or from being struck by construction vehicles in the construction or staging area. The Project would include activities in areas where CRLF has been documented. To avoid and minimize potential effects on CRLF, the Project would implement the conservation measures described in Section 6, "Avoidance and Minimization Measures."

5.2.2 INDIRECT EFFECTS

Potential indirect effects on CRLF include potential temporary degradation of water quality resulting from discharge of contaminants or sediment from construction, and alteration of the hydrology in Permanente Creek during creek restoration activities.



Source: AECOM 2015, adapted by GEI

Exhibit 8. Designated Restoration Plan Area

In addition, noise, visual disturbance, and vibrations from construction activity could cause CRLF individuals to vacate or avoid suitable habitat, potentially resulting in increased predation and stress associated with the temporary loss of movement and foraging habitat. In addition, increases in human concentrations and activity near suitable habitat may increase the number of native and nonnative predators attracted to trash or food left in the area. To avoid and minimize potential effects on CRLF, the Project would follow conservation measures, such as implementing standard best management practices for water quality, as described in Section 6.

5.3 EFFECTS ON CRITICAL HABITAT AND ESSENTIAL FISH HABITAT

5.3.1 CRITICAL HABITAT

Designated critical habitat for CRLF and Central California Coastal Steelhead are present near the Action Area. The nearest unit of CRLF critical habitat is approximately 2 miles to the southwest, but it is not hydrologically connected to the Action Area and would not be affected by the Proposed Action. Designated critical habitat for Central California Coastal Steelhead includes Stevens Creek, which is approximately 4 miles downstream of and hydrologically connected to the Action Area, via Permanente Creek and the Permanente Creek Diversion Channel. Because of the intermittent flows to Stevens Creek, and the distance downstream of Stevens Creek, it is very unlikely that any potential temporary increase in sedimentation or other adverse conditions that could result from the Proposed Action would extend to critical habitat in Stevens Creek. Therefore, no effect on designated critical habitat for CRLF or steelhead would occur.

5.3.2 ESSENTIAL FISH HABITAT

The Action Area is within the Coyote Creek U.S. Geologic Survey Hydrologic Unit, which is designated EFH for Chinook Salmon. Permanente Creek is currently inaccessible to salmon. Implementation of the proposed action would enhance habitat quality in Permanente Creek and would not diminish future potential to establish access to the creek for salmon. Therefore, no effect on salmon EFH would occur.

5.4 INTERRELATED AND INTERDEPENDENT ACTIONS

ESA Section 7(a)(2) requires agencies with regulatory authority over listed species to issue BOs, evaluating the direct and indirect effects of federal actions, and actions that are interrelated or interdependent with such actions. A BO must determine whether the actions being evaluated may appreciably reduce the listed species' likelihood of survival or recovery in the wild by reducing their productivity, numbers, or distribution.

No additional projects or actions associated with the Project analyzed in this BA are interrelated or interdependent on the Project. There are no related projects associated with the Project. The ongoing mining activities at the Lehigh site and the future reclamation of the mine and associated facilities are not dependent on the Project for their implementation or success.

5.5 CUMULATIVE EFFECTS

Cumulative effects on listed species and habitat include the effects of pending, and future state, tribal, local, or private actions that are reasonably certain to occur in the Action Area under consideration. The effects of projects that require a federal action are not considered in the cumulative-effects evaluation during Section 7 consultation evaluations because they are subject to separate consultation (USFWS and NMFS 1998). Also, the nonfederal

action must be located in the Action Area, or project site, that is evaluated in the Section 7 consultation process (USFWS and NMFS 1998).

No other projects are expected to occur in the Action Area as defined by this Project. Lehigh will continue implementing the approved off-channel reclamation plan for the existing quarry and surrounding areas, and the work described herein is expected to satisfy creek restoration obligations, of that reclamation plan.. Therefore, implementation of the reclamation plan is exempted from the cumulative impact analysis for this Project.

In addition, the stream restoration project is expected to result in improvement to and expansion of existing aquatic and upland habitat upon Project completion. Therefore, the Project is not expected to result in a cumulative effect on CRLF or its habitat. The Action Area does not contain designated critical habitat for CRLF; therefore, critical habitat would not be subject to cumulative effects from the Project.

This page intentionally left blank.

6 AVOIDANCE AND MINIMIZATION MEASURES

This section describes avoidance and minimization and habitat conservation measures that would be incorporated as part of the Project. The measures described in this section are proposed in part to avoid and minimize effects on the federally listed species (i.e., CRLF) that may occur in the Action Area.

6.1 STANDARD ENVIRONMENTAL COMMITMENTS

Lehigh would implement standard environmental protection measures (environmental commitments) during construction to minimize environmental effects and disruption of surrounding areas. These commitments include those required by State of California regulations as well as county ordinances. This would include completing stormwater permitting, and preparing and implementing a SWPPP as required by the San Francisco Bay RWQCB to minimize erosion and potential impacts on downstream water quality. The SWPPP would outline stormwater best management practices, such as placing sandbags around stormwater catch basins, silt fences around disturbed areas, and covers on excavated soil piles, and spraying disturbed areas using water trucks to minimize fugitive dust and dirt emissions. The Project would comply with city ordinances related to noise generation, traffic control, public notices, protection of historical resources, and protection of existing vegetation. The Project also would comply with state and local requirements to characterize and dispose of hazardous materials and recycle solid waste.

6.2 COMPLIANCE WITH PERMIT TERMS AND CONDITIONS

Lehigh would require its contractors and suppliers, its general contractor, and all of the general contractor's subcontractors and suppliers to comply with all terms and conditions of all required Project permits, approvals, and conditions. Lehigh ultimately would be responsible for the actions of its contractors regarding compliance with permit conditions.

Before the start of any ground-disturbing activity associated with construction of any Project feature that would affect waters of the United States, including wetlands, or waters of the state, Lehigh would obtain all necessary permits for the Project under Sections 404 and 401 of the Clean Water Act or the state's Porter-Cologne Water Quality Control Act.

All permits, regulatory approvals, and permit conditions for effects on wetland habitats would be secured before implementation of any grading activities in waters of the United States or wetland habitats, including waters of the state. Lehigh would commit to replacing, restoring, or enhancing on a "no net loss" basis (in accordance with USACE and the San Francisco Bay RWQCB) the acreage of all wetlands and other waters of the United States, if any, that would be removed, lost, and/or degraded with Project implementation.

Wetland habitat would be restored, enhanced, and/or replaced at an acreage and location and by methods agreeable to USACE and the San Francisco Bay RWQCB, as determined during the Section 404 and Section 401 permitting processes. Final mitigation ratios would be determined during the permitting process. All mitigation requirements determined through this process would be implemented before grading plans are approved.

Water quality certification pursuant to Section 401 of the Clean Water Act is required before issuance of the record of decision and a Section 404 permit. Before construction in any areas containing wetland features, Lehigh

would obtain water quality certification for the Project. Any measures required as part of the issuance of water quality certification would be implemented.

6.3 SPECIES-SPECIFIC AVOIDANCE AND MINIMIZATION AND HABITAT CONSERVATION MEASURES

Applicable avoidance and minimization measures from the 2014 Programmatic Biological Opinion for Section 404 Permits potentially affecting CRLF (USFWS 2014) were included in this biological assessment. The following conservation measures would be implemented before and during Project construction:

a) Prepare a Wetland Mitigation Plan. A qualified wetland biologist will prepare a wetland mitigation and monitoring plan (MMP) for impacts on wetlands and waters under state or federal jurisdiction. The MMP will outline the anticipated mitigation obligations for temporary and permanent impacts on waters of the United States, including wetlands, resulting from Project-related activities. The wetland MMP will include the following elements:

- Baseline information.
- Anticipated habitat enhancements to be achieved through onsite restoration actions.
- When possible, a preference for mitigation within the Permanente Quarry property, for impacts on both jurisdictional waters and wetlands.
- Performance and success criteria for habitat enhancement of Permanente Creek and adjacent features to compensate for impacts on other waters, including:
  - a replanting plan for appropriate native riparian woody vegetation;
  - an 80% overall revegetation planting success rate for mitigation areas over a 10-year period;
  - a minimum overall mitigation ratio of 1.1:1 acres for permanent impacts and 1:1 acres for temporary impacts;
  - plantings that are self-reliant, exhibit average or better health and vigor, and have observable growth in stems and leaves at least 2 years before the end of the 10-year monitoring period;
  - visual inspection of all revegetation sites during each growing season, with qualitative and quantitative measures of plant cover and performance;
  - observations of total percent plant cover in the planting area, natural recruitment of native species, and establishment of new nonnative species; and
  - annual monitoring reports submitted to the California Department of Fish and Wildlife and the San Francisco Bay RWQCB documenting revegetation conditions, including recommendations to adapt maintenance and replacement of failed plantings.

- Performance and success criteria for wetland creation or enhancement, including but not limited to the following:

  - At least 70% survival of installed plants for each of the first 3 years following planting.

  - Performance criteria for vegetation percent cover in years 1–4 as follows: at least 10% cover of installed plants in year 1; at least 20% cover in year 2; at least 30% cover in year 3; and at least 40% cover in year 4.

  - Performance criteria for hydrology in Years 1–5 as follows: 14 or more consecutive days of flooding, ponding, or a water table 12 inches or less below the soil surface during the growing season at a minimum frequency of 3 of the 5 monitoring years OR establishment of a prevalence of wetland obligate plant species.

  - Limitations on relative cover contributed by invasive plant species that can threaten the success of created or enhanced wetlands, as follows: no greater than 35% in year 1, 20% in years 2 and 3, 15% in year 4, and 10% in year 5.

  - Supplemental water provided by a water truck for the first 2 years following installation, if necessary. Any supplemental water must be removed or turned off for a minimum of 2 consecutive years before the end of the monitoring period, and the wetland must meet all other criteria during this period. At the end of the 5-year monitoring period, the wetland must be self-sufficient and capable of persistence without supplemental water.

  - At least 75 percent cover by hydrophytic vegetation at the end of the 5-year monitoring period. In addition, wetland hydrology and hydric soils as defined by the USACE (2008) must be present and defined as follows:

    - *Hydrophytic vegetation:* A plant community occurring in areas where the frequency and duration of inundation or soil saturation produce permanently or periodically saturated soils of sufficient duration to exert a controlling influence on the plant species present.

    - *Wetland hydrology:* Identified by indicators such as sediment deposits, water stains on vegetation, and oxidized rhizospheres along living roots in the upper 12 inches of the soil, or satisfaction of the hydrology performance criteria listed above.

    - *Hydric soils:* Soils that are saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions, which often are characterized by features such as redox concentrations that form by the reduction, translocation, and/or oxidation of iron and manganese oxides. Hydric soils may lack hydric indicators for a number of reasons. In such cases, the same standard used to determine wetland hydrology (when indicators are lacking) can be used.

  - 5 years after any wetland creation, performance of a wetland delineation to determine whether created wetlands are developing as planned. If they are not, remedial measures will be taken to meet the mitigation measure's performance standard.

- Monitoring and reporting requirements.

  - The wetland MMP also will include conceptual site-specific plans to compensate for wetland losses resulting from the Project and the USACE Section 404 permit terms. These may include but are not limited to the provision of on-site mitigation through wetland creation or enhancement of existing jurisdictional features; additional on-site wetland creation or enhancement; or off-site mitigation.

b) **Implement Riparian Mitigation.** The purpose of the Project is to restore wetland and riparian habitat along Permanente Creek. Stream restoration activities include hand planting of woody riparian vegetation, as well as seeding for understory riparian vegetation. Replacement and restoration plantings will restore and expand existing riparian habitat along Permanente Creek. The restoration and planting will be consistent with the revegetation plan prepared as part of the Amended Consent Decree with the Sierra Club and the approved *Reclamation Plan for Permanente Quarry* (WRA 2011), and the adopted mitigation monitoring and reporting program (Santa Clara County 2011). The 5-year performance standards identified in the revegetation plan include:

- species richness of two tree or shrub species per plot,
- 45 percent canopy cover,
- an average density of 200 plantings per acre, and
- 60 percent survival of plantings.

c) **Manage Wildlife Passage during Construction.** Wherever possible, Lehigh will enhance or construct wildlife passage for CRLF across access roads during construction. Accommodations will be made for terrestrial wildlife movement through existing culverts that convey hydrology.

d) **Designate a Point of Contact.** USACE will ensure that Lehigh implements the conservation measures of the BO and that Lehigh designates a point of contact for all inquiries for the duration of the construction period. The name and contact information will be provided to the Service no more than 30 calendar days before the date of initial ground disturbance. At least 14 calendar days before the date of initial ground disturbance, USACE will ensure that Lehigh submits a signed letter to the Service verifying they possess a copy of the BO and have read and fully understand their responsibilities.

e) **Allow Site Access to Agencies.** Lehigh will ensure that the Service, California Department of Fish and Wildlife, and/or their designated agents can immediately and without delay, access and inspect the Project site for compliance with the Project description, conservation measures, and reasonable and prudent measures included in the BO and evaluate Project effects on CRLF and its habitat.

f) **Implement a Worker Environmental Awareness Program.** The Service-approved biologist will conduct employee education training for employees working on earthmoving and/or construction activities. Personnel will be required to attend the presentation, which will describe the CRLF; avoidance, minimization, and conservation measures; legal protection of CRLF; and other related issues. Each attendee will sign an attendance sheet that includes his or her printed name, company or

agency, e-mail address, and telephone number. The sign-in sheet will be sent to the Service within 7 calendar days of the completion of the training.

g) **Minimize the Work Area.** Lehigh will limit the number of access routes, construction areas, equipment staging, storage, parking, and stockpile areas to the maximum extent possible. All Project-related traffic will be restricted to established roads, construction areas, equipment staging, storage, parking, and stockpile areas. These areas will be included in any preconstruction surveys and, to the maximum extent possible, established in previously disturbed locations.

h) **Enforce Seasonal Work Restrictions.** To the extent practicable, construction in the Permanente Creek channel and suitable pond habitats will be conducted during the dry summer months, between June 15 and October 15, to minimize potential impacts on moving or breeding CRLF.

i) **Post and Observe Construction Speed Limits.** A 10-mile-per-hour speed limit will be posted by Lehigh or its representatives at all construction locations except on roads with a posted speed limit. This speed limit will be observed by all Project personnel. On roads with posted speed limits, construction-related vehicles will observe the minimum safe speed.

j) **Conduct CRLF Preconstruction Surveys and Relocate Individuals.** Preconstruction surveys for CRLF will be conducted within 24 hours before the start of initial ground disturbance. The preconstruction surveys will be conducted by a qualified biologist, who will be preapproved by the Service and experienced in identifying CRLF. The biologist will consult with the Service before conducting the preconstruction surveys to coordinate on methodology for movement of CRLF individuals found in the work area. If CRLF are observed, a Service-permitted biologist will remove them from the construction site and temporarily relocate them to nearby suitable aquatic habitat.

   The Service-approved biologist will limit the duration of the handling and captivity of the CRLF to the minimum amount of time necessary to complete the task. If the animal must be held in captivity, it will be kept in a cool, dark, moist, aerated environment, such as a clean and disinfected bucket or plastic container with a damp sponge. The holding container will not contain any standing water.

   Lehigh will immediately notify the Service once the CRLF and the site are secure.

k) **Enforce a Litter Control Program.** A litter control program will be instituted at the Project site. All workers will ensure that their food scraps, paper wrappers, food containers, cans, bottles, and other trash are deposited in covered or closed trash containers. The trash containers will be removed from the Project site each working day.

l) **Restrict Pets and Firearms.** No pets will be permitted at the Project site. No firearms will be allowed at the Project site with the exception of those carried by authorized security personnel or local, state, or federal law enforcement officials.

m) **Stop Work during Rain Events.** To the maximum extent practicable, no construction activities will occur during rain events or within 24 hours following a rain event. A Service-approved biologist will inspect the construction area and all equipment/materials for the presence of CRLF before the resumption of construction activities after rain events. Any CRLF found in the construction area will be avoided and allowed to leave on its own or removed as agreed to under the Service-approved CRLF relocation methodology.

n) **Minimize or Avoid Nighttime Construction.** To the maximum extent practicable, nighttime construction will be minimized or avoided.

o) **Avoid Use of Woven Netting in Erosion Control Measures.** Plastic monofilament netting, loosely woven netting, or similar materials will not be used at the Project site because CRLF can become entangled in this material. Materials using fixed weaves, polypropylene, polymer, or other synthetic materials will not be used. Any materials found on-site will be immediately removed by Lehigh or its designated representatives.

p) **Control Dust.** If necessary, dust control measures will be implemented during construction. These measures will include regular truck watering of construction access areas and disturbed soil areas with water or organic soil stabilizers. Watering guidelines will be established to avoid excessive runoff into potential aquatic habitat for CRLF.

q) **Cover Trenches.** Trenches or pits 1 foot or deeper that will be left unfilled for more than 48 hours will be securely covered with boards or other materials to prevent CRLF from falling into them. If this is not possible, Lehigh will ensure that wooden ramps or other structures of suitable surface that provide adequate footing for CRLF are placed in the trench or pit to allow for their unaided escape. The trench, pit, or hole will be inspected by the Service-approved biologist each workday morning at least 1 hour before the initiation of work and in the late afternoon no more than 1 hour after work has ceased to ascertain whether any individuals have become trapped. If the ramps fail to allow the animal to escape, the Service-approved biologist will remove the CRLF and transport it to a safe location.

r) **Monitor Construction within Aquatic Habitats.** To minimize disturbance on CRLF, any restoration or grading within suitable aquatic habitat will be conducted under the supervision of a Service-approved biologist and first cleared of any CRLF by transferring them to suitable habitat where construction is not occurring, as agreed to by the Service. Before the initial ground disturbance, Lehigh will obtain approval of the relocation protocol from the Service in the event that a CRLF is encountered and needs to be moved away from the Project site.

   The construction site will be checked at the beginning of each day to confirm that CRLF have not reentered the site. CRLF that reenter the Project site will be relocated as designated by the Service.

s) **Provide Stop-Work Authority.** The Service-approved biologist will have oversight over implementation of all the conservation measures and have the authority and responsibility to stop Project activities if the biologist determines that any of the environmental requirements are not being fulfilled.

t) **Implement Dewatering Protocols.** If the work site is to be temporarily dewatered by pumping, intakes will be completely screened with wire mesh not larger than 5 millimeters to prevent CRLF from entering the pump system. Water will be released or pumped downstream at an appropriate rate to maintain downstream flows during construction. Upon completion of construction activities, any barriers to flow will be removed in a manner that will allow flow to resume with the least disturbance to the substrate.

u) **Remove Exotic Species.** The Service-approved biologist will permanently remove any aquatic exotic wildlife species such as bullfrogs and crayfish to the maximum extent possible during construction activities.

v) **Notify the Service If Take Occurs.** USACE will ensure that Lehigh reports any information to the Service about take or suspected take of listed wildlife species not exempted by the BO for the project. The Service will be notified via electronic mail and telephone within 24 hours from the time the information is received by Lehigh. Notification will include the species, number of individuals, sex (if known), date, time, location of the incident or of the finding of a dead or injured animal, how the individual was taken, photographs of the species animal, and names of persons who observed the take and/or found the animal. The individual animal will be preserved, as appropriate, and held in a secure location until instructions are received from the Service regarding the disposition of the specimen or until the Service takes custody of the specimen.

This page intentionally left blank.

7 CONCLUSIONS

Based on the biology and ecology of the federally listed species with the potential to occur in the Action Area, on the environmental baseline for the Action Area, and on the potential effects of the Project, implementing the Project may affect, and is likely adversely affect CRLF. The Project would have no effect on designated critical habitat or EFH.

California Red-Legged Frog: The Project may affect, and is likely to adversely affect CRLF through potential loss of individuals and disturbance of individuals or their habitat. However, with the exception of potential conversion of Pond 13 to stream channel and associated riparian habitat, these effects are expected to be localized and temporary. CRLF has not been documented within Pond 13, and conversion of this pond to other suitable CRLF habitat is not expected to result in loss of occupied aquatic habitat in the Action Area. Relatively few CRLF individuals would be affected given the quality of habitat on the site and the limited extent of the Project, both spatially and temporally. Furthermore, the restoration of Permanente Creek would result in a net long-term benefit to the species by increasing aquatic and upland habitat for CRLF. The Project would not jeopardize the continued existence of this species based on the limited effects of the Project and the limited local population size of CRLF in the Action Area. The Project is expected to result in increased carrying capacity for CRLF in the Action Area upon Project completion and therefore provide a net benefit to local CRLF populations.

Critical Habitat: The project would have no effect on designated critical habitat. The nearest unit of CRLF critical habitat is approximately 2 miles southwest of and is not hydrologically connected the Action Area. The Action Area is approximately 4 miles upstream of critical habitat for Central California Coastal Steelhead, and Project implementation is very unlikely to increase sedimentation or result in other adverse effects to this habitat.

Essential Fish Habitat: The project would have no effect on EFH for Chinook Salmon. Implementation of the proposed action would enhance habitat quality in Permanente Creek and would not diminish potential to establish access to the creek for salmon if the Permanente Creek Diversion Channel is altered as part of a future unrelated action.

This page intentionally left blank.

8 REFERENCES

AECOM. 2015 (July). *Preliminary Delineation of Waters of the United States, Including Wetlands: Lehigh Hanson Permanente Creek Restoration Project*. Sacramento, CA.

Bobzien, S., J. E. DiDonato, and P. J. Alexander. 2000. *Status of the California Red-Legged Frog in the East Bay Regional Park District*. Oakland, CA.

Bulger, J. B., N. J. Scott, and R. B. Seymour. 2003. Terrestrial Activity and Conservation of Adult California Red-Legged Frogs *Rana aurora draytonii* in Coastal Forests and Grasslands. *Biological Conservation* 110:85–95.

Cowardin, L. M., V. Carter, F. C. Golet, and E. T. LaRoe. 1979. *Classification of Wetlands and Deepwater Habitats of the United States*. Washington, DC: U.S. Fish and Wildlife Service.

Hayes, M. P., and M. R. Jennings. 1988. Habitat Correlates of Distribution of the California Red-Legged Frog (*Rana aurora draytonii*) and the Foothill Yellow-Legged Frog (*Rana boylii*): Implications for Management. In *Proceedings of the Symposium on the Management of Amphibians, Reptiles, and Small Mammals in North America*, tech. coords. R. C. Szaro, K. E. Severson, and D. R. Patton, 144–158. U.S. Forest Service General Technical Report RM-166.

Holland, R. 1986. *Preliminary Descriptions of the Terrestrial Natural Communities of California*. Sacramento: California Department of Fish and Game.

Jennings, M. R. 2006. *California Red-Legged Frog (*Rana draytonii*) Surveys at the Hanson Permanente Cement Facility, Cupertino, California*. Davis, CA: Rana Resources.

———. 2007. *California Red-Legged Frog (*Rana draytonii*) Surveys at the Hanson Permanente Cement Facility, Cupertino, California*. Davis, CA: Rana Resources.

Jennings, M. R., and M. P. Hayes. 1994. *Amphibian and Reptile Species of Special Concern in California*. Final report to the California Department of Fish and Game, Inland Fisheries Division, Rancho Cordova, CA.

Santa Clara County. 2011. *Draft Environmental Impact Report for the Permanente Quarry Reclamation Plan Amendment*. San Jose, CA.

Sawyer, J. O., T. Keeler-Wolf, and J. M. Evens. 2009. *A Manual of California Vegetation*. Second edition. Sacramento: California Native Plant Society.

Stebbins 2003. *Western Reptiles and Amphibians* Third EditionHoughton Mifflin Company. Houston.

USACE. *See* U.S. Army Corps of Engineers.

U.S. Army Corps of Engineers. 2008. *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0)*. September 2008

U.S. Fish and Wildlife Service. 2002. *Recovery Plan for the California Red-Legged Frog (*Rana aurora draytonii*)*. Portland, OR.

U.S. Fish and Wildlife Service. 2014. Programmatic Biological Opinion for Issuance of Permits under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act, including Authorizations Under 22 Nationwide Permits, for Projects that May Affect the Threatened California Red-Legged Frog in Nine San Francisco Bay Area Counties, California.

U.S. Fish and Wildlife Service and National Marine Fisheries Service. 1998. *Endangered Species Consultation Handbook: Procedures for Conducting Consultation and Conference Activities Under Section 7 of the Endangered Species Act*. March 1998.

USFWS. *See* U.S. Fish and Wildlife Service.

USFWS and NMFS. *See* U.S. Fish and Wildlife Service and National Marine Fisheries Service.

Wright, A. H., and A. A. Wright. 1949. *Handbook of Frogs and Toads of the United States and Canada.* Ithaca, NY: Comstock Publishing Company, Inc.

WRA, Inc. 2008 (January). *Delineation of Potential Clean Water Act Section 404 Jurisdictional Wetlands and Waters, Lehigh Permanente Quarry, Santa Clara County, California*. Prepared for Lehigh Southwest Cement Company.

———. 2011 (December). *Biological Resources Assessment of the Lehigh Permanente Quarry Santa Clara County, California*. San Rafael, CA.

9 LIST OF PREPARERS

Eric Htain, senior regulatory specialist/biologist, GEI

Anne King, senior wildlife biologist, GEI

David Bise, senior wildlife biologist, AECOM

Tracy Walker, wildlife biologist, AECOM

This page intentionally left blank.

APPENDIX A

U.S. Fish and Wildlife Service Species List

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Sacramento Fish and Wildlife Office
FEDERAL BUILDING, 2800 COTTAGE WAY, ROOM W-2605
SACRAMENTO, CA 95825
PHONE: (916)414-6600 FAX: (916)414-6713

Consultation Code: 08ESMF00-2016-SLI-1351 April 26, 2016
Event Code: 08ESMF00-2016-E-02936
Project Name: Permanente Creek Restoration Project

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, under the jurisdiction of the U.S. Fish and Wildlife Service (Service) that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the Service under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

Please follow the link below to see if your proposed project has the potential to affect other species or their habitats under the jurisdiction of the National Marine Fisheries Service:

http://www.nwr.noaa.gov/protected_species/species_list/species_lists.html

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2)

of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq.*), and projects affecting these species may require development of an eagle conservation plan (http://www.fws.gov/windenergy/eagle_guidance.html). Additionally, wind energy projects should follow the wind energy guidelines (http://www.fws.gov/windenergy/) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm; http://www.towerkill.com; and http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment

United States Department of Interior
Fish and Wildlife Service

Project name: Permanente Creek Restoration Project

Official Species List

Provided by:

Sacramento Fish and Wildlife Office
FEDERAL BUILDING
2800 COTTAGE WAY, ROOM W-2605
SACRAMENTO, CA 95825
(916) 414-6600

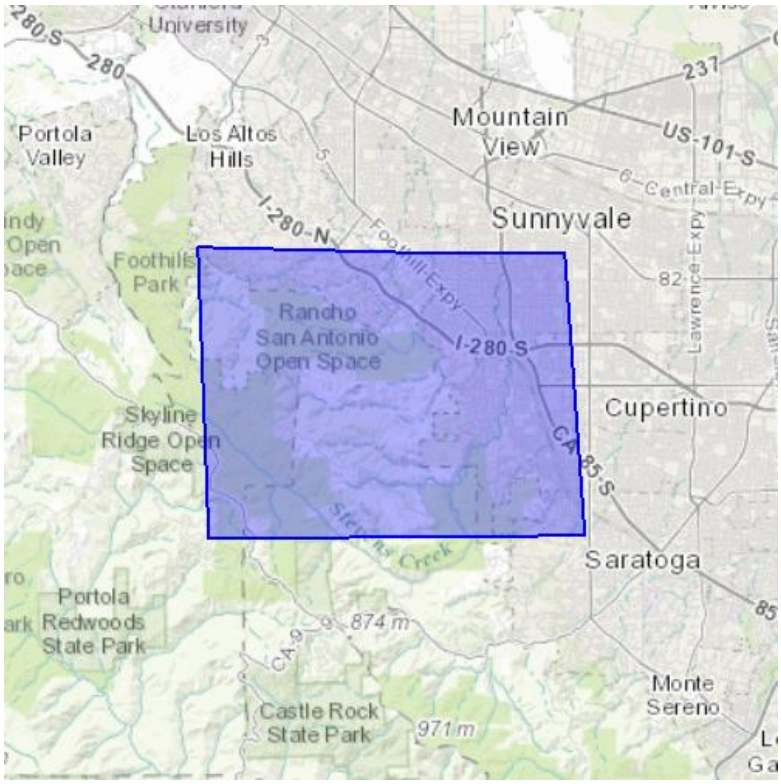
Consultation Code: 08ESMF00-2016-SLI-1351
Event Code: 08ESMF00-2016-E-02936

Project Type: ** OTHER **

Project Name: Permanente Creek Restoration Project

Please Note: The FWS office may have modified the Project Name and/or Project Description, so it may be different from what was submitted in your previous request. If the Consultation Code matches, the FWS considers this to be the same project. Contact the office in the 'Provided by' section of your previous Official Species list if you have any questions or concerns.

Project Location Map:



Project Coordinates: MULTIPOLYGON (((-122.16865539550781 37.36142550190517, -122.16487884521483 37.280882458555325, -122.03407287597655 37.28170197474228, -122.04093933105469 37.359788198380755, -122.08419799804689 37.359788198380755, -122.16865539550781 37.36142550190517)))

Project Counties: San Mateo, CA | Santa Clara, CA | Santa Cruz, CA

Endangered Species Act Species List

There are a total of 12 threatened or endangered species on your species list. Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. Critical habitats listed under the **Has Critical Habitat** column may or may not lie within your project area. See the **Critical habitats within your project area** section further below for critical habitat that lies within your project. Please contact the designated FWS office if you have questions.

Amphibians	**Status**	**Has Critical Habitat**	**Condition(s)**
California red-legged frog *(Rana draytonii)* Population: Entire	Threatened	Final designated	
California tiger Salamander *(Ambystoma californiense)* Population: U.S.A. (Central CA DPS)	Threatened	Final designated	
Birds			
California Clapper rail *(Rallus longirostris obsoletus)* Population: Entire	Endangered		
California Least tern *(Sterna antillarum browni)*	Endangered		
Marbled murrelet *(Brachyramphus marmoratus)* Population: CA, OR, WA	Threatened	Final designated	
Fishes			
Delta smelt *(Hypomesus transpacificus)*	Threatened	Final designated	

Population: Entire			
steelhead *(Oncorhynchus (=salmo) mykiss)* Population: Northern California DPS	Threatened	Final designated	
Tidewater goby *(Eucyclogobius newberryi)* Population: Entire	Endangered	Final designated	
Flowering Plants			
San Mateo Woolly sunflower *(Eriophyllum latilobum)*	Endangered		
Insects			
Bay Checkerspot butterfly *(Euphydryas editha bayensis)* Population: Entire	Threatened	Final designated	
San Bruno Elfin butterfly *(Callophrys mossii bayensis)* Population: Entire	Endangered		
Reptiles			
San Francisco Garter snake *(Thamnophis sirtalis tetrataenia)* Population: Entire	Endangered		

Critical habitats that lie within your project area

The following critical habitats lie fully or partially within your project area.

Amphibians	Critical Habitat Type
California red-legged frog *(Rana draytonii)* Population: Entire	Final designated

APPENDIX B

Project Design Drawings

PERMANENTE CREEK RESTORATION PLAN

DRAFT
70% DESIGN SUBMITTAL

SHEET INDEX

C1	COVER SHEET
C2	OVERVIEW
C3	EXISTING CHANNEL PROFILE
C4	SHEET LAYOUT OVERVIEW
C5	CONCRETE CHANNEL SOUTHERN BANK PLANTING PLAN
C6	CHANNEL WIDENING PLAN (1 OF 5)
C7	CHANNEL WIDENING PLAN (2 OF 5)
C8	CHANNEL WIDENING PLAN (3 OF 5)
C9	SEDIMENT REMOVAL AREA AND CULVERT #8 PLAN
C10	CULVERT #8 PROFILE AND SECTION
C11	SEDIMENT REMOVAL AREA PROFILE AND SECTIONS
C12	CHANNEL WIDENING PLAN (4 OF 5)
C13	CHANNEL WIDENING PLAN (5 OF 5)
C14	ROCK PILE AREA PLAN
C15	ROCK PILE AREA SECTIONS
C16	MATERIAL REMOVAL AREA PLAN (1 OF 2)
C17	MATERIAL REMOVAL AREA PLAN (2 OF 2)
C18	MATERIAL REMOVAL AREA SECTIONS (1 OF 2)
C19	MATERIAL REMOVAL AREA SECTIONS (2 OF 2)
C20	ACCESS AND STAGING PLAN (1 OF 2)
C21	ACCESS AND STAGING PLAN (2 OF 2)
C22	DEWATERING DETAILS
C23	MISCELLANEOUS DETAILS
C24	HABITAT LOG DETAILS AND ROCK SPECIFICATIONS
C25	NOTES
L1	RIPARIAN PLANTING SECTIONS (1 OF 3)
L2	RIPARIAN PLANTING SECTIONS (2 OF 3)
L3	RIPARIAN PLANTING SECTIONS (3 OF 3)

VICINITY MAP
N.T.S. (GOOGLE)

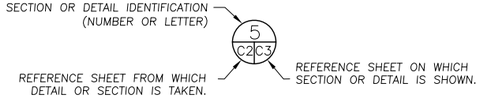
GENERAL NOTES

1. TOPOGRAPHIC MAPPING WAS PERFORMED BY:
   WATERWAYS CONSULTING, INC.
   509 SWIFT STREET, UNIT A
   SANTA CRUZ, CA 95060
   SURVEY DATES; JUNE THROUGH AUGUST 2013, FEBRUARY THROUGH MAY 2014, MARCH 2015.
2. ELEVATION DATUM: NAVD88 BASED ON A FIELD TIE TO SANTA CLARA VALLEY WATER DISTRICT BENCHMARK ID: BM198 WITH AN ELEVATION OF 478.22'.
3. HORIZONTAL DATUM: NAD83 CALIFORNIA STATE PLANE, ZONE 3.
4. AERIAL PHOTO SOURCE:
   AERIAL PHOTOMAPPING SERVICES
   2929 LARKIN AVENUE
   CLOVIS, CA 93612
   PHOTOGRAPH DATE: JUNE 20, 2013
5. ELEVATIONS AND DISTANCES SHOWN ARE IN FEET AND DECIMALS THEREOF. CONTOUR INTERVAL IS 1 FOOT.
6. THIS IS NOT A BOUNDARY SURVEY. PROPERTY LINES, IF SHOWN, WERE COMPILED FROM RECORD INFORMATION AND FROM FIELD TIES TO EXISTING BOUNDARY MONUMENTATION. THE LOCATION OF THESE LINES IS SUBJECT TO CHANGE, PENDING THE RESULTS OF A COMPLETE BOUNDARY SURVEY.
7. TREE DIMENSIONS: TRUNK DIAMETERS SHOWN REPRESENT DIAMETER AT BREAST HEIGHT (DBH), MEASURED IN INCHES. DBH IS MEASURED 4.5 FT ABOVE GROUND FOR SINGLE TRUNKS AND TRUNKS THAT SPLIT INTO SEVERAL STEMS CLOSE TO THE GROUND. EACH TRUNK IS SHOWN AT MULTI-STEM TREES. ONLY THE LABEL OF THE DBH OF THE LARGEST TRUNK IS SHOWN FOR DRAWING CLARITY. WHERE TREES FORK NEAR BREAST HEIGHT, TRUNK DIAMETER IS MEASURED AT THE NARROWEST PART OF THE MAIN STEM BELOW THE FORK. FOR TREES ON A SLOPE, BREAST HEIGHT IS REFERENCED FROM THE UPPER SIDE OF THE SLOPE. FOR LEANING TREES, BREAST HEIGHT IS MEASURED ON THE SIDE THAT THE TREE LEANS TOWARD. TREES WITH DBH LESS THAN 8" ARE TYPICALLY NOT SHOWN.

   12"P = 12" DBH PINE

8. TREE SPECIES ARE IDENTIFIED WHEN KNOWN. HOWEVER, FINAL DETERMINATION SHOULD BE MADE BY A QUALIFIED BOTANIST. REFER TO THE LEGEND FOR TREE SPECIES SYMBOLS.
9. SURVEYED TREES INCLUDE:
   A. OAKS (QUERCUS SPP.) 5 INCHES OR LARGER DBH
   B. ALL OTHER TREES 12 INCHES OR LARGER DBH
   C. ALL MULTI-STEM TREES WITH A COMBINED DIAMETER OF 24 INCHES OR LARGER DBH

SECTION AND DETAIL CONVENTION



ABBREVIATIONS

AVG.	AVERAGE	NTS	NOT TO SCALE
CC	CONCRETE	O.C.	ON CENTER
CY	CUBIC YARDS	O.D.	RELATIVE COMPACTION
DBH	DIAMETER BREST HEIGHT	RSP	ROCK SLOPE PROTECTION
DIA.	DIAMETER	SD	STORM DRAIN
E	EXISTING	SPK	SPIKE
E.G.	EXISTING GROUND	SQ.FT.	SQUARE FOOT
ELEV.	ELEVATION	TBD	TO BE DETERMINED
DI	DRAINAGE INLET	TYP	TYPICAL
FG	FINISHED GRADE	UNK	UNKNOWN
FT	FEET	WSE	WATER SURFACE ELEVATION
INV	INVERT	YR	YEAR
N	NEW		

PROJECT DESCRIPTION

THESE DRAWINGS PROVIDE 70% LEVEL DESIGNS FOR THE CONSTRUCTION OF CHANNEL AND FLOODPLAIN ENHANCEMENTS ON PORTIONS OF PERMANENTE CREEK AT THE PERMANENTE QUARRY PROPERTY IN SANTA CLARA COUNTY, CALIFORNIA.

THE DESIGNS ARE SUBJECT TO CHANGE BASED ON RESOURCE AGENCY COMMENTS, ENVIRONMENTAL REVIEW AND PERMIT ISSUANCE.

TREE REMOVAL NOTES

1. DBH IS THE DIAMETER MEASURED AT BREAST HEIGHT.
2. WILLOWS TO BE REMOVED SHALL BE SALVAGED PER DETAIL 2, SHT. C23. THIS INCLUDES ALL UNMAPPED WILLOWS. WILLOWS TO BE SALVAGED FOR TRANSPLANTING WILL BE FLAGGED IN THE FIELD BY THE PROJECT ARBORIST.
3. ALL OTHER TREES REMOVED DURING CONSTRUCTION SHALL BE SALVAGED WITH ROOTWADS INTACT AND INCORPORATED ON BENCHES AS FLOODPLAIN ROUGHNESS LOGS. BRANCHES SHALL BE PLACED ON FLOODPLAIN BENCHES AND ADJACENT UPPER BANK SLOPES AS SLASH.

TREE ABBREVIATIONS

A	ALDER
B	BAY
BK	BUCKEYE
M	MAPLE
O	OAK
SYC	SYCAMORE
W	WILLOW

WATERWAYS CONSULTING INC.
509A SWIFT ST.
SANTA CRUZ, CA 95060
PH:(831)421-9291 // FAX:(888)819-6847
WWW.WATWAYS.COM

wra
ENVIRONMENTAL CONSULTANTS
LANDSCAPE ARCHITECTS AND PLANNERS
2169-G East Francisco Blvd.
San Rafael, CA 94901
(415) 454-8868 Phone
(415) 454-0129 Fax

PREPARED AT THE REQUEST OF:
LEHIGH HANSON HEIDELBERG CEMENT GROUP

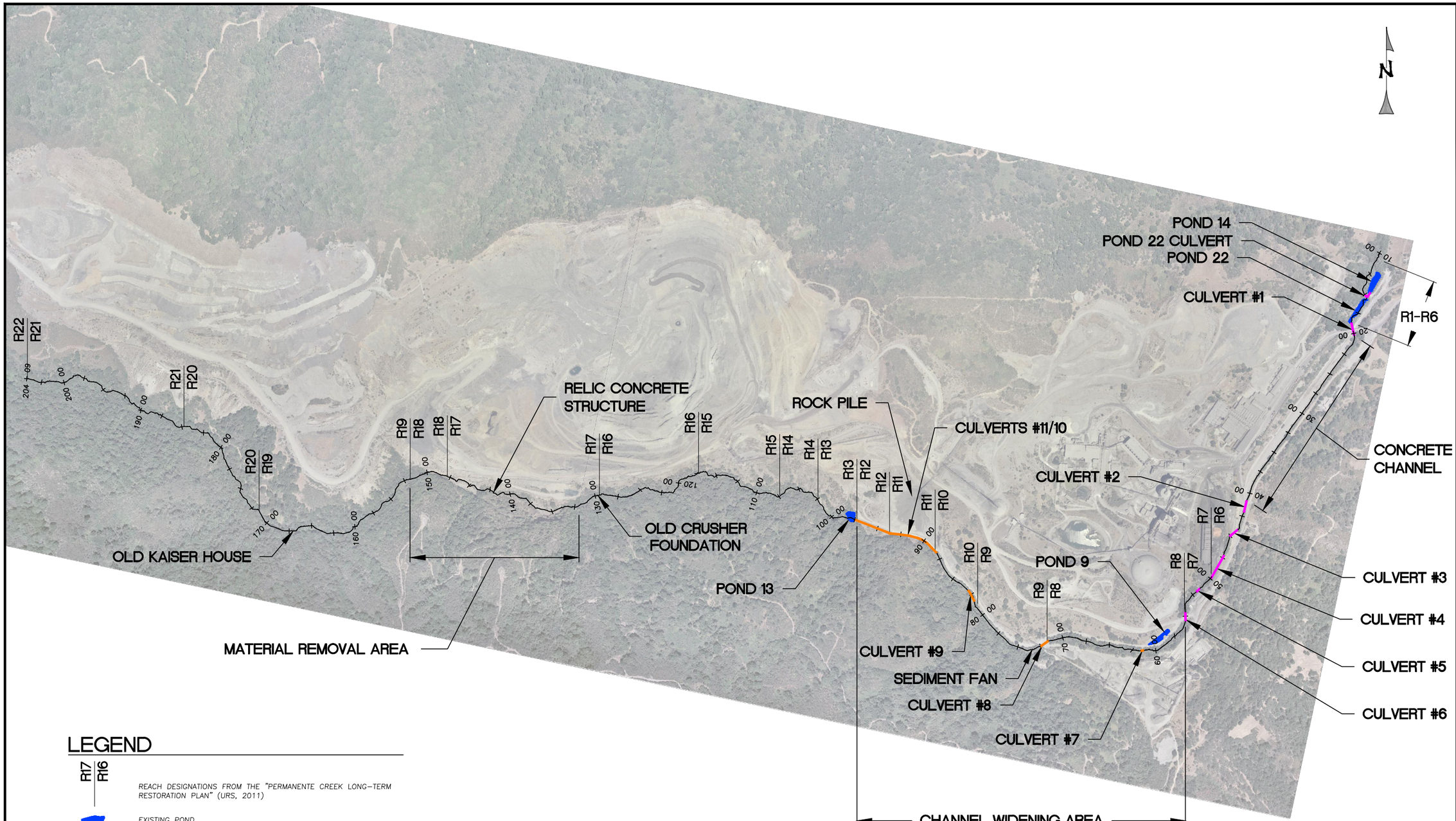
COVER SHEET

PERMANENTE CREEK RESTORATION PLAN
70% DESIGN SUBMITTAL

DESIGNED BY:	–
DRAWN BY:	B.M.S.
CHECKED BY:	M.W.W.
DATE:	04/27/15
JOB NO.:	13-016

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

C1 | 1 OF 25



LEGEND

- R17 | R16 — REACH DESIGNATIONS FROM THE "PERMANENTE CREEK LONG-TERM RESTORATION PLAN" (URS, 2011)
- EXISTING POND
- EXISTING CULVERT TO BE REMOVED
- EXISTING CULVERT TO REMAIN
- 70 00 — THALWEG ALIGNMENT 2013

PROJECT AREA OVERVIEW

SCALE: 1" = 500'

WATERWAYS CONSULTING INC.
509A SWIFT ST.
SANTA CRUZ, CA 95060
PH:(831)421-9291 // FAX:(888)819-6847
WWW.WATWAYS.COM

PRELIMINARY

NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT GROUP

OVERVIEW

PERMANENTE CREEK RESTORATION PLAN
70% DESIGN SUBMITTAL

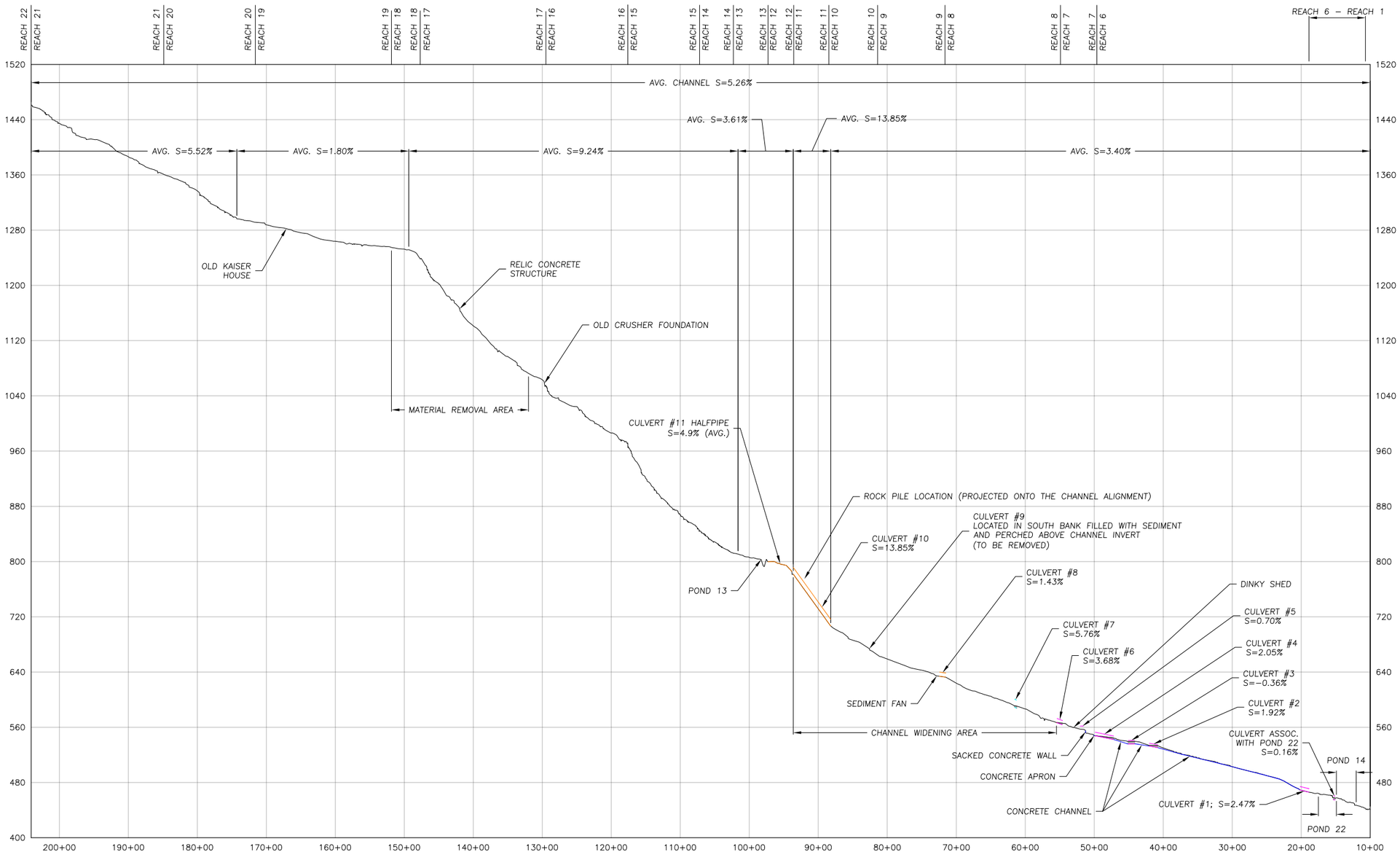
DESIGNED BY:	B.M.S.
DRAWN BY:	B.M.S.
CHECKED BY:	M.W.W.
DATE:	04/27/15
JOB NO.:	13-016

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS

0 1"

C2

2 OF 25



LEGEND

REACH 7 / REACH 6 — REACH DESIGNATIONS FROM THE "PERMANENTE CREEK LONG-TERM RESTORATION PLAN" (URS, 2011)

EXISTING CULVERT TO BE REMOVED

EXISTING CULVERT TO REMAIN

EXISTING CHANNEL PROFILE

SCALE: H: 1" = 800'; V: 1"=80'

WATERWAYS CONSULTING INC.
509A SWIFT ST.
SANTA CRUZ, CA 95060
PH:(831)421-9291 // FAX:(888)819-6847
WWW.WATWAYS.COM

PRELIMINARY

NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:

LEHIGH HANSON
HEIDELBERG CEMENT GROUP

EXISTING CHANNEL PROFILE

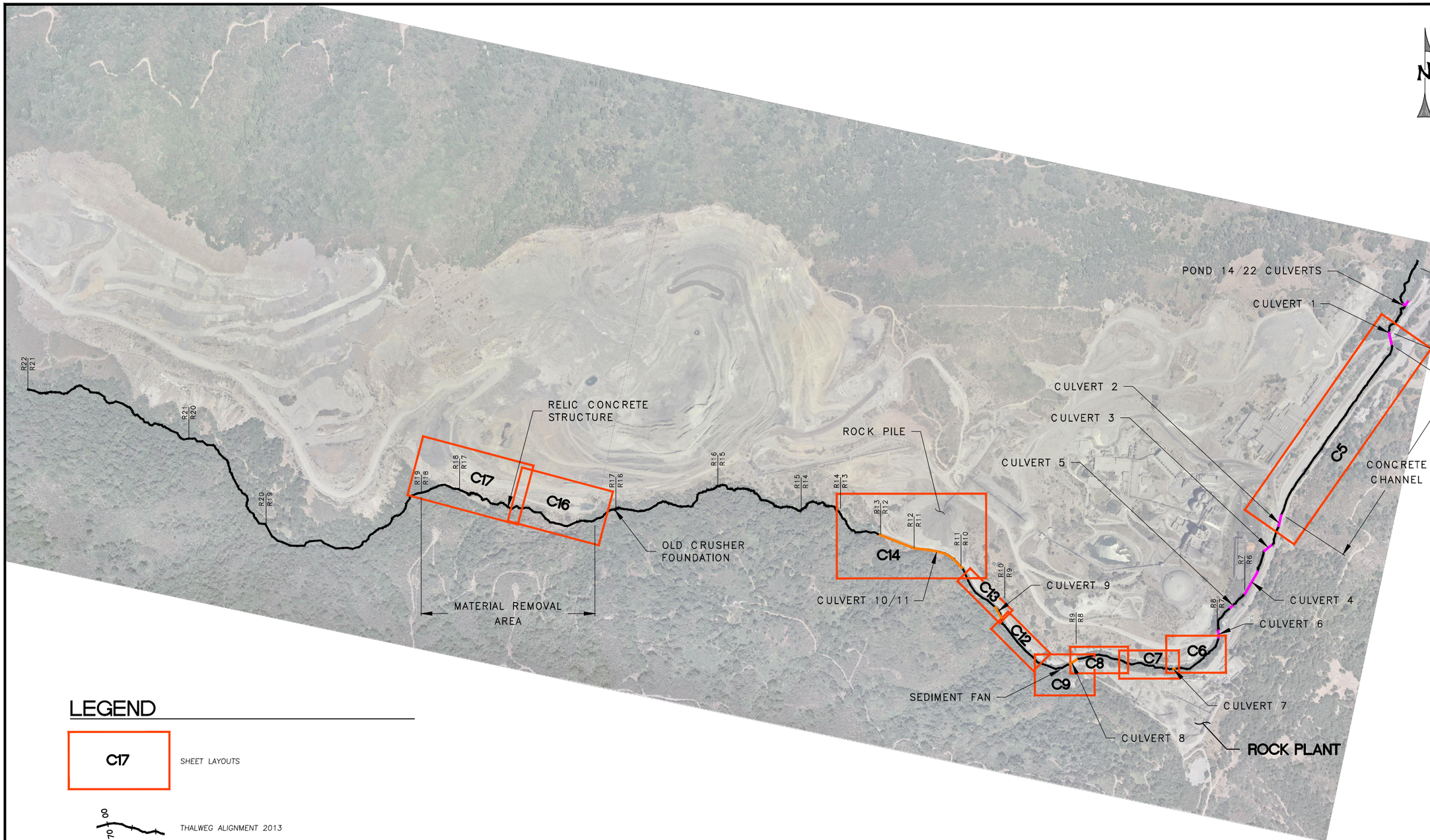
PERMANENTE CREEK RESTORATION PLAN

70% DESIGN SUBMITTAL

DESIGNED BY:	B.M.S.
DRAWN BY:	B.M.S.
CHECKED BY:	M.W.W.
DATE:	04/27/15
JOB NO.:	13-016

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS

0 1"



LEGEND

C17 — SHEET LAYOUTS

00 / 70 — THALWEG ALIGNMENT 2013

EXISTING CULVERT TO BE REMOVED

EXISTING CULVERT TO REMAIN

SHEET LAYOUT OVERVIEW

SCALE: 1" = 500'

WATERWAYS CONSULTING INC.
509A SWIFT ST.
SANTA CRUZ, CA 95060
PH:(831)421-9291 // FAX:(888)819-6847
WWW.WATWAYS.COM

PRELIMINARY

NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:

LEHIGH HANSON HEIDELBERG CEMENT GROUP

SHEET LAYOUT OVERVIEW

PERMANENTE CREEK RESTORATION PLAN

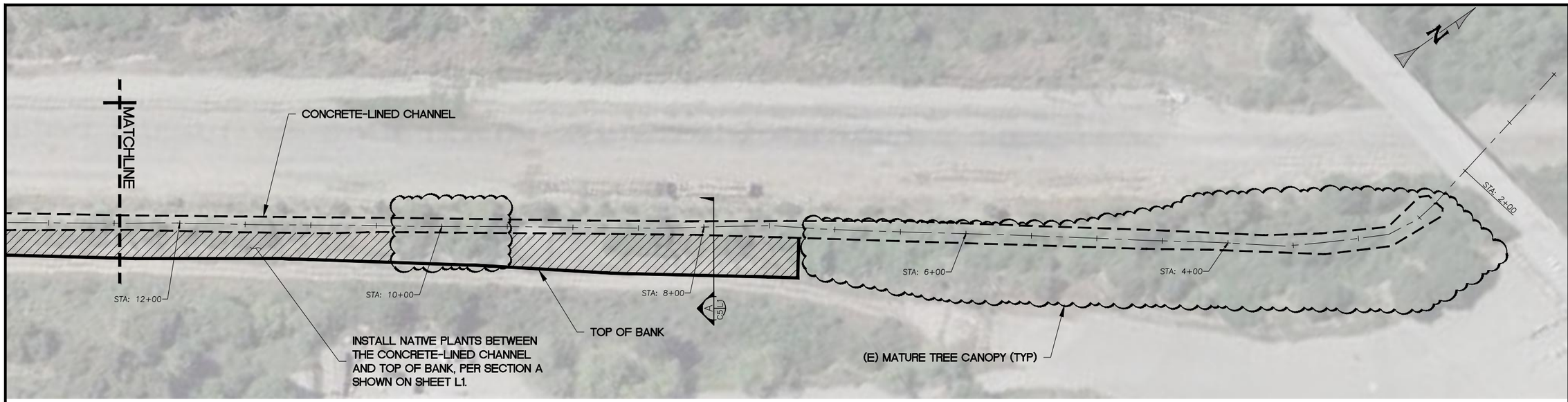
70% DESIGN SUBMITTAL

DESIGNED BY:	B.M.S.
DRAWN BY:	B.M.S.
CHECKED BY:	M.W.W.
DATE:	04/27/15
JOB NO.:	13-016

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS

0 1"

C4



NOTES:

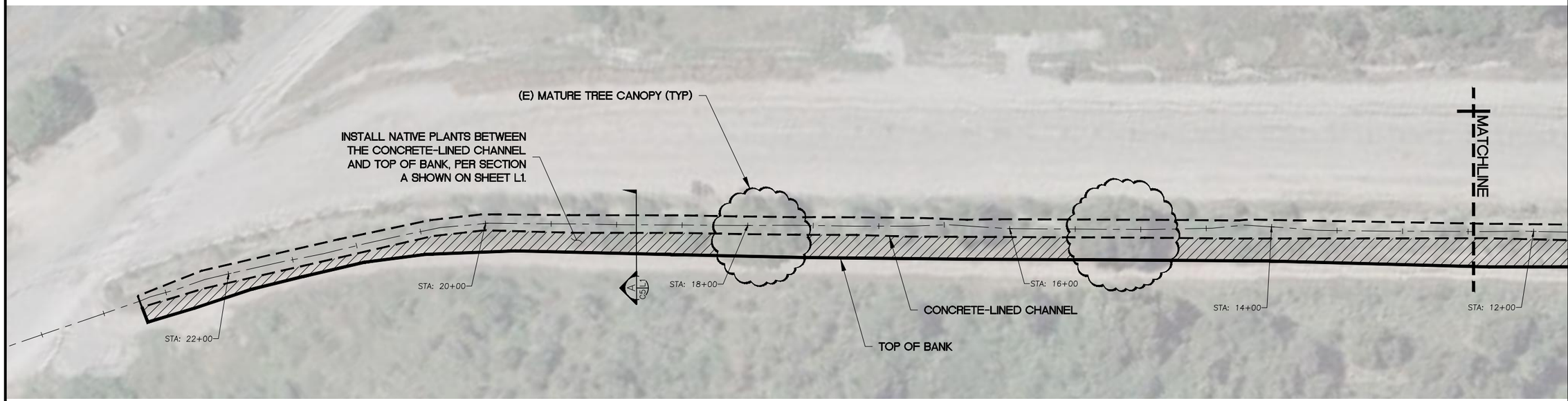
1. ALL EXISTING NATIVE TREES AND SHRUBS SHALL BE PROTECTED IN PLACE. EXISTING PLANT SPECIES INCLUDE, BUT ARE NOT LIMITED TO, PRUNUS ILICIFOLIA, QUERCUS AGRIFOLIA, SALIX LAEVIGATA, SALIX LASIOLEPSIS, AND UMBELLULARIA CALIFORNICA. WEED CONTROL ACTIONS SHALL BE PERFORMED AROUND EXISTING OAK SEEDLINGS, AS DESCRIBED BELOW, TO ENCOURAGE ESTABLISHMENT.
2. A THREE-FOOT DIAMETER AREA SHALL BE CLEARED AND GRUBBED AT EACH PROPOSED PLANTING LOCATION AND AROUND EACH EXISTING OAK SEEDLING. CLEARING AND GRUBBING AROUND OAK SEEDLINGS SHALL OCCUR BY HAND-WEEDING TO AVOID ANY ROOT DISTURBANCE OR PLANT DAMAGE.
3. PLANTING EXCAVATION SHALL NOT OCCUR WITHIN THE DRIP LINE OF EXISTING SHRUBS, WITHIN TEN FEET FROM THE TRUNKS OF EXISTING ESTABLISHED TREES, OR WITHIN FIVE FEET OF EXISTING OAK SEEDLINGS.
4. A QUALIFIED RESTORATION SPECIALIST SHALL CONFIRM THE LOCATION OF PROPOSED PLANTS AND OAK SEEDLINGS PRIOR TO PLANTING AND WEED CONTROL TO CONFIRM AVOIDANCE OF EXISTING VEGETATION.
5. DEPENDING ON THE CONDITION OF EXISTING SOILS, SOIL EXCAVATED FOR PLANTING MAY REQUIRE AMENDMENT WITH GREEN WASTE COMPOST. EXCESS SOIL SHALL BE USED TO FORM A WATERING WELL AROUND THE INSTALLED PLANT.
6. THREE TO FOUR INCHES OF MULCH AND/OR WEED MATS SHALL BE PLACED IN THE CLEARED AND GRUBBED AREA AROUND EACH INSTALLED PLANT OR OAK SEEDLING FOR WEED CONTROL AND MOISTURE RETENTION.

CONCRETE-LINED CHANNEL SOUTHERN BANK PLANTING PLAN

SCALE: 1" = 40'

LEGEND

PROPOSED REVEGETATION AREA = 0.55 ACRES



CONCRETE-LINED CHANNEL SOUTHERN BANK PLANTING PLAN

SCALE: H: 1" = 40'

WATERWAYS CONSULTING INC.
509A SWIFT ST.
SANTA CRUZ, CA 95060
PH:(831)421-9291 // FAX:(888)819-6847
WWW.WATWAYS.COM

PRELIMINARY

NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:

LEHIGH HANSON
HEIDELBERG CEMENT GROUP

CONCRETE CHANNEL SOUTHERN BANK PLANTING PLAN

PERMANENTE CREEK RESTORATION PLAN

70% DESIGN SUBMITTAL

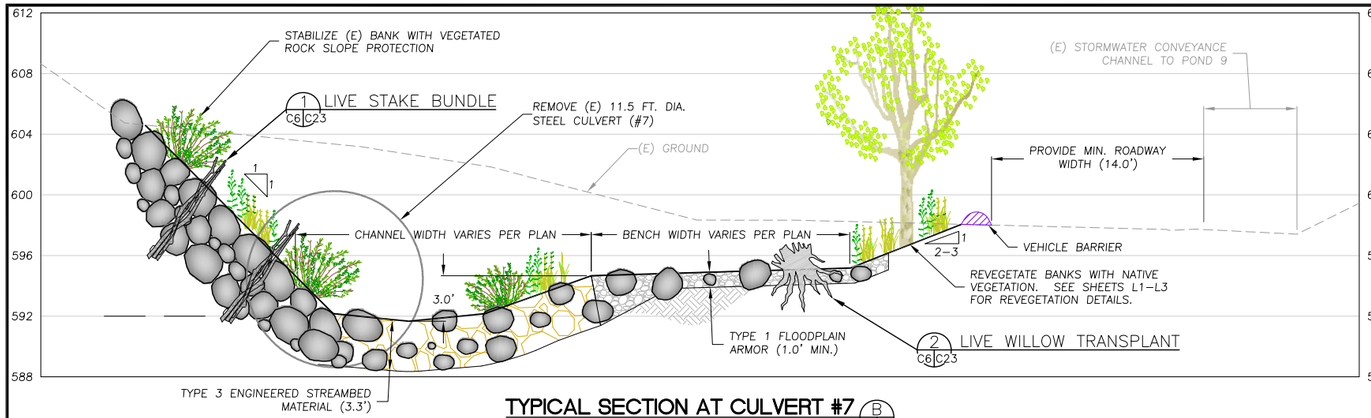
DESIGNED BY:	B.M.Z.
DRAWN BY:	B.M.Z.
CHECKED BY:	M.W.W.
DATE:	04/27/15
JOB NO.:	13-016

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS

0 1"

C5

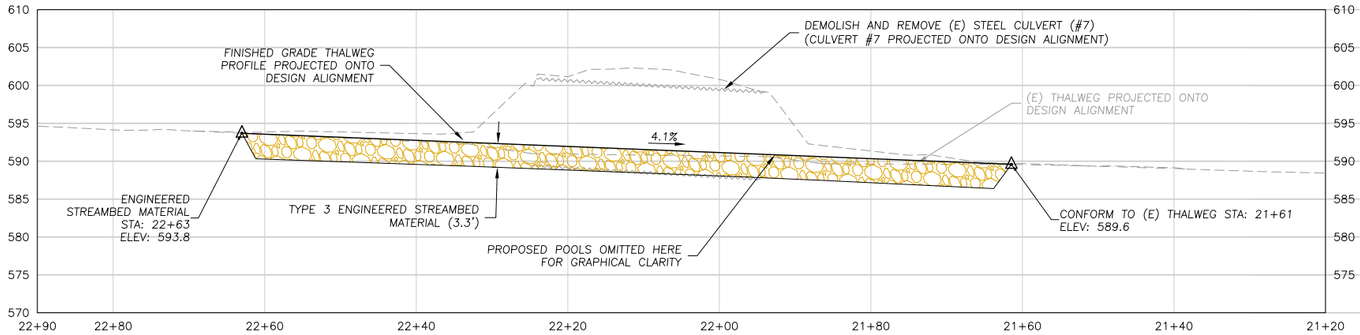
5 OF 25



TYPICAL SECTION AT CULVERT #7 (B)

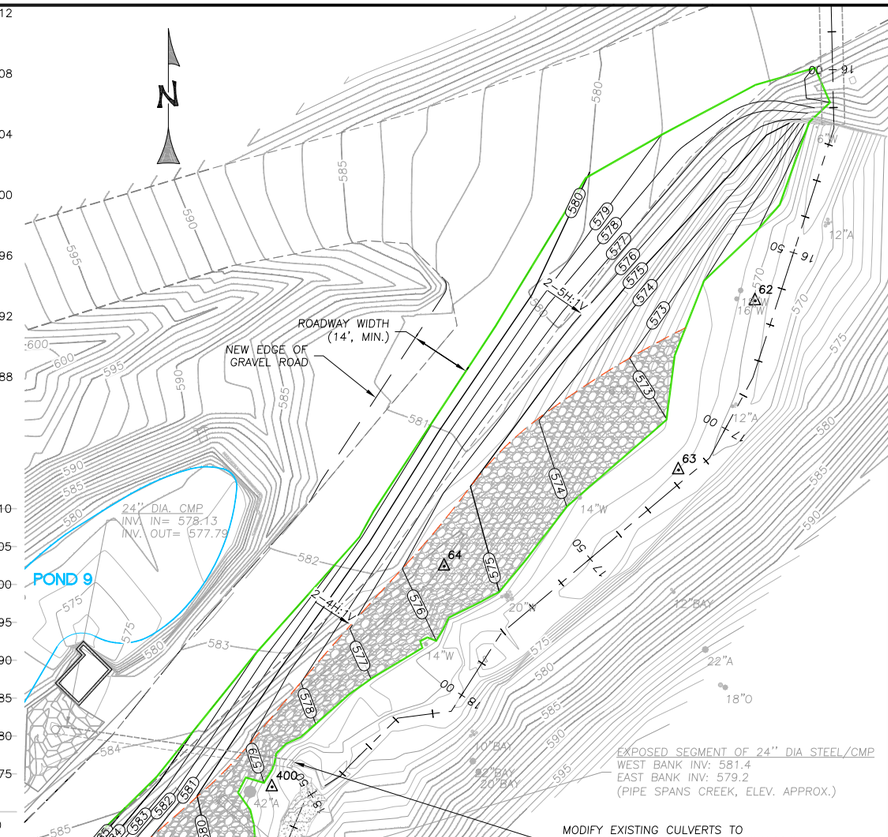
SCALE: 1" = 5'

C6,C7 C6



CULVERT #7 CHANNEL PROFILE

SCALE: 1" = 10'



CHANNEL WIDENING PLAN (1 OF 5)

SCALE: 1" = 20'

TREE REMOVAL SUMMARY

TREE SPECIES	DBH	NUMBER
ALDER (DOUBLE STEM)	24"	1

NOTE:
THE TREE REMOVAL SUMMARY IS FOR STA. 16+20 TO STA. 23+50.

LEGEND

- SURVEY CONTROL
- (E) TREE
- (E) TREE TO BE REMOVED
- (E) CONTOURS
- PROPOSED CONTOURS
- (E) THALWEG ALIGNMENT
- (E) EDGE OF DIRT ROAD
- (E) WATER LINE
- (E) STORM DRAIN LINE
- (E) EXPOSED ROCK SLOPE PROTECTION
- LIMITS OF GRADING (APPROX.)
- EXPANDED FLOODPLAIN BENCH (APPROX.)
- ENGINEERED STREAMBED MATERIAL
- VEGETATED ROCK SLOPE PROTECTION

WATERWAYS CONSULTING INC.
509A SWIFT ST.
SANTA CRUZ, CA 95060
PH:(831)421-9291 // FAX:(888)819-6847
WWW.WATWAYS.COM

PRELIMINARY

NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT GROUP

CHANNEL WIDENING PLAN (1 OF 5)

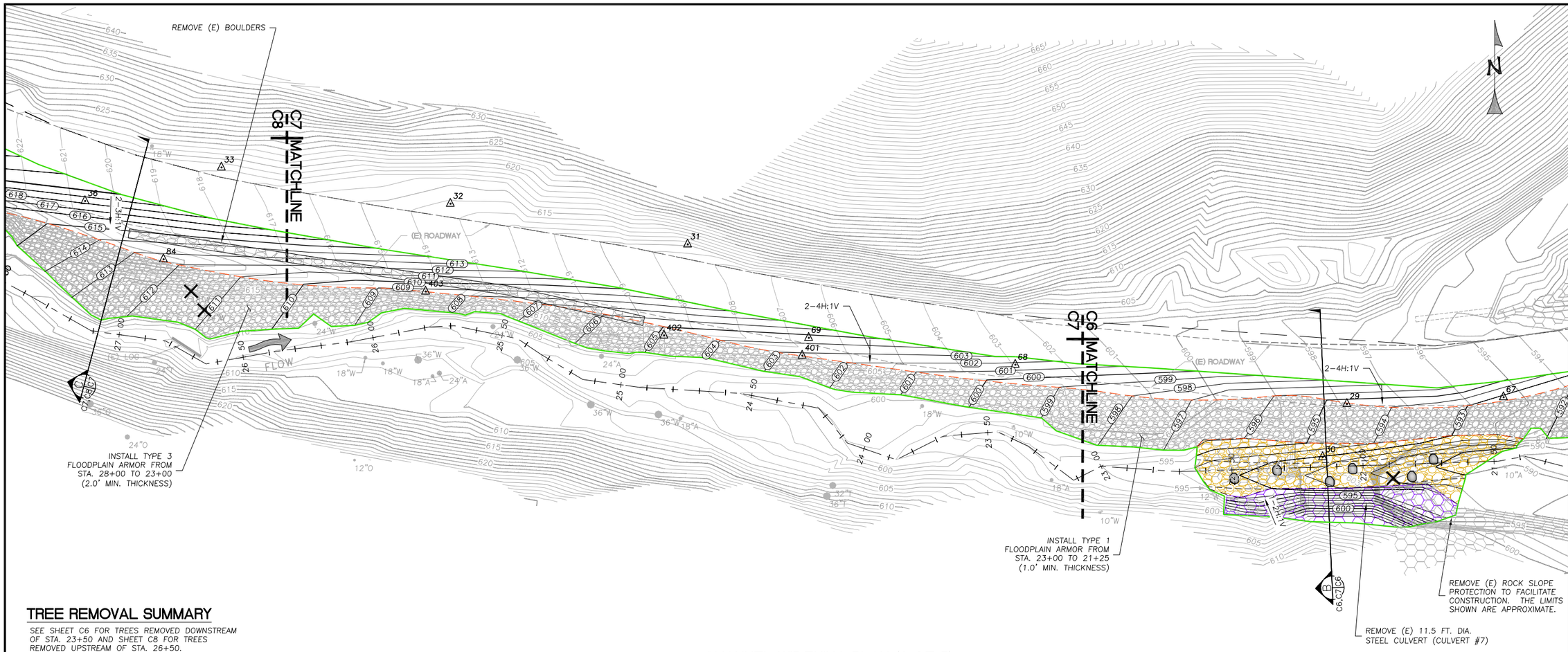
PERMANENTE CREEK RESTORATION PLAN
70% DESIGN SUBMITTAL

DESIGNED BY:	B.Z.
DRAWN BY:	B.M.S.
CHECKED BY:	M.W.W.
DATE:	04/27/15
JOB NO.:	13-016

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

C6

6 OF 25



TREE REMOVAL SUMMARY

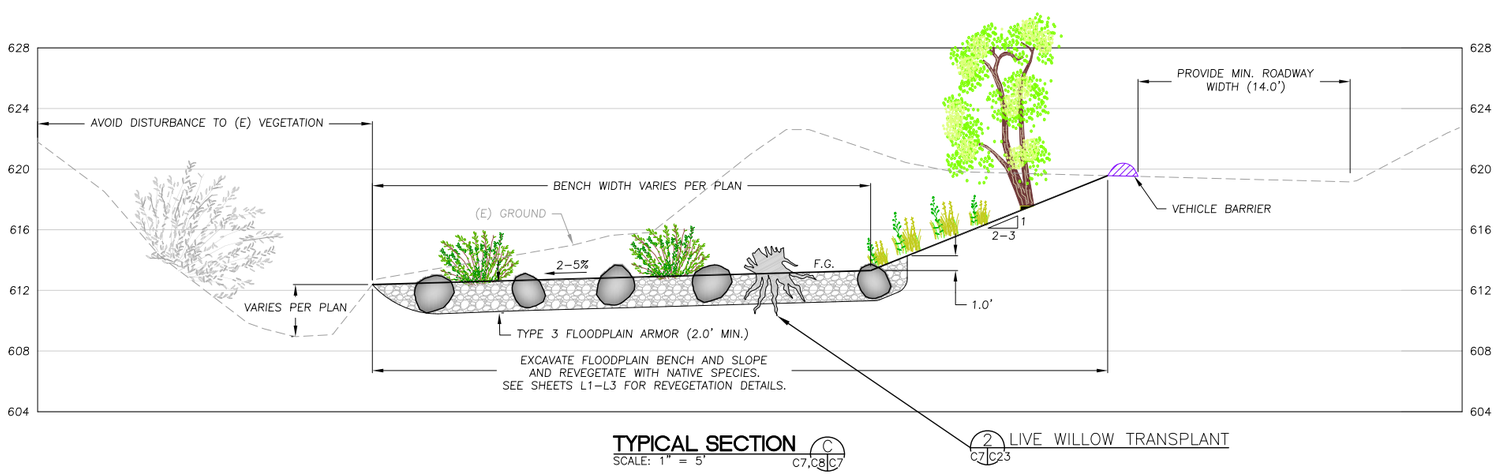
SEE SHEET C6 FOR TREES REMOVED DOWNSTREAM OF STA. 23+50 AND SHEET C8 FOR TREES REMOVED UPSTREAM OF STA. 26+50.

CHANNEL WIDENING PLAN (2 OF 5)

SCALE: 1" = 20'

LEGEND

△2	SURVEY CONTROL
8"A	(E) TREE
X	(E) TREE TO BE REMOVED
585 586	(E) CONTOURS
586 585	PROPOSED CONTOURS
	(E) THALWEG ALIGNMENT
	(E) EDGE OF DIRT ROAD
W	(E) WATER LINE
SD	(E) STORM DRAIN LINE
	(E) EXPOSED ROCK SLOPE PROTECTION
	LIMITS OF GRADING (APPROX.)
	EXPANDED FLOODPLAIN BENCH (APPROX.)
	ENGINEERED STREAMBED MATERIAL
	VEGETATED ROCK SLOPE PROTECTION



TYPICAL SECTION

SCALE: 1" = 5'

C C7,C8,C7

WATERWAYS CONSULTING INC.
509A SWIFT ST.
SANTA CRUZ, CA 95060
PH:(831)421-9291 // FAX:(888)819-6847
WWW.WATWAYS.COM

PRELIMINARY

NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:

LEHIGH HANSON HEIDELBERG CEMENT GROUP

CHANNEL WIDENING PLAN (2 OF 5)

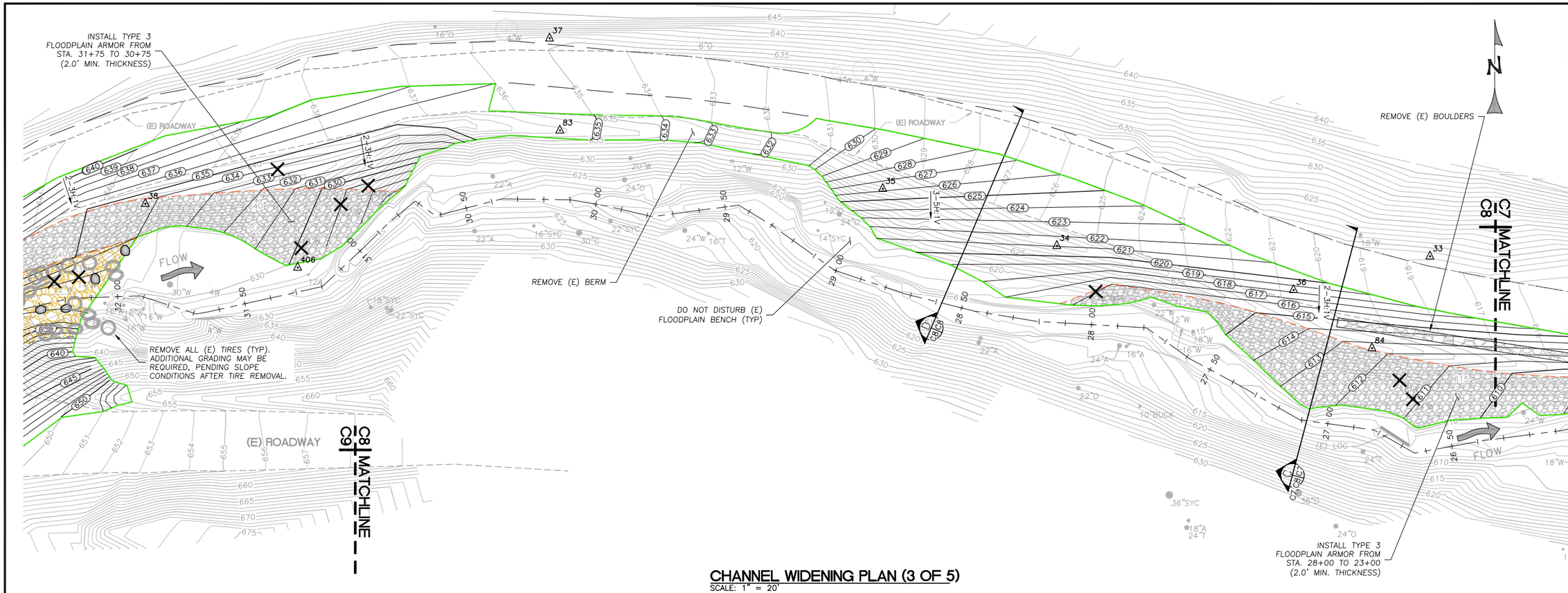
PERMANENTE CREEK RESTORATION PLAN

70% DESIGN SUBMITTAL

DESIGNED BY:	B.M.S.
DRAWN BY:	B.M.S.
CHECKED BY:	M.W.W.
DATE:	04/27/15
JOB NO.:	13-016

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS

0 1"



CHANNEL WIDENING PLAN (3 OF 5)
SCALE: 1" = 20'

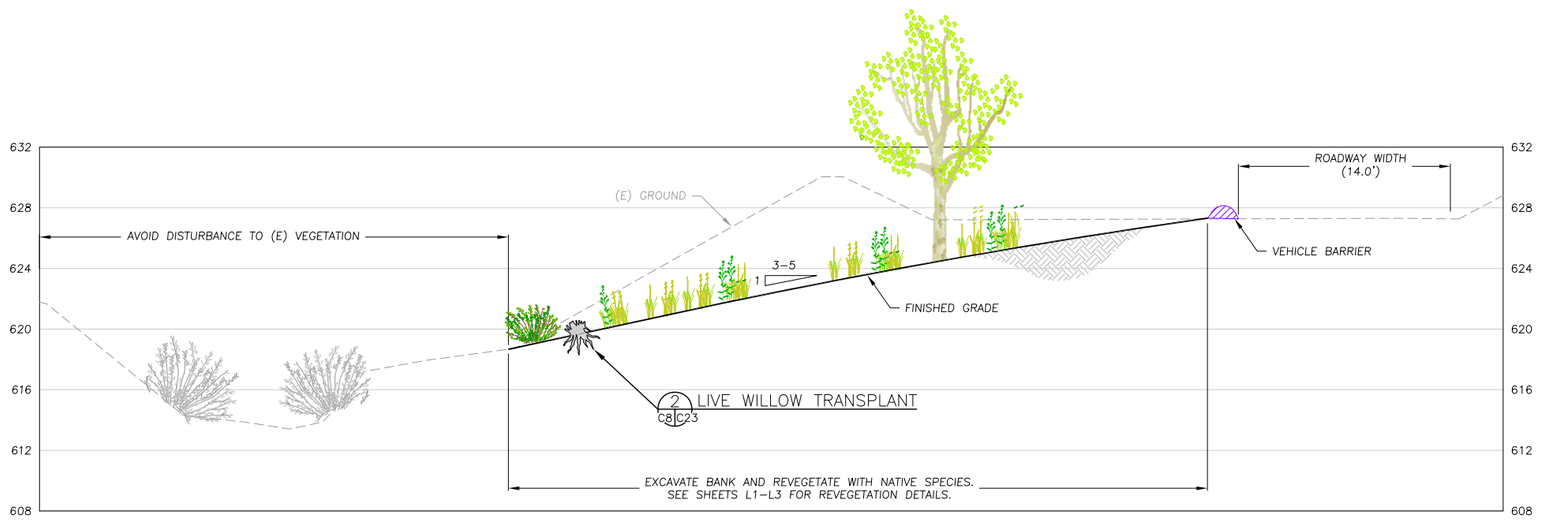
TREE REMOVAL SUMMARY

TREE SPECIES	DBH	NUMBER
WILLOW	14"	1
WILLOW	18"	2
WILLOW	24"	1
WILLOW	22"	1
OAK	10"	1
BAY	16"	1

NOTES:
1. SEE SHEET C9 FOR TREES TO BE REMOVED UPSTREAM OF STA. 31+50. SEE SHEET C7 FOR TREES TO BE REMOVED DOWNSTREAM OF STA. 26+50.

LEGEND

- SURVEY CONTROL
- (E) TREE
- (E) TREE TO BE REMOVED
- (E) CONTOURS
- PROPOSED CONTOURS
- (E) THALWEG ALIGNMENT
- (E) EDGE OF DIRT ROAD
- (E) WATER LINE
- (E) STORM DRAIN LINE
- (E) EXPOSED ROCK SLOPE PROTECTION
- LIMITS OF GRADING (APPROX.)
- EXPANDED FLOODPLAIN BENCH (APPROX.)
- ENGINEERED STREAMBED MATERIAL
- VEGETATED ROCK SLOPE PROTECTION



TYPICAL SECTION
SCALE: 1" = 5'

WATERWAYS CONSULTING INC.
509A SWIFT ST.
SANTA CRUZ, CA 95060
PH:(831)421-9291 // FAX:(888)819-6847
WWW.WATWAYS.COM

PRELIMINARY
NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:
LEHIGH HANSON HEIDELBERG CEMENT GROUP

CHANNEL WIDENING PLAN (3 OF 5)

PERMANENTE CREEK RESTORATION PLAN
70% DESIGN SUBMITTAL

DESIGNED BY:	B.M.S.
DRAWN BY:	B.M.S.
CHECKED BY:	M.W.W.
DATE:	04/27/15
JOB NO.:	13-016

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

TREE REMOVAL SUMMARY

TREE SPECIES	DBH	NUMBER
SYCAMORE	32"	1
WILLOW	12"	1
WILLOW	14"	1
WILLOW	18"	1
BAY	12"	1
OAK	10"	1
OAK	8"	2
OAK	6"	1

NOTE:
SEE SHEET C8 FOR TREES REMOVED DOWNSTREAM OF STA. 31+50.

LEGEND

- SURVEY CONTROL
- (E) TREE
- (E) TREE TO BE REMOVED
- (E) CONTOURS
- (E) THALWEG ALIGNMENT
- (E) EDGE OF DIRT ROAD
- (E) WATER LINE
- LIMITS OF GRAVEL/FINES
- LIMITS OF GRADING (APPROX.)
- RETAINING WALL
- EXPANDED FLOODPLAIN BENCH (APPROX.)
- ENGINEERED STREAMBED MATERIAL
- VEGETATED ROCK SLOPE PROTECTION
- (E) TRACTOR TIRE

SEDIMENT REMOVAL AREA AND CULVERT #8 PLAN

SCALE: 1" = 20'

WATERWAYS CONSULTING INC.
509A SWIFT ST.
SANTA CRUZ, CA 95060
PH:(831)421-9291 // FAX:(888)819-6847
WWW.WATWAYS.COM

PRELIMINARY

NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT GROUP

SEDIMENT REMOVAL AREA AND CULVERT #8 PLAN

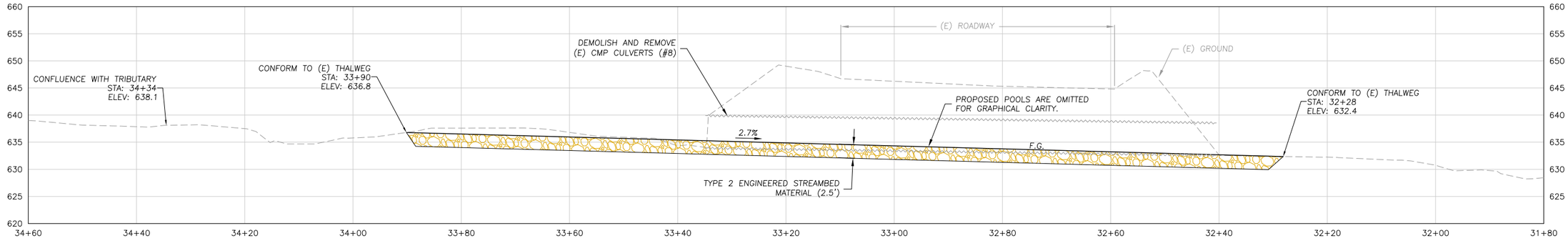
PERMANENTE CREEK RESTORATION PLAN
70% DESIGN SUBMITTAL

DESIGNED BY:	B.Z.
DRAWN BY:	B.M.S.
CHECKED BY:	M.W.W.
DATE:	04/27/15
JOB NO.:	13-016

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

C9 | 9 OF 25

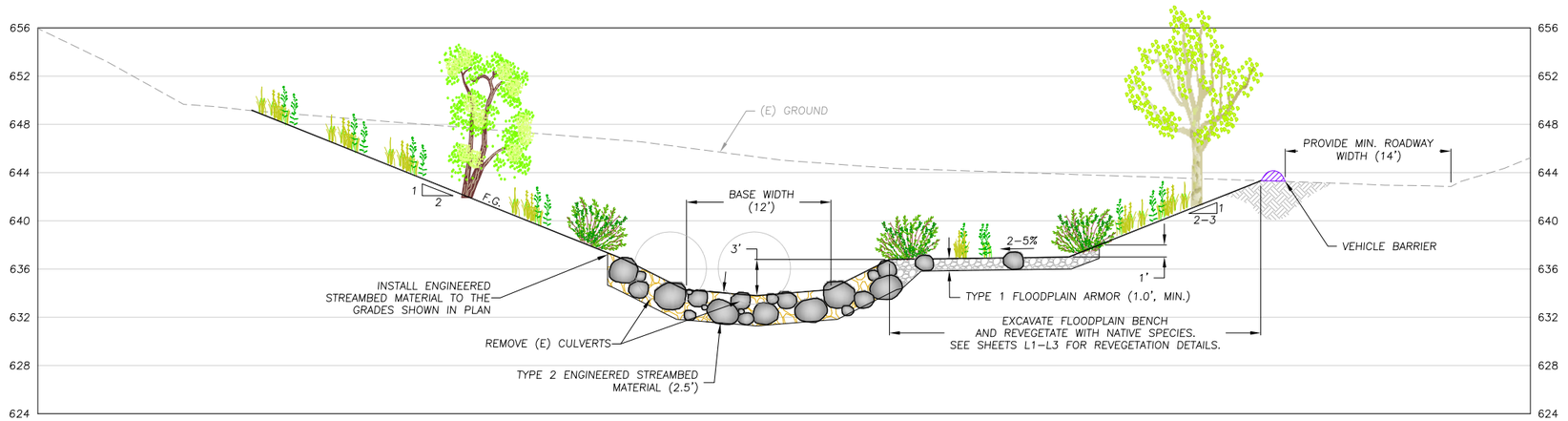
NOTES:
1. BOTTOM OF WALL (BW) GRADES SHOWN ON THIS PLAN REPRESENT FINISHED GRADE AT BOTTOM OF WALL, NOT TOP OF FOOTING ELEVATION.
2. CONTOUR INTERVAL:
   A. 1 FOOT ALONG PERMANENTE CREEK
   B. 5 FEET AT THE SEDIMENT REMOVAL AREA



CULVERT #8 CHANNEL PROFILE

SCALE: 1" = 10'

1 C9|C10



CULVERT #8 SECTION

SCALE: 1" = 6'

B C9|C10

WATERWAYS CONSULTING INC.
509A SWIFT ST.
SANTA CRUZ, CA 95060
PH:(831)421-9291 // FAX:(888)819-6847
WWW.WATWAYS.COM

PRELIMINARY

NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:

LEHIGH HANSON
HEIDELBERG CEMENT
GROUP

CULVERT #8
PROFILE AND
SECTION

PERMANENTE CREEK
RESTORATION PLAN

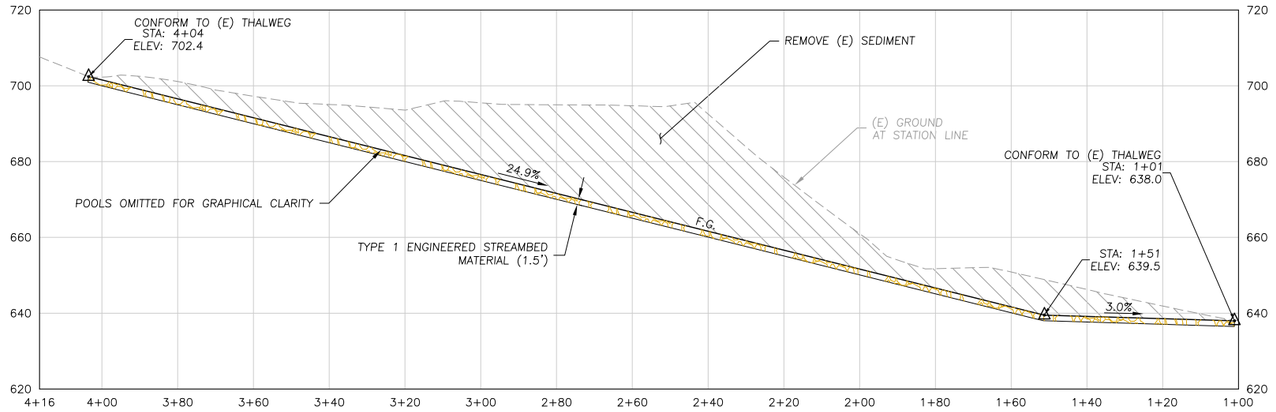
70% DESIGN SUBMITTAL

DESIGNED BY:	B.M.Z.
DRAWN BY:	B.M.S.
CHECKED BY:	M.W.W.
DATE:	04/27/15
JOB NO.:	13–016

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS

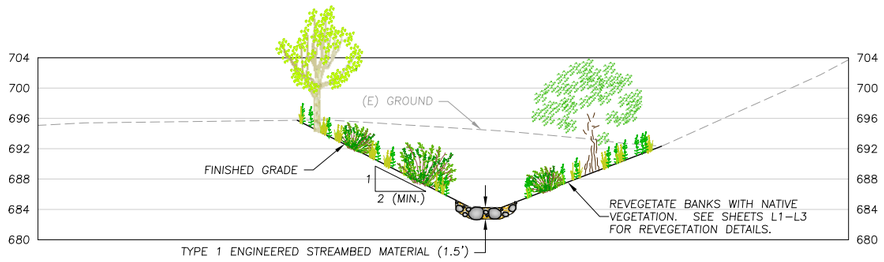
0 1"

C10

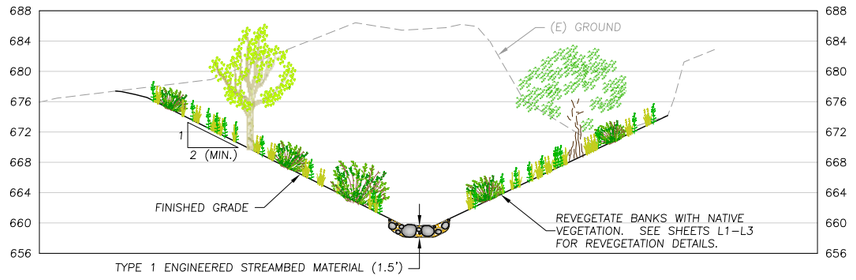


TRIBUTARY PROFILE
SCALE: 1" = 20'
(2) C9|C11

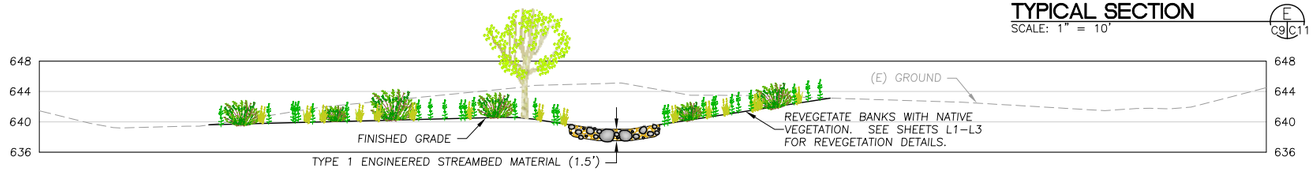
NOTE:
1. FINISHED GRADES SHOWN ARE APPROXIMATE. ALL IMPORTED FILL SHALL BE REMOVED FROM THE CHANNEL BED AND BANKS.
2. CONFORM ENGINEERED STREAMBED MATERIAL TO THE EXISTING CHANNEL AT THE UPSTREAM AND DOWNSTREAM END AS DIRECTED BY THE ENGINEER.



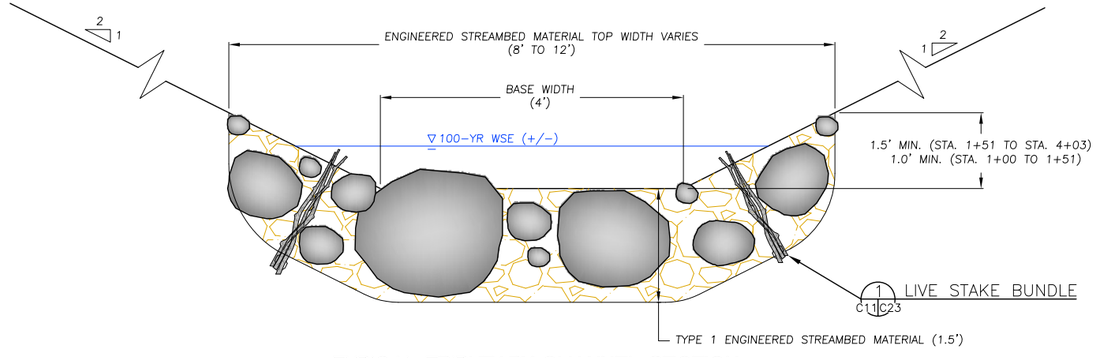
TYPICAL SECTION
SCALE: 1" = 10'
(D) C9|C11



TYPICAL SECTION
SCALE: 1" = 10'
(E) C9|C11



TYPICAL SECTION
SCALE: 1" = 10'
(F) C9|C11



TYPICAL TRIBUTARY CHANNEL SECTION
SCALE: 1" = 1'

WATERWAYS CONSULTING INC.
509A SWIFT ST.
SANTA CRUZ, CA 95060
PH:(831)421-9291 // FAX:(888)819-6847
WWW.WATWAYS.COM

PRELIMINARY

NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT
GROUP

SEDIMENT REMOVAL AREA PROFILE AND SECTIONS

PERMANENTE CREEK RESTORATION PLAN
70% DESIGN SUBMITTAL

DESIGNED BY:	B.Z.
DRAWN BY:	B.S.
CHECKED BY:	M.W.W.
DATE:	04/27/15
JOB NO.:	13-016

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

C12 C13 MATCHLINE

(E) CONVEYOR AND ASSOCIATED INFRASTRUCTURE TO BE REMOVED BY OTHERS PRIOR TO THE START OF CONSTRUCTION

(E) CONVEYOR

(E) ROADWAY

2–5H:1V

3–5H:1V

C9 C12 MATCHLINE

INSTALL TYPE 1 FLOODPLAIN ARMOR FROM STA. 40+50 TO 31+75 (1.0' MIN. THICKNESS)

(E) TRIBUTARY

(E) PERMANENTE CREEK THALWEG

N

LEGEND

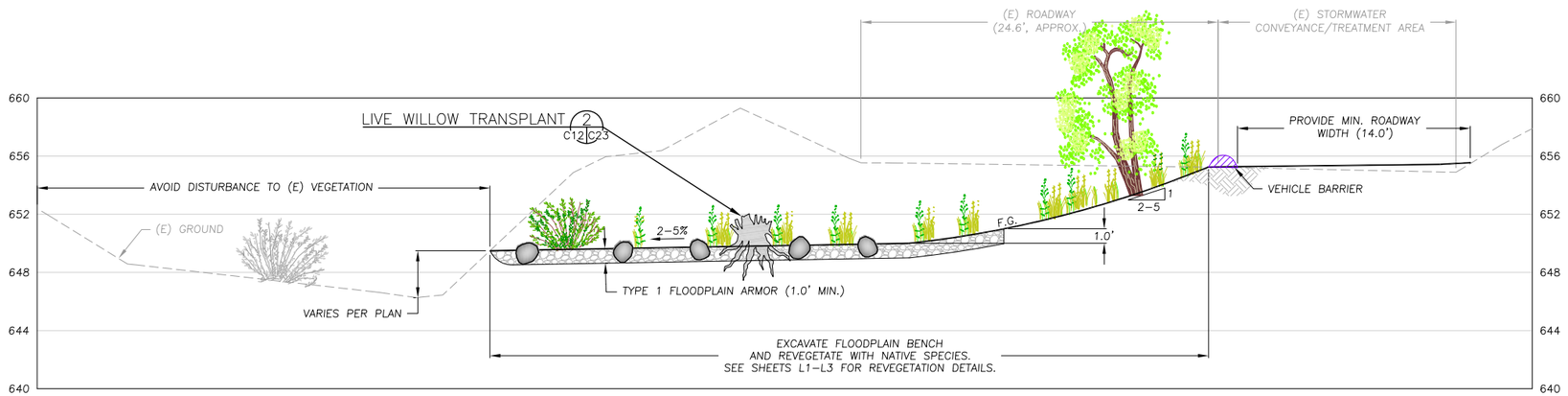
- SURVEY CONTROL
- (E) TREE
- (E) TREE TO BE REMOVED
- (E) CONTOURS
- PROPOSED CONTOURS
- (E) THALWEG ALIGNMENT
- (E) EDGE OF DIRT ROAD
- (E) WATER LINE
- (E) STORM DRAIN LINE
- (E) EXPOSED ROCK SLOPE PROTECTION
- LIMITS OF GRADING (APPROX.)
- EXPANDED FLOODPLAIN BENCH (APPROX.)
- ENGINEERED STREAMBED MATERIAL
- VEGETATED ROCK SLOPE PROTECTION

TREE REMOVAL SUMMARY

TREE SPECIES	DBH	NUMBER
ALDER	18"	1
WILLOW	12"	1
WILLOW	24"	1

CHANNEL WIDENING PLAN

SCALE: 1" = 20'



TYPICAL SECTION

SCALE: 1" = 5'

A C12 C12

WATERWAYS CONSULTING INC.
509A SWIFT ST.
SANTA CRUZ, CA 95060
PH:(831)421-9291 // FAX:(888)819-6847
WWW.WATWAYS.COM

PRELIMINARY

NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:

LEHIGH HANSON HEIDELBERG CEMENT GROUP

CHANNEL WIDENING PLAN (4 OF 5)

PERMANENTE CREEK RESTORATION PLAN

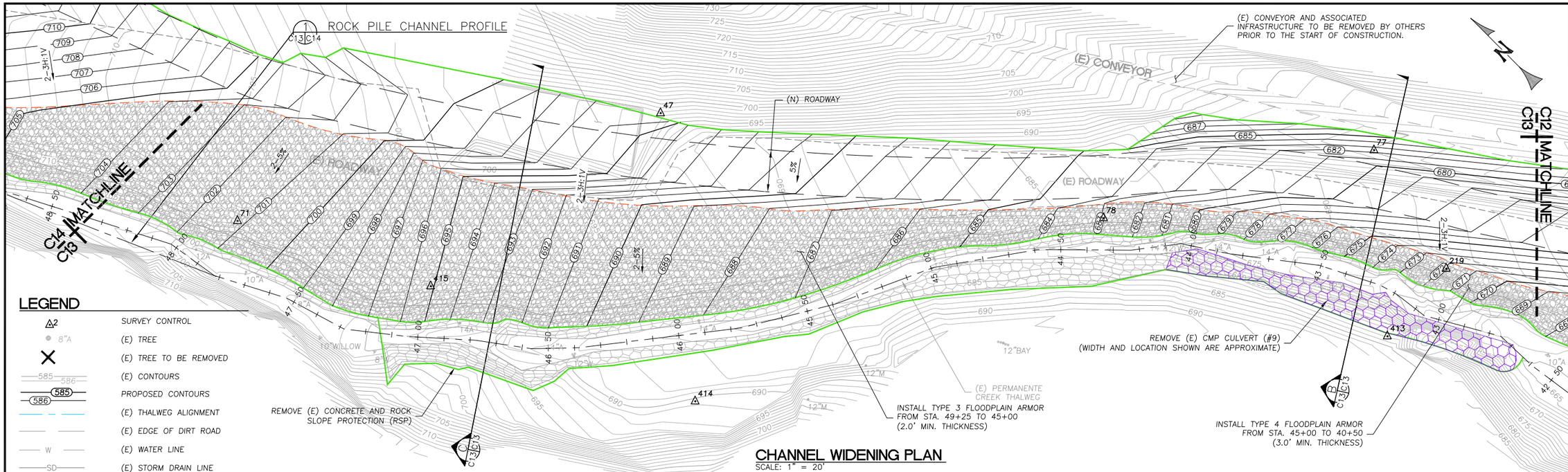
70% DESIGN SUBMITTAL

DESIGNED BY:	B.Z.
DRAWN BY:	B.M.S.
CHECKED BY:	M.W.W.
DATE:	04/27/15
JOB NO.:	13-016

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS

0 1"

ROCK PILE CHANNEL PROFILE



LEGEND

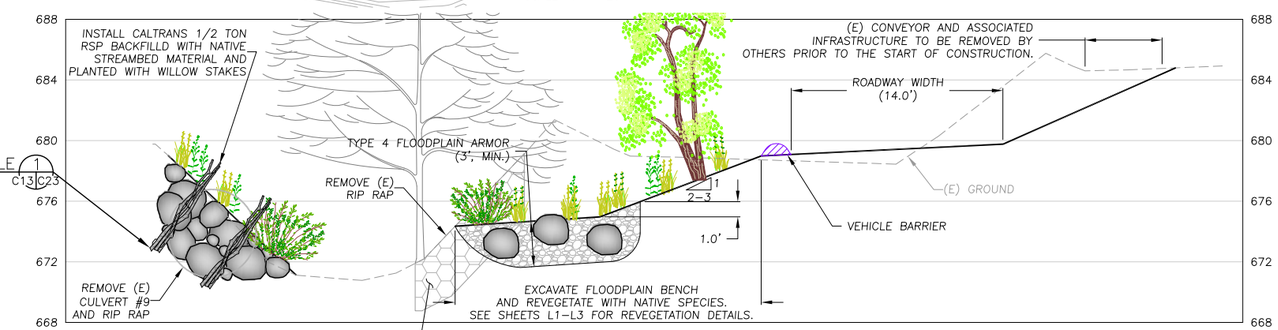
△2	SURVEY CONTROL
8"A	(E) TREE
X	(E) TREE TO BE REMOVED
585 586	(E) CONTOURS
586	PROPOSED CONTOURS
	(E) THALWEG ALIGNMENT
	(E) EDGE OF DIRT ROAD
W	(E) WATER LINE
SD	(E) STORM DRAIN LINE
	(E) EXPOSED ROCK SLOPE PROTECTION
	LIMITS OF GRADING (APPROX.)
	EXPANDED FLOODPLAIN BENCH (APPROX.)
	VEGETATED ROCK SLOPE PROTECTION

TREE REMOVAL SUMMARY

TREE SPECIES	DBH	NUMBER
NONE	N/A	N/A

CHANNEL WIDENING PLAN

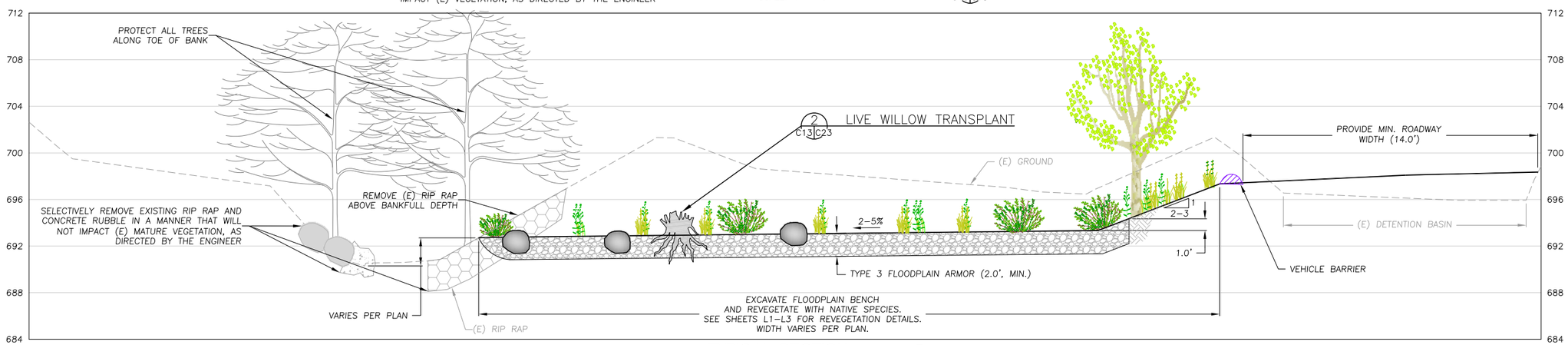
SCALE: 1" = 20'



TYPICAL SECTION

SCALE: 1" = 5'

B C13|C13



TYPICAL SECTION

SCALE: 1" = 5'

C C13|C13

WATERWAYS CONSULTING INC.
509A SWIFT ST.
SANTA CRUZ, CA 95060
PH:(831)421-9291 // FAX:(888)819-6847
WWW.WATWAYS.COM

PRELIMINARY

NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:

LEHIGH HANSON
HEIDELBERG CEMENT GROUP

CHANNEL WIDENING PLAN (5 OF 5)

PERMANENTE CREEK RESTORATION PLAN

70% DESIGN SUBMITTAL

DESIGNED BY:	B.Z.
DRAWN BY:	B.M.S.
CHECKED BY:	M.W.W.
DATE:	04/27/15
JOB NO.:	13-016

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS

0 1"

NOTE:
THE GRADING PLAN REFLECTS THE LOWER LIMIT OF POTENTIAL FINISHED GRADE CHANNEL PROFILES. REFER TO THE NOTES ON SHEET C25 FOR A DESCRIPTION OF PROPOSED METHODOLOGY FOR "FIELD-FITTING" THE DESIGN PROFILE TO ACCOMMODATE UNKNOWN SUBSURFACE CONDITIONS.

LIMITS OF GRADING (APPROX.)

MAINTAIN (E) PARKING AREA

POND 13B TO REMAIN

(N) ROAD

(E) ROAD

POND 13

LIMITS OF (E) ROCK PILE (MAY 2011, APPROX.)

(E) ROCK PILE AND INTAKE TO CONVEYOR SYSTEM TO BE REMOVED BY OTHERS PRIOR TO CONSTRUCTION.

FINAL ROAD DRAINAGE DETAILS TO BE DETERMINED.

(E) CONVEYOR, ASSOCIATED INFRASTRUCTURE, AND UTILITIES TO BE REMOVED BY OTHERS PRIOR TO CONSTRUCTION.

CONFORM TO (E) GROUND

REMOVE (E) DAM INCLUDING ALL CONCRETE AND STEEL COMPONENTS

DEMOLISH CULVERT #11 AND ASSOCIATED CONCRETE HEADWALL. BACKFILL AREA AND REVEGETATE WITH NATIVE PLANTS.

NOTE: CHANNEL FLOWLINE TO MEANDER WITHIN CONSTRUCTED CORRIDOR PER TYPICAL CHANNEL TREATMENT SECTION, SHEET C15

DEMOLISH CULVERT #10. BACKFILL AREA AND REVEGETATE WITH NATIVE PLANTS. (EXISTING ALIGNMENT ESTIMATED)

C14 MATCHLINE
C13

LEGEND

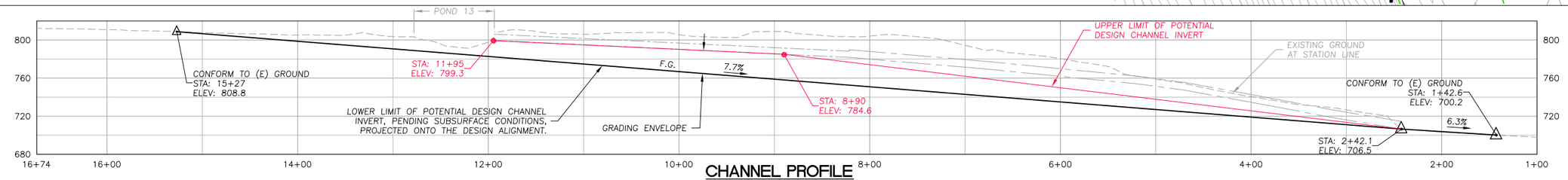
- (E) CONTOURS
- (N) CONTOURS
- (E) TREE
- (E) TREE TO BE REMOVED
- (E) CULVERT
- (E) ROADWAY
- (E) THALWEG
- PROPOSED THALWEG
- LIMITS OF GRADING

TREE REMOVAL SUMMARY

TREE SPECIES	DBH	NUMBER
ALDER	10"	1
ALDER	12"	1
MAPLE	12"	1

NOTES:
1. INSTALL BOULDER GROINS ON THE FLOODPLAIN BENCHES TO ADD ROUGHNESS AND DIRECT FLOW AWAY FROM BANKS.
2. ENGINEERED STREAMBED MATERIAL SHALL BE INSTALLED PER TYPICAL CHANNEL TREATMENT SECTION, SHEET C15, EXCEPT AT LOCATIONS WHERE BEDROCK IS EXPOSED DURING CONSTRUCTION.

ROCK PILE AREA PLAN
SCALE: 1" = 50'



CHANNEL PROFILE
SCALE: 1" = 60'

WATERWAYS CONSULTING INC.
509A SWIFT ST.
SANTA CRUZ, CA 95060
PH:(831)421-9291 // FAX:(888)819-6847
WWW.WATWAYS.COM

PRELIMINARY
NOT FOR CONSTRUCTION

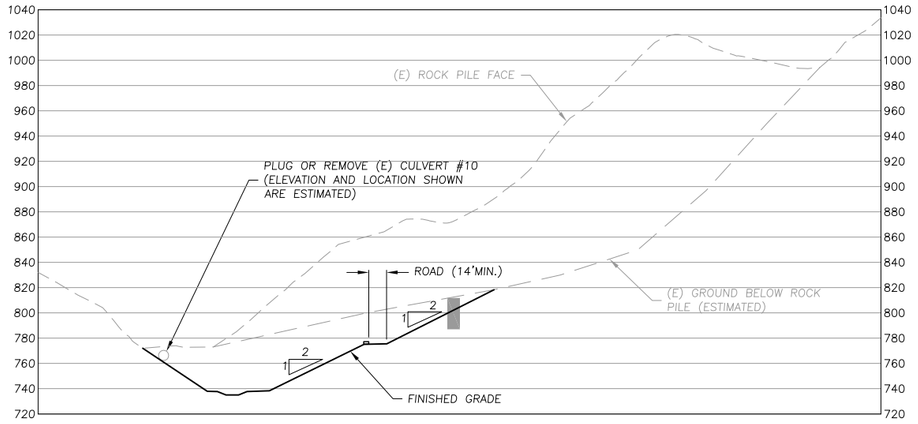
PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT GROUP

ROCK PILE AREA PLAN

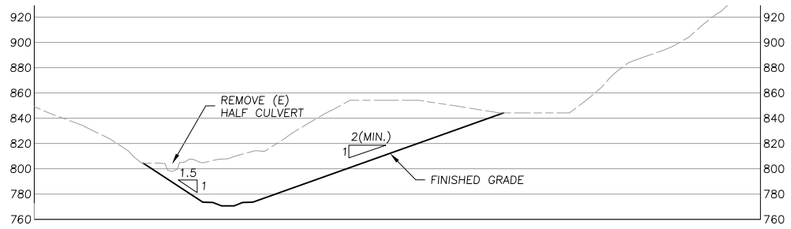
PERMANENTE CREEK RESTORATION PLAN
70% DESIGN SUBMITTAL

DESIGNED BY: B.Z.
DRAWN BY: B.R.S
CHECKED BY: M.W.W.
DATE: 04/27/15
JOB NO.: 13-016

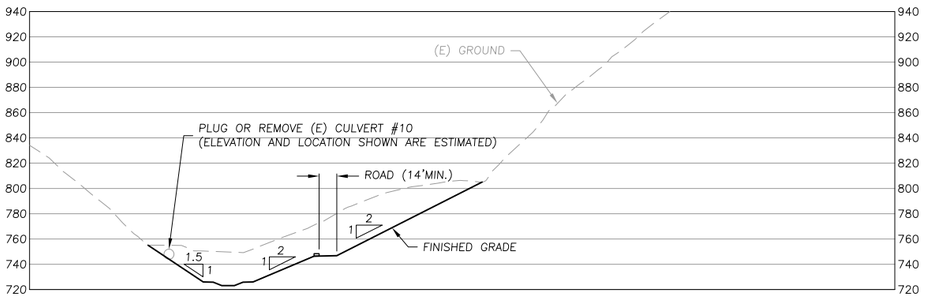
BAR IS ONE INCH ON ORIGINAL DRAWING. ADJUST SCALES FOR REDUCED PLOTS
0 1"



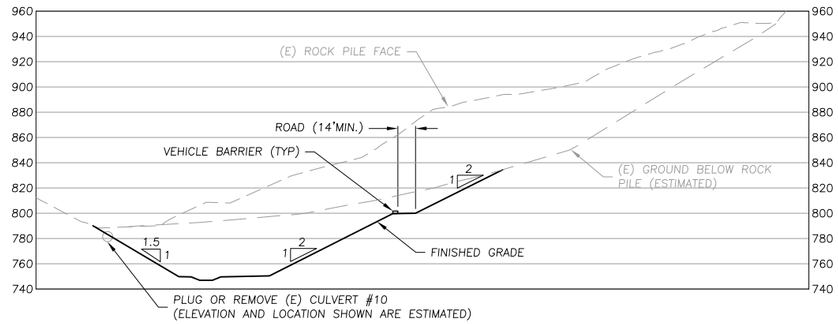
TYPICAL SECTION
SCALE: 1" = 60'
C
C14 C15



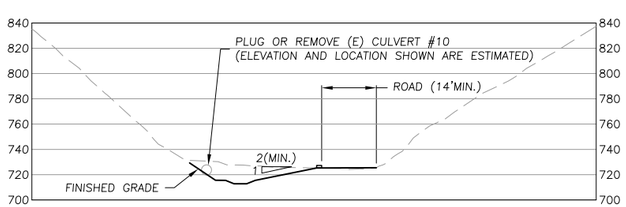
TYPICAL SECTION
SCALE: 1" = 60'
E
C14 C15



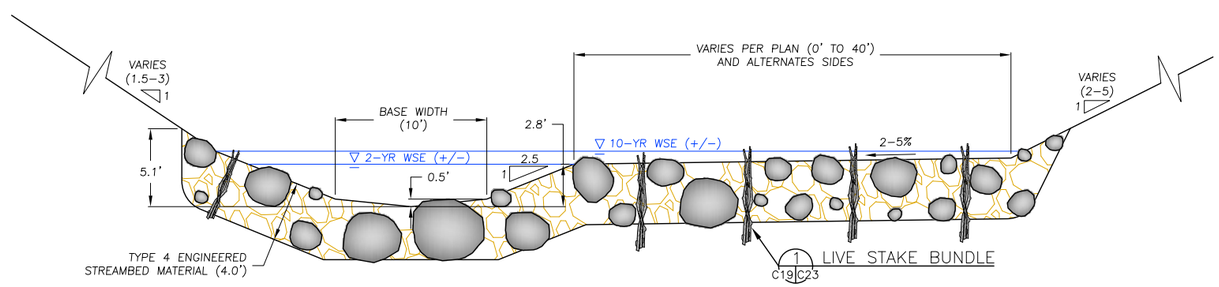
TYPICAL SECTION
SCALE: 1" = 60'
B
C14 C15



TYPICAL SECTION
SCALE: 1" = 60'
D
C14 C15



TYPICAL SECTION
SCALE: 1" = 60'
A
C14 C15



TYPICAL CHANNEL TREATMENT SECTION
SCALE: 1" = 5'

WATERWAYS CONSULTING INC.
509A SWIFT ST.
SANTA CRUZ, CA 95060
PH:(831)421-9291 // FAX:(888)819-6847
WWW.WATWAYS.COM

PRELIMINARY

NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT
GROUP

ROCK PILE
AREA
SECTIONS

PERMANENTE CREEK
RESTORATION PLAN
70% DESIGN SUBMITTAL

DESIGNED BY:	B.M.Z.
DRAWN BY:	B.R.S.
CHECKED BY:	M.W.W.
DATE:	04/27/15
JOB NO.:	13-016

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

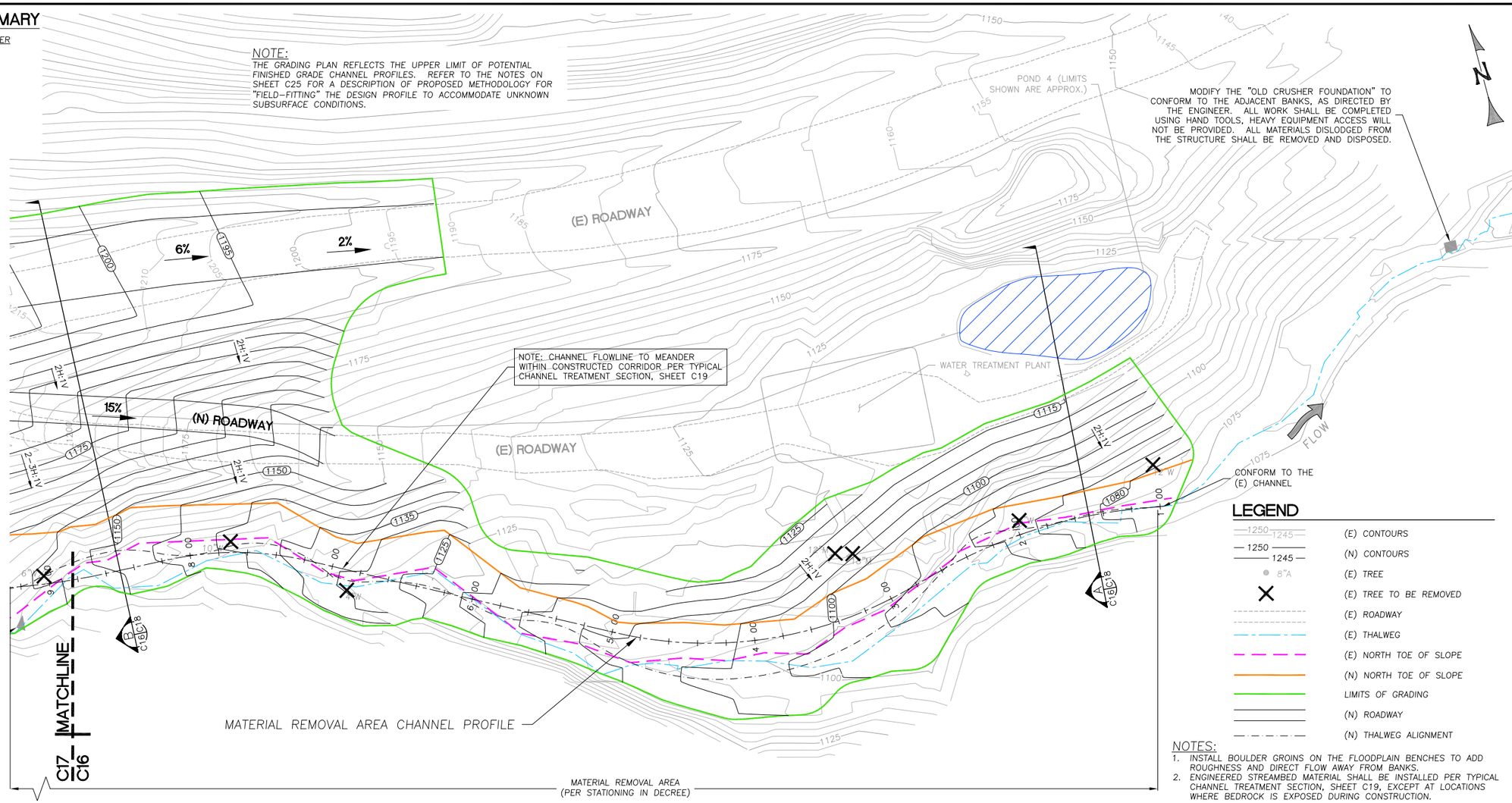
C15

15 OF 25

TREE REMOVAL SUMMARY

TREE SPECIES	DBH	NUMBER
MADRONE	12"	1
MADRONE	18"	1
WILLOW	4"	1
WILLOW	6"	2
WILLOW	10"	1
WILLOW	12"	1

NOTE:
THE GRADING PLAN REFLECTS THE UPPER LIMIT OF POTENTIAL FINISHED GRADE CHANNEL PROFILES. REFER TO THE NOTES ON SHEET C25 FOR A DESCRIPTION OF PROPOSED METHODOLOGY FOR "FIELD-FITTING" THE DESIGN PROFILE TO ACCOMMODATE UNKNOWN SUBSURFACE CONDITIONS.

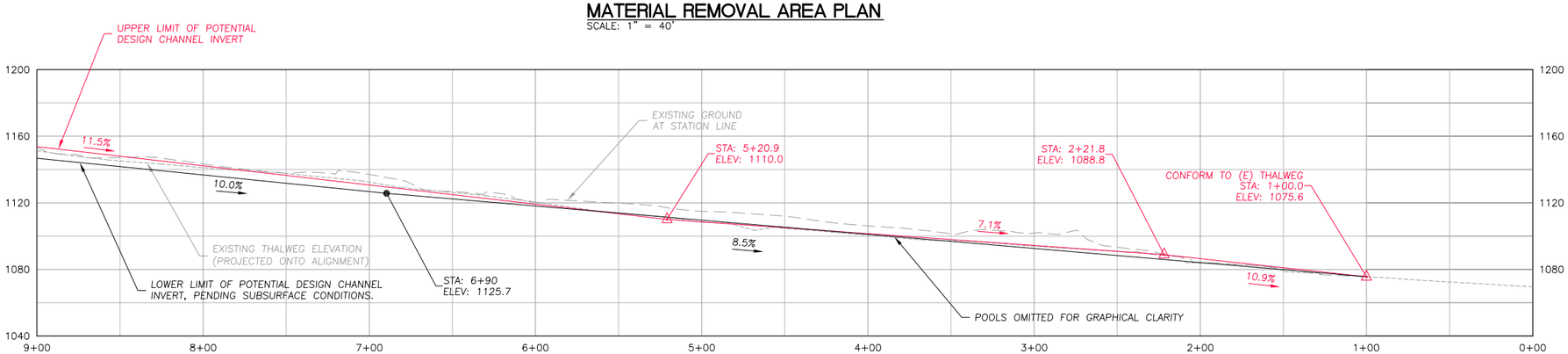


MATERIAL REMOVAL AREA PLAN
SCALE: 1" = 40'

LEGEND

- (E) CONTOURS
- (N) CONTOURS
- (E) TREE
- (E) TREE TO BE REMOVED
- (E) ROADWAY
- (E) THALWEG
- (E) NORTH TOE OF SLOPE
- (N) NORTH TOE OF SLOPE
- LIMITS OF GRADING
- (N) ROADWAY
- (N) THALWEG ALIGNMENT

NOTES:
1. INSTALL BOULDER GROINS ON THE FLOODPLAIN BENCHES TO ADD ROUGHNESS AND DIRECT FLOW AWAY FROM BANKS.
2. ENGINEERED STREAMBED MATERIAL SHALL BE INSTALLED PER TYPICAL CHANNEL TREATMENT SECTION, SHEET C19, EXCEPT AT LOCATIONS WHERE BEDROCK IS EXPOSED DURING CONSTRUCTION.



MATERIAL REMOVAL AREA CHANNEL PROFILE
SCALE: 1" = 40'

WATERWAYS CONSULTING INC.
509A SWIFT ST.
SANTA CRUZ, CA 95060
PH:(831)421-9291 // FAX:(888)819-6847
WWW.WATWAYS.COM

PRELIMINARY
NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT GROUP

MATERIAL REMOVAL AREA PLAN (1 OF 2)

PERMANENTE CREEK RESTORATION PLAN
70% DESIGN SUBMITTAL

DESIGNED BY:	B.M.Z.
DRAWN BY:	B.M.S.
CHECKED BY:	M.W.W.
DATE:	04/27/15
JOB NO.:	13-016

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

LEGEND

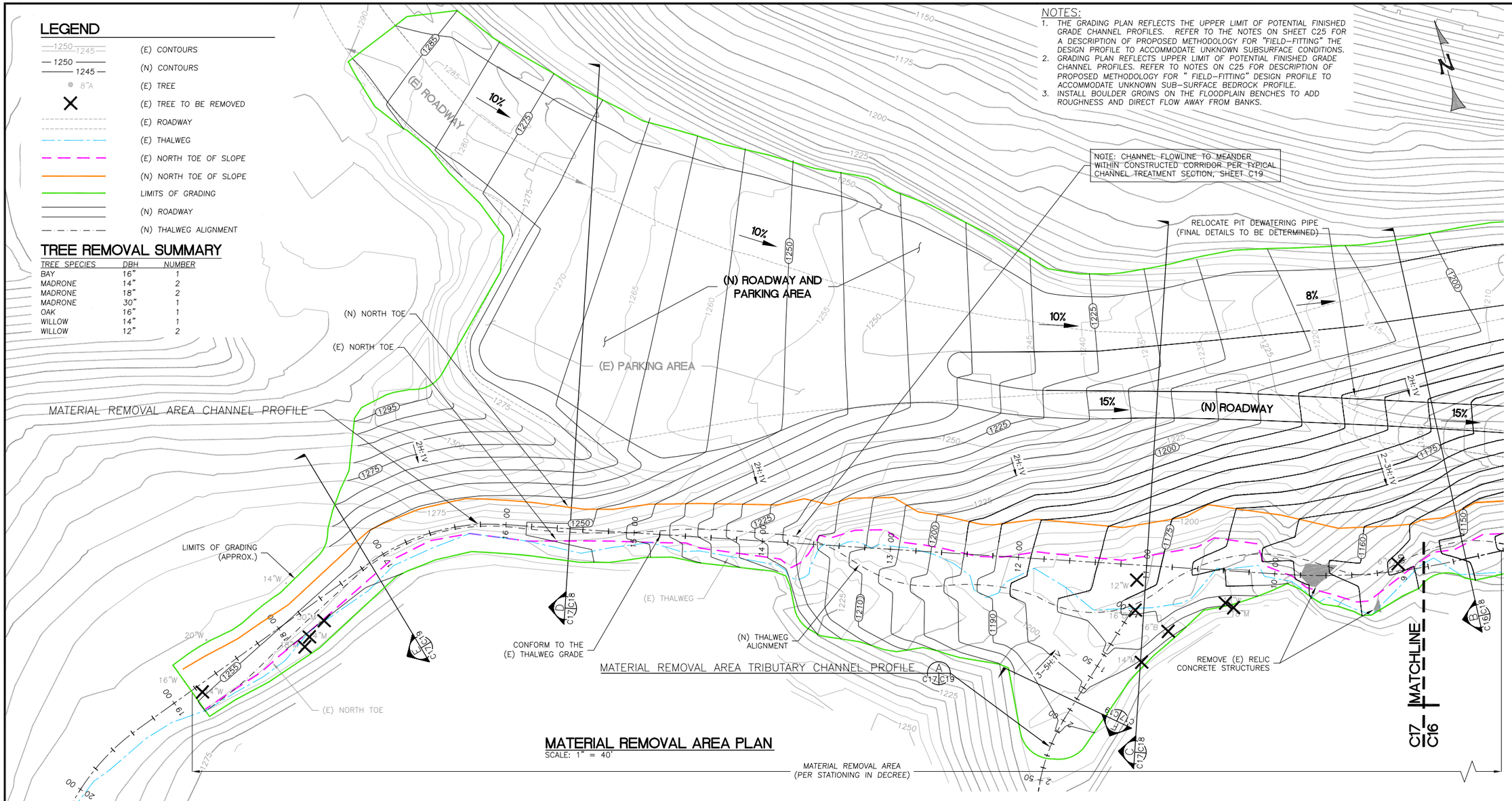
- (E) CONTOURS
- (N) CONTOURS
- (E) TREE
- (E) TREE TO BE REMOVED
- (E) ROADWAY
- (E) THALWEG
- (E) NORTH TOE OF SLOPE
- (N) NORTH TOE OF SLOPE
- LIMITS OF GRADING
- (N) ROADWAY
- (N) THALWEG ALIGNMENT

TREE REMOVAL SUMMARY

TREE SPECIES	DBH	NUMBER
BAY	16"	1
MADRONE	14"	2
MADRONE	18"	2
MADRONE	30"	1
OAK	16"	1
WILLOW	14"	1
WILLOW	12"	2

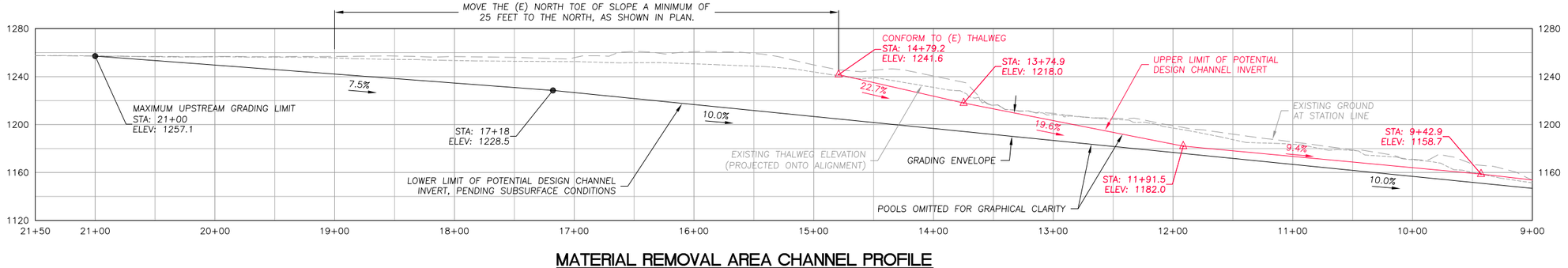
NOTES:

1. THE GRADING PLAN REFLECTS THE UPPER LIMIT OF POTENTIAL FINISHED GRADE CHANNEL PROFILES. REFER TO THE NOTES ON SHEET C25 FOR A DESCRIPTION OF PROPOSED METHODOLOGY FOR "FIELD-FITTING" THE DESIGN PROFILE TO ACCOMMODATE UNKNOWN SUBSURFACE CONDITIONS.
2. GRADING PLAN REFLECTS UPPER LIMIT OF POTENTIAL FINISHED GRADE CHANNEL PROFILES. REFER TO NOTES ON C25 FOR DESCRIPTION OF PROPOSED METHODOLOGY FOR " FIELD-FITTING" DESIGN PROFILE TO ACCOMMODATE UNKNOWN SUB-SURFACE BEDROCK PROFILE.
3. INSTALL BOULDER GROINS ON THE FLOODPLAIN BENCHES TO ADD ROUGHNESS AND DIRECT FLOW AWAY FROM BANKS.



MATERIAL REMOVAL AREA PLAN

SCALE: 1" = 40'



MATERIAL REMOVAL AREA CHANNEL PROFILE

SCALE: 1" = 50'

WATERWAYS CONSULTING INC.
509A SWIFT ST.
SANTA CRUZ, CA 95060
PH:(831)421-9291 // FAX:(888)819-6847
WWW.WATWAYS.COM

PRELIMINARY

NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:

LEHIGH HANSON HEIDELBERG CEMENT GROUP

MATERIAL REMOVAL AREA PLAN (2 OF 2)

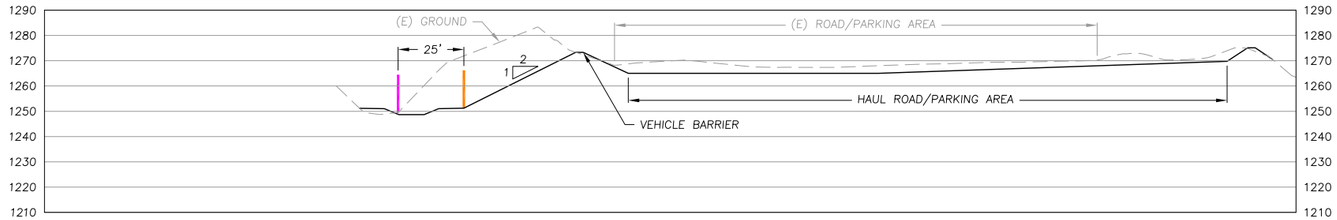
PERMANENTE CREEK RESTORATION PLAN

70% DESIGN SUBMITTAL

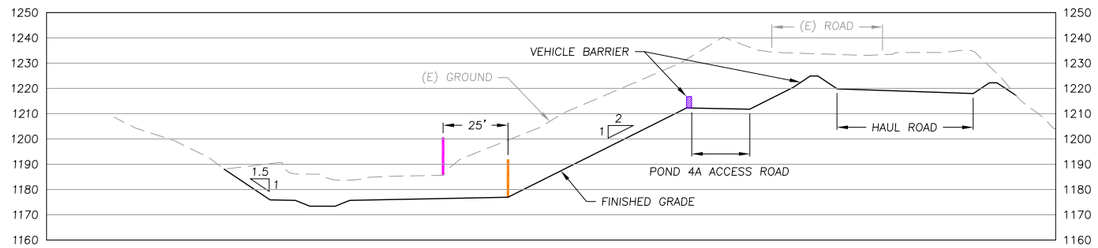
DESIGNED BY:	B.Z.
DRAWN BY:	B.M.S.
CHECKED BY:	M.W.W.
DATE:	04/27/15
JOB NO.:	13-016

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS

0 1"

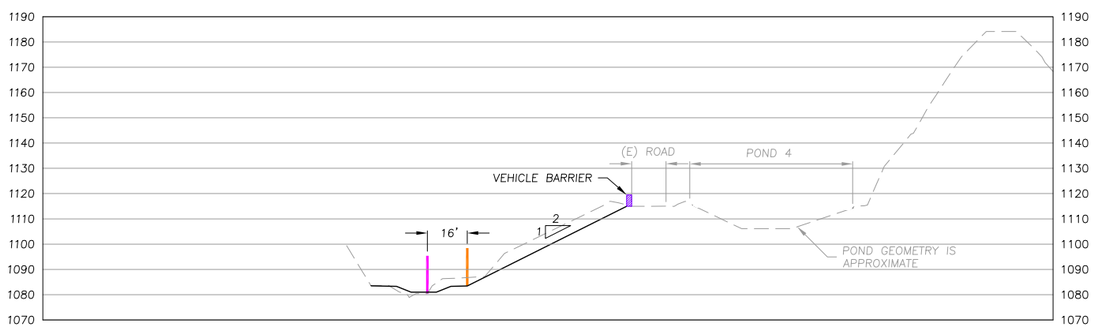


TYPICAL SECTION (D) C17 C18
SCALE: 1" = 30'



TYPICAL SECTION (C) C17 C18
SCALE: 1" = 30'

TYPICAL SECTION (B) C17 C18
SCALE: 1" = 30'



TYPICAL SECTION (A) C17 C18
SCALE: 1" = 30'

LEGEND

(E) NORTH SLOPE TOE

PROPOSED NORTH SLOPE TOE

WATERWAYS CONSULTING INC.
509A SWIFT ST.
SANTA CRUZ, CA 95060
PH:(831)421-9291 // FAX:(888)819-6847
WWW.WATWAYS.COM

PRELIMINARY

NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT GROUP

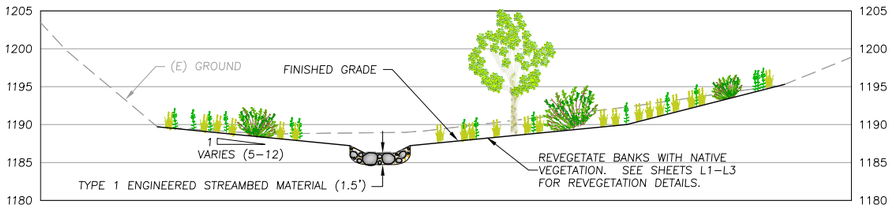
MATERIAL REMOVAL AREA SECTIONS (1 OF 2)

PERMANENTE CREEK RESTORATION PLAN

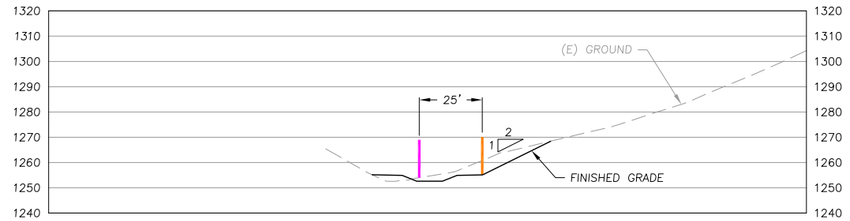
70% DESIGN SUBMITTAL

DESIGNED BY: B.M.Z.
DRAWN BY: B.M.S.
CHECKED BY: M.W.W.
DATE: 04/27/15
JOB NO.: 13-016

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"



TYPICAL SECTION
SCALE: 1" = 10'
F C17|C19

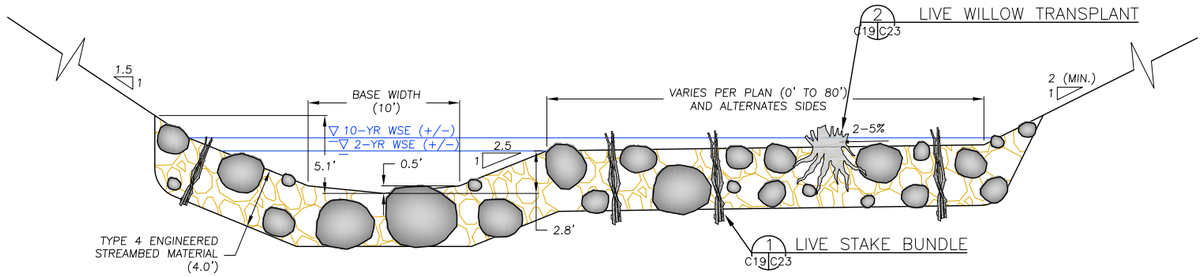


TYPICAL SECTION
SCALE: 1" = 30'
E C17|C19

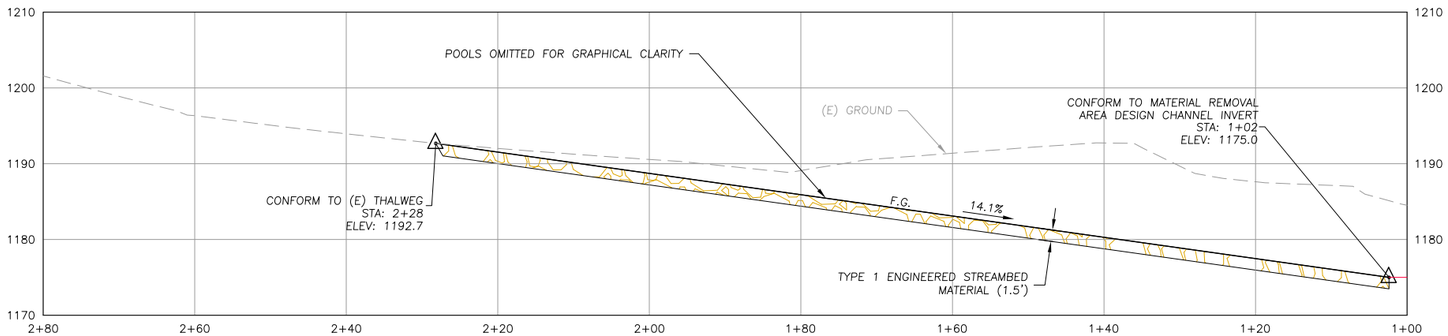
LEGEND

(E) NORTH SLOPE TOE

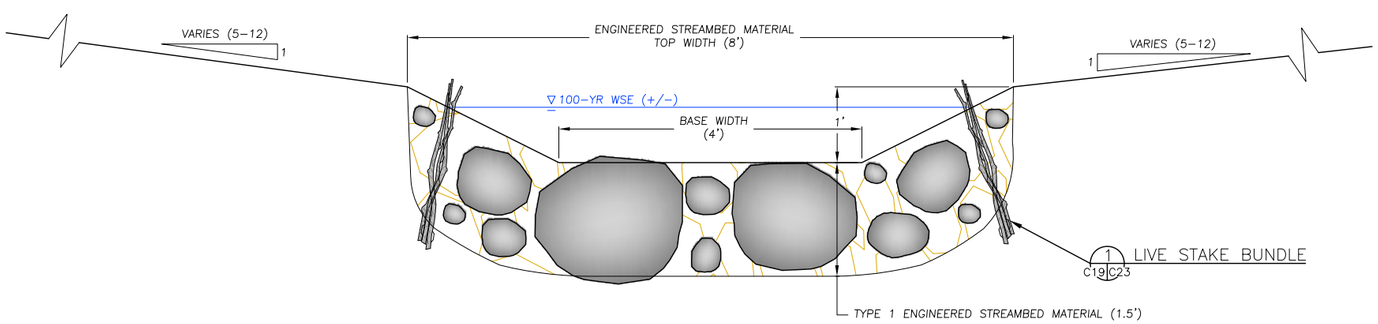
PROPOSED NORTH SLOPE TOE



TYPICAL CHANNEL TREATMENT SECTION
SCALE: 1" = 5'



MATERIAL REMOVAL AREA TRIBUTARY CHANNEL PROFILE
SCALE: 1" = 10'
A C17|C19



TYPICAL TRIBUTARY CHANNEL TREATMENT SECTION
SCALE: 1" = 1'

WATERWAYS CONSULTING INC.
509A SWIFT ST.
SANTA CRUZ, CA 95060
PH:(831)421-9291 // FAX:(888)819-6847
WWW.WATWAYS.COM

PRELIMINARY

NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT GROUP

MATERIAL REMOVAL AREA SECTIONS (2 OF 2)

PERMANENTE CREEK RESTORATION PLAN

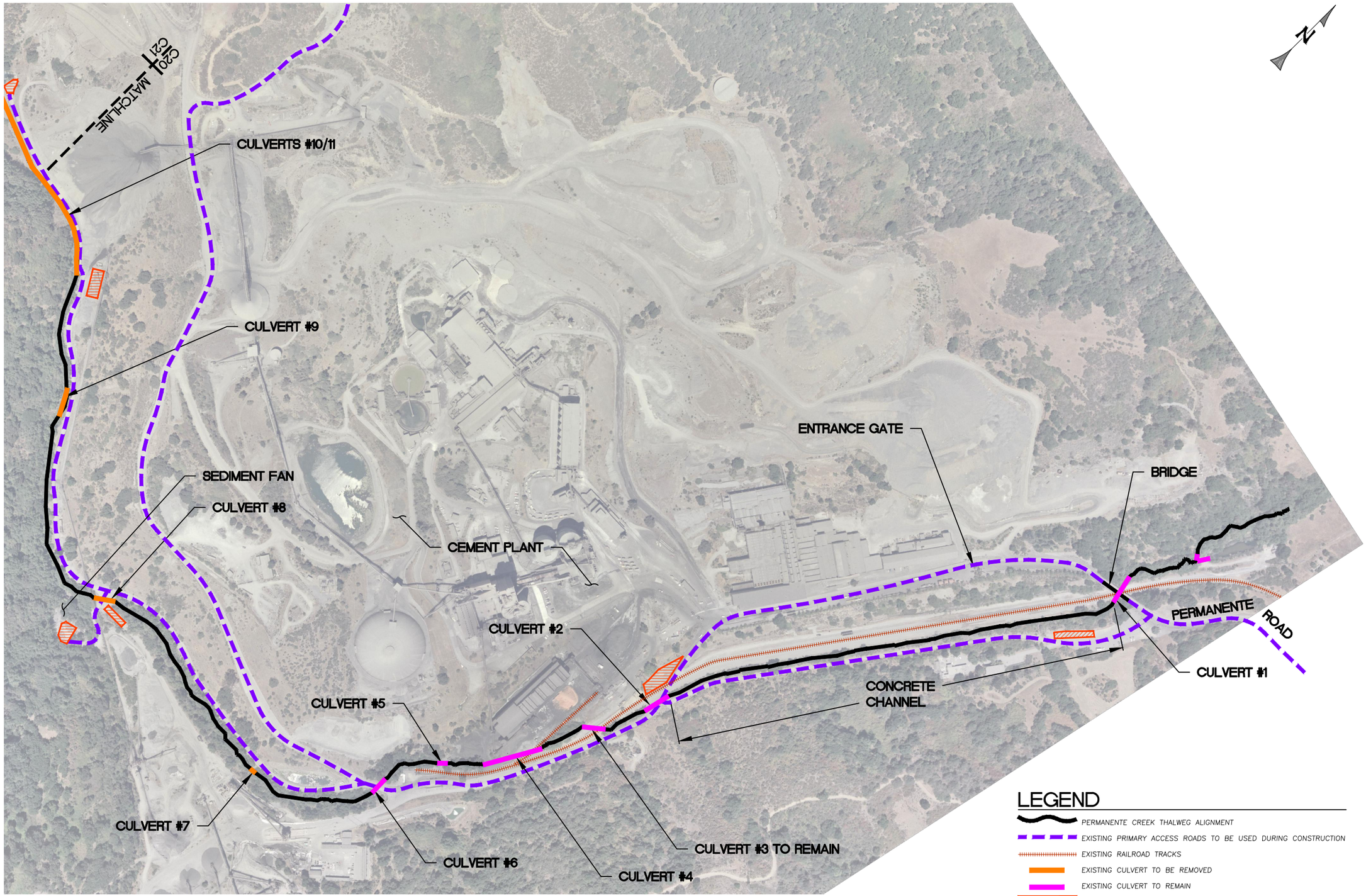
70% DESIGN SUBMITTAL

DESIGNED BY: B.Z.
DRAWN BY: B.M.S.
CHECKED BY: M.W.W.
DATE: 04/27/15
JOB NO.: 13-016

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

C19

19 OF 25



ACCESS AND STAGING PLAN
SCALE: 1"=200'

WATERWAYS CONSULTING INC.
509A SWIFT ST.
SANTA CRUZ, CA 95060
PH:(831)421-9291 // FAX:(888)819-6847
WWW.WATWAYS.COM

PRELIMINARY
NOT FOR CONSTRUCTION

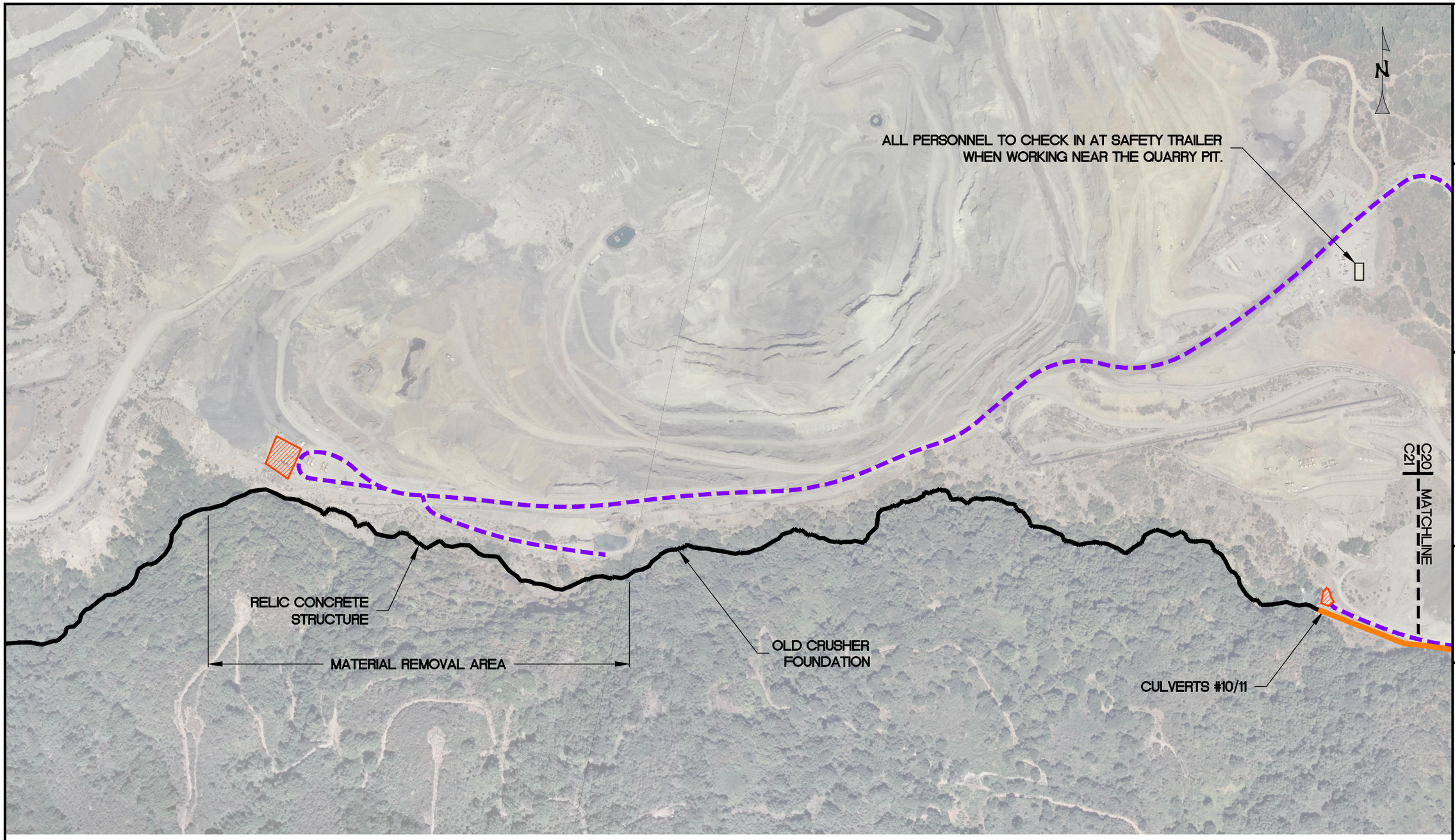
PREPARED AT THE REQUEST OF:
LEHIGH HANSON HEIDELBERG CEMENT GROUP

ACCESS AND STAGING PLAN (1 OF 2)

PERMANENTE CREEK RESTORATION PLAN
70% DESIGN SUBMITTAL

DESIGNED BY: B.M.S.
DRAWN BY: B.M.S.
CHECKED BY: M.W.W.
DATE: 04/27/15
JOB NO.: 13-016

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"



LEGEND

- PERMANENTE CREEK THALWEG ALIGNMENT
- EXISTING PRIMARY ACCESS ROADS TO BE USED DURING CONSTRUCTION
- EXISTING RAILROAD TRACKS
- EXISTING CULVERT TO BE REMOVED
- EXISTING CULVERT TO REMAIN
- STAGING AND STOCKPILE AREAS

ACCESS AND STAGING PLAN

SCALE: 1" = 200'

WATERWAYS CONSULTING INC.
509A SWIFT ST.
SANTA CRUZ, CA 95060
PH:(831)421-9291 // FAX:(888)819-6847
WWW.WATWAYS.COM

PRELIMINARY

NOT FOR CONSTRUCTION

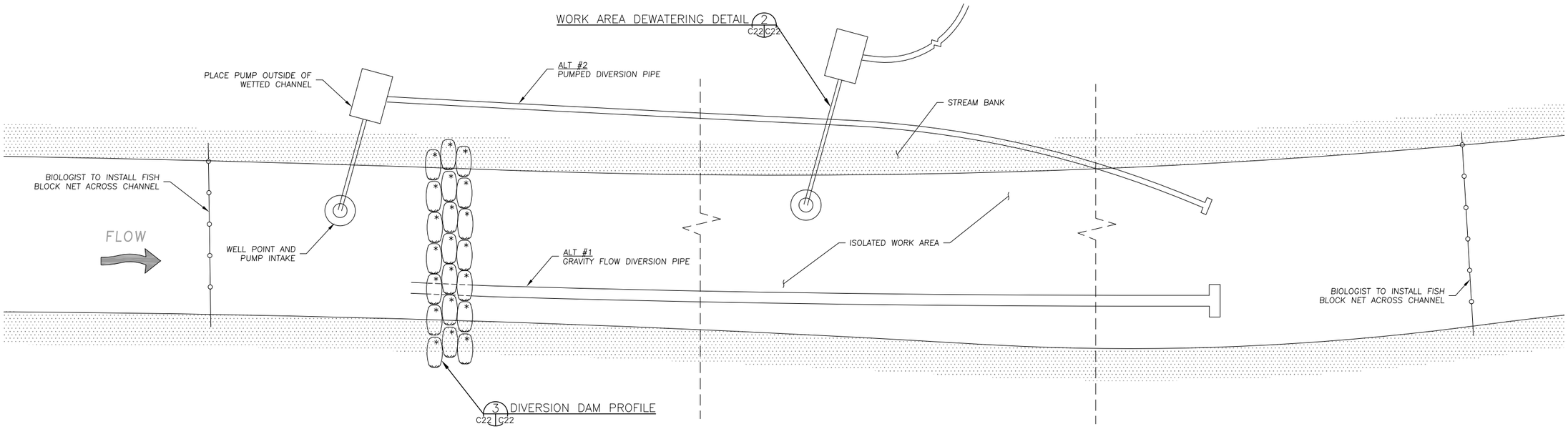
PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT
GROUP

ACCESS AND STAGING PLAN
(2 OF 2)

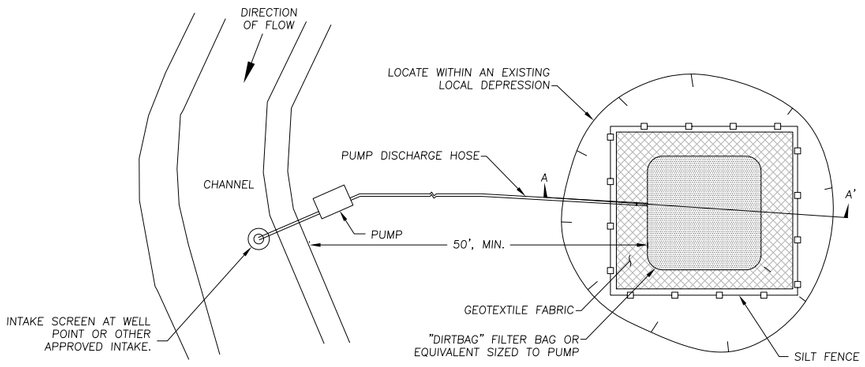
PERMANENTE CREEK
RESTORATION PLAN
70% DESIGN SUBMITTAL

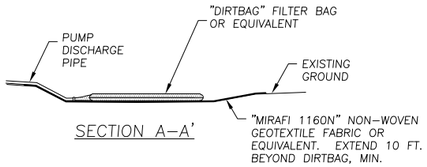
DESIGNED BY:	B.M.S.
DRAWN BY:	B.M.S.
CHECKED BY:	M.W.W.
DATE:	04/27/15
JOB NO.:	13-016

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"



TYPICAL DEWATERING PLAN
N.T.S. 1 C22 C22



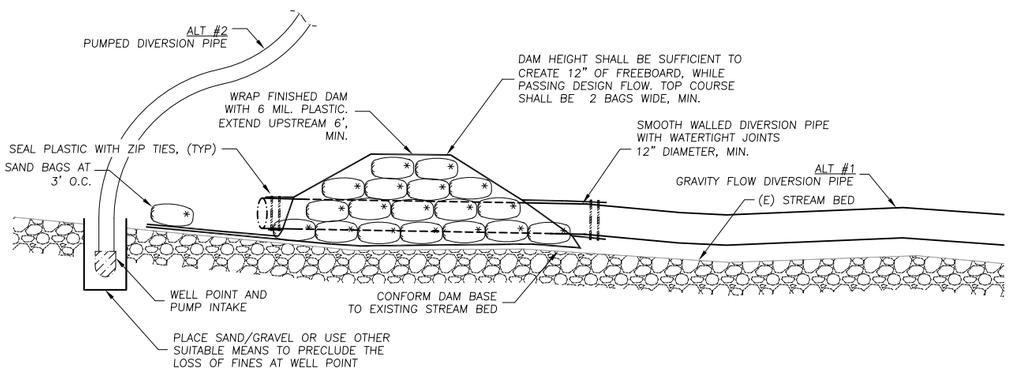


SECTION A–A'

DEWATERING DISCHARGE AREA NOTES:
1. DEWATERING SHALL COMPLY WITH ALL PROJECT PERMITS.
2. THIS DETAIL REPRESENTS A POTENTIAL OPTION FOR DEWATERING OF WORK AREAS.
3. PROPOSED FILTRATION METHODS WILL BE FIELD–FIT TO EXISTING CONDITIONS AT THE TIME OF CONSTRUCTION, AS APPROVED BY THE ENGINEER.
4. TURBID WATER SHALL BE DISCHARGED AT A LOCATION WHERE THERE IS AN EXISTING DEPRESSION AT A MINIMUM OF 50 FEET FROM THE EXISTING CHANNEL. EXACT LOCATION TO BE APPROVED BY THE ENGINEER. WHERE NATURAL DEPRESSION CANNOT BE FOUND, FILTER BAGS, "BAKER TANKS" OR OTHER APPROVED MEANS SHALL BE EMPLOYED.
5. NO OVERLAND FLOW SHALL BE ALLOWED TO DRAIN FROM A DISCHARGE AREA TO AN EXISTING OR PROPOSED CHANNEL.

WORK AREA DEWATERING DETAIL
N.T.S. 2 C22 C22

DIVERSION NOTES
1. THE DIVERSION PLAN SHOWN IS SCHEMATIC. CONTRACTOR SHALL SUBMIT A SITE DIVERSION/DEWATERING PLAN FOR APPROVAL BY THE ENGINEER. THE BASIC REQUIREMENTS OF THE DIVERSION PLAN ARE SPECIFIED IN THE SPECIAL PROVISIONS.
2. THE TYPICAL DEWATERING PLAN SHOWN DEPICTS TWO SEPARATE TYPES OF DIVERSION STRUCTURES TO BE INSTALLED AND MAINTAINED DURING CONSTRUCTION. THESE STRUCTURES MAY BE USED SEPARATELY OR IN TANDEM AS NECESSARY TO MEET WATER QUALITY REQUIREMENTS.
3. DIVERSION PIPES MAY BE RELOCATED DURING CONSTRUCTION.



DIVERSION DAM PROFILE
N.T.S. 3 C22 C22

NOTE: CONTRACTOR MAY USE ALTERNATE DAM DETAIL, SUBJECT TO APPROVAL OF THE ENGINEER AND THE PERMITTING AGENCIES.

WATERWAYS CONSULTING INC.
509A SWIFT ST.
SANTA CRUZ, CA 95060
PH:(831)421-9291 // FAX:(888)819-6847
WWW.WATWAYS.COM

PRELIMINARY
NOT FOR CONSTRUCTION

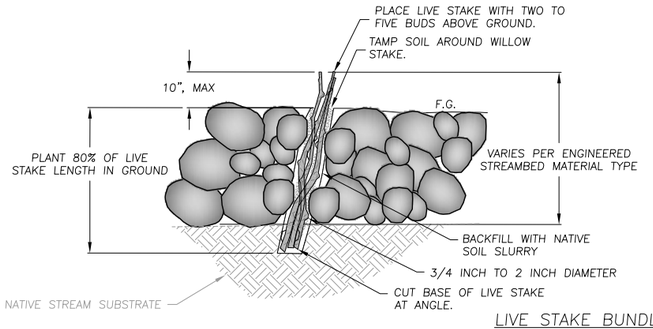
PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT GROUP

DEWATERING DETAILS

PERMANENTE CREEK RESTORATION PLAN
70% DESIGN SUBMITTAL

DESIGNED BY:	–
DRAWN BY:	B.M.S.
CHECKED BY:	M.W.W.
DATE:	04/27/15
JOB NO.:	13-016

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

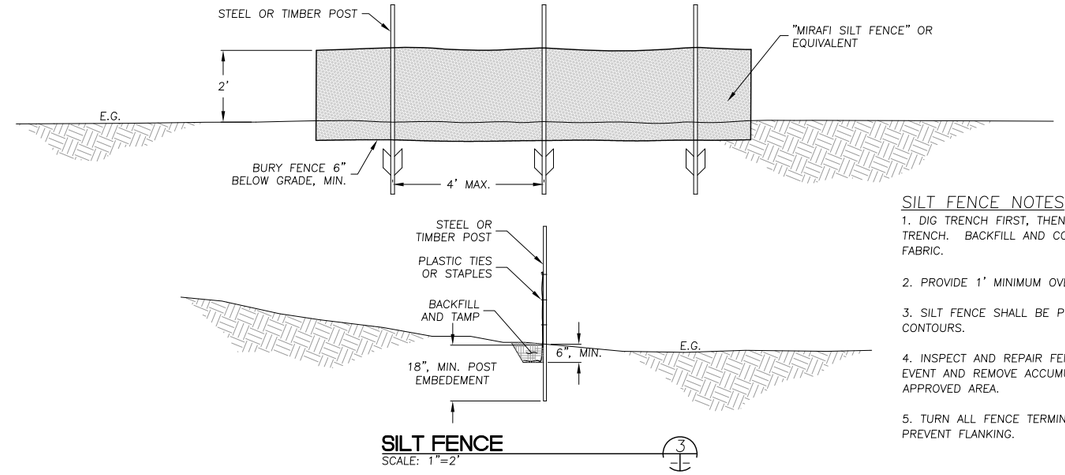


LIVE STAKE BUNDLE

N.T.S. — 1

LIVE STAKE BUNDLE NOTES:

1. LIVE STAKE BUNDLES TO BE INSTALLED WITHIN ENGINEERED STREAMBED MATERIAL ON EXCAVATED FLOODPLAINS AND WITHIN FLOODPLAIN ARMOR AT 7' ON-CENTER SPACING.
2. LIVE STAKE BUNDLES SHALL CONTACT NATIVE SOIL.
3. LIVE STAKE BUNDLES TO CONSIST OF LIVE STAKES 3/4"-2" IN DIA. AT THE BASAL END.
4. TOP ENDS OF STAKES SHALL BE BLUNT AND BASAL ENDS SHALL BE ANGLED AT 45 DEGREES.
5. PLACE LIVE STAKE BUNDLES COINCIDENT WITH THE ENGINEERED STREAMBED MATERIAL AND FLOODPLAIN ARMOR.
6. AFTER PLACEMENT, BACKFILL AND WATER-JET ALL VOIDS AROUND LIVE STAKE BUNDLES TO REMOVE AIR POCKETS.
7. AFTER INSTALLATION CLEANLY CUT EACH STAKE TO LEAVE 10" EXPOSED, MAX.

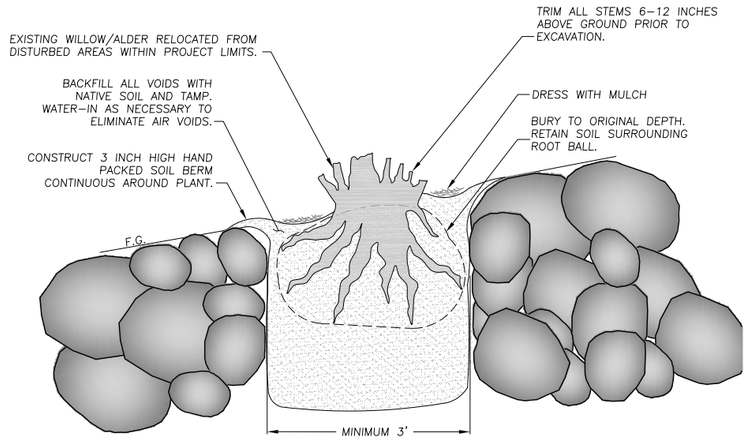


SILT FENCE

SCALE: 1"=2' — 3

SILT FENCE NOTES

1. DIG TRENCH FIRST, THEN ERECT FENCE IN TRENCH. BACKFILL AND COMPACT SOIL TO SECURE FABRIC.
2. PROVIDE 1' MINIMUM OVERLAP AT FENCE SPLICES.
3. SILT FENCE SHALL BE PLACED ON SLOPE CONTOURS.
4. INSPECT AND REPAIR FENCE AFTER EACH STORM EVENT AND REMOVE ACCUMULATED SEDIMENT, TO AN APPROVED AREA.
5. TURN ALL FENCE TERMINATIONS UPSLOPE TO PREVENT FLANKING.

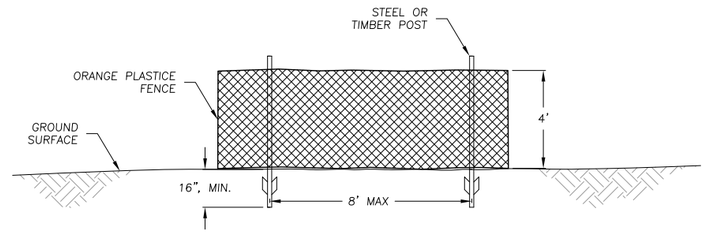


WILLOW TRANSPLANT DETAIL

SCALE: N.T.S. — 2

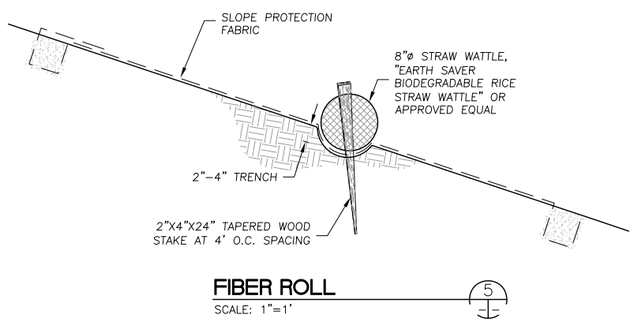
WILLOW TRANSPLANT NOTES:

1. SALVAGE:
   - 1.1. LIVE SHRUBS TO BE SALVAGED FOR TRANSPLANTING WILL BE FLAGGED IN THE FIELD BY THE ENGINEER.
   - 1.2. PRIOR TO REMOVAL, LOP BRANCHES TO 6-12 INCHES ABOVE THE ROOT CROWN, USING SHARP, CLEAN TOOLS.
   - 1.3. REMOVE THE ROOTWAD AND A MINIMUM EIGHTEEN INCH LAYER (AT SIDES AND BASE) OF ROOTS AND SOIL FROM THE GROUND AND EITHER TRANSPORT DIRECTLY TO THE PROPOSED LOCATION FOR INSTALLATION, OR STORE AS OUTLINED BELOW. PERFORM SALVAGE AND RELOCATION IN SUCH A MANNER AS TO MINIMIZE HANDLING AND ASSOCIATED DISTURBANCE TO THE SOIL BOUND BY THE ROOTS.
   - 1.4. IMMEDIATELY COVER LIVE SHRUBS WITH A SINGLE LAYER OF SATURATED BURLAP TO PREVENT DESICCATION OF THE ROOTS, AND PLACED UNDER SHADE COVERING IF THE LIVE SHRUB IS NOT PLANTED WITHIN FIFTEEN MINUTES OF SALVAGE. CONTRACTOR SHALL MAINTAIN SATURATION OF THE BURLAP AND SOIL MASS UNTIL PLANTED.
   - 1.5. DO NOT STACK LIVE SHRUBS ON TOP OF ONE ANOTHER DURING STORAGE.
   - 1.6. IN NO EVENT SHALL SALVAGED ROOTWADS BE STORED FOR PERIODS EXCEEDING 72 HOURS, WITHOUT PRIOR WRITTEN PERMISSION OF THE ENGINEER.
2. INSTALLATION
   - 2.1. PLACE LIVE SHRUBS AT FLOODPLAIN LOCATIONS FLAGGED IN THE FIELD BY THE ENGINEER.
   - 2.2. PLACE THE EXCAVATED ROOTWAD IN A PRE-PREPARED HOLE. FILL THE HOLE WITH WATER IMMEDIATELY PRIOR TO PLANTING. SCARIFY THE SIDES OF THE PLANTING HOLE PRIOR TO PLANTING.
   - 2.3. REMOVE BURLAP PRIOR TO PLANTING. BACKFILL THE HOLE HALF WAY WITH NATIVE SOIL AND JET WITH WATER TO REMOVE VOIDS AFTER PLACEMENT. CONTINUE TO ADD SOIL AND WATER UNTIL THE SATURATED BACKFILL MATERIAL COVERS THE TOP OF THE ROOT CROWN TO THE APPROXIMATE ORIGINAL DEPTH OF SOIL, PRIOR TO SALVAGE.



BOUNDARY FENCE DETAIL

SCALE: 1"=3' — 4



FIBER ROLL

SCALE: 1"=1' — 5

WATERWAYS CONSULTING INC.
509A SWIFT ST.
SANTA CRUZ, CA 95060
PH:(831)421-9291 // FAX:(888)819-6847
WWW.WATWAYS.COM

PRELIMINARY
NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT
GROUP

MISCELLANEOUS DETAILS

PERMANENTE CREEK
RESTORATION PLAN
70% DESIGN SUBMITTAL

DESIGNED BY:	-
DRAWN BY:	B.M.S.
CHECKED BY:	M.W.W.
DATE:	04/27/15
JOB NO.:	13-016

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 — 1"

C23 | 23 OF 25

ROCK SPECIFICATIONS

THERE SHALL BE THREE CLASSES OF ROCK SPECIFIED ON THIS PROJECT;
(1) – ENGINEERED STREAMBED MATERIAL
(2) – FLOODPLAIN ARMOR
(3) – ROCK SLOPE PROTECTION (R.S.P.)

ALL IMPORTED ROCK SHALL CONFORM TO THE FOLLOWING QUALITY REQUIREMENTS:

1) ROCK SHALL BE RESISTANT TO WEATHERING AND WATER ACTION AND FREE OF ORGANIC OR OTHER UNSUITABLE MATERIAL. DO NOT USE SHALE, ROCK WITH SHALE SEAMS, OR OTHER FISSILE OR FISSURED ROCK THAT MAY BREAK INTO SMALLER PIECES IN THE PROCESS OF HANDLING AND PLACING.
2) ROCK SHALL BE SUB–ROUNDED TO SUB–ANGULAR IN SHAPE.
3) ROCK SHALL BE GRANITE OR HAVE A SPECIFIC GRAVITY EQUAL TO OR GREATER THAN THAT OF GRANITE.
4) COLOR AND TEXTURE SHALL BE CONSTANT THROUGHOUT THE STOCKPILE.

SAMPLES OF ALL IMPORTED ROCK SHALL BE PROVIDED TO THE ENGINEER FOR APPROVAL, PRIOR TO STOCKPILING ON SITE.

INDIVIDUAL ROCK CLASSES AND PLACEMENT METHODS ARE FURTHER DEFINED AS FOLLOWS:

1 – ENGINEERED STREAMBED MATERIAL

ENGINEERED STREAMBED MATERIAL SHALL CONSIST OF SANDS, GRAVELS, COBBLES, AND BOULDERS FREE OF ORGANIC MATTER, AND MEETING THE FOLLOWING GRADATION SPECIFICATIONS (REFER TO DRAWINGS FOR TYPE LOCATIONS):

TYPE 1 GRADATION:

U.S. SIEVE SIZE	PERCENT PASSING (BY WEIGHT)
18"	100
12"	60–85
8"	40–60
4"	25–40
0.6"	10–20
No. 4	5–10

TYPE 2 GRADATION:

U.S. SIEVE SIZE	PERCENT PASSING (BY WEIGHT)
30"	100
24"	60–85
12"	40–60
4"	25–40
0.6"	10–20
No. 4	5–10

TYPE 3 GRADATION:

U.S. SIEVE SIZE	PERCENT PASSING (BY WEIGHT)
40"	100
30"	60–85
16"	40–60
8"	25–40
4"	15–25
0.6"	10–15
No. 4	5–10

TYPE 4 GRADATION:

U.S. SIEVE SIZE	PERCENT PASSING (BY WEIGHT)
48"	100
36"	60–85
20"	40–60
10"	25–40
4"	15–25
0.6"	10–15
No. 4	5–10

A) ENGINEERED STREAMBED MATERIAL SHALL BE PLACED TO THE LINES, GRADES AND DEPTHS SHOWN ON THE DRAWINGS, OR AS DIRECTED BY THE ENGINEER. UNIFORMLY DISTRIBUTE LARGE STONES TO PRODUCE THE REQUIRED GRADATION OF ROCK. PREVENT CONTAMINATION OF ROCK MATERIALS BY EXCAVATION AND/OR EARTH MATERIALS.

B) FOLLOWING PLACEMENT, ROCK SURFACE SHALL BE JETTED WITH WATER TO IMPROVE COMPACTION AND EMBED THE FINES WITHIN THE MIX. JETTING SHALL START AT THE UPSTREAM LIMITS OF PLACEMENT AND PROGRESS DOWNSTREAM. JETTING SHALL CONTINUE UNTIL THE TURBIDITY LEVELS OF RUNOFF PRODUCED FROM THE JETTING PROCESS HAVE REACHED AN ACCEPTABLE LEVEL AS DETERMINED BY THE ENGINEER. ALL SEDIMENT–LADEN RUNOFF GENERATED BY THE JETTING OPERATIONS SHALL BE PUMPED TO A SETTLING TANK OR SIMILAR DEVICE TO REDUCE TURBIDITY TO ACCEPTABLE LEVELS, IN COMPLIANCE WITH PERMIT CONDITIONS, PRIOR TO DISCHARGE TO THE CREEK.

2 – FLOODPLAIN ARMOR

FLOODPLAIN ARMOR MATERIAL SHALL CONSIST OF SANDS, GRAVELS, COBBLES, AND BOULDERS FREE OF ORGANIC MATTER, AND MEETING THE FOLLOWING GRADATION SPECIFICATIONS (REFER TO DRAWINGS FOR TYPE LOCATIONS):

TYPE 1 GRADATION:

TYPE 1 FLOODPLAIN ARMOR SHALL COMPLY WITH THE ENGINEERED STREAMBED MATERIAL TYPE 1 GRADATION.

TYPE 2 GRADATION:

U.S. SIEVE SIZE	PERCENT PASSING (BY WEIGHT)
24"	100
18"	60–85
12"	40–60
6"	25–40
3"	10–25
No. 4	5–15
No. 10	0–5

TYPE 3 GRADATION:

U.S. SIEVE SIZE	PERCENT PASSING (BY WEIGHT)
30"	100
24"	60–85
18"	40–60
6"	25–40
3"	10–25
No. 4	5–15
No. 10	0–5

TYPE 4 GRADATION:

TYPE 4 FLOODPLAIN ARMOR SHALL COMPLY WITH THE ENGINEERED STREAMBED MATERIAL TYPE 4 GRADATION.

A) FLOODPLAIN ARMOR MATERIAL SHALL BE PLACED TO THE LINES, GRADES AND DEPTHS SHOWN ON THE DRAWINGS, OR AS DIRECTED BY THE ENGINEER. UNIFORMLY DISTRIBUTE LARGE STONES TO PRODUCE THE REQUIRED GRADATION OF ROCK. PREVENT CONTAMINATION OF ROCK MATERIALS BY EXCAVATION AND/OR EARTH MATERIALS.

B) FOLLOWING PLACEMENT, ROCK SURFACE SHALL BE JETTED WITH WATER TO IMPROVE COMPACTION AND EMBED THE FINES WITHIN THE MIX. JETTING SHALL START AT THE UPSTREAM LIMITS OF PLACEMENT AND PROGRESS DOWNSTREAM. JETTING SHALL CONTINUE UNTIL THE TURBIDITY LEVELS OF RUNOFF PRODUCED FROM THE JETTING PROCESS HAVE REACHED AN ACCEPTABLE LEVEL AS DETERMINED BY THE ENGINEER. ALL SEDIMENT–LADEN RUNOFF GENERATED BY THE JETTING OPERATIONS SHALL BE PUMPED TO A SETTLING TANK OR SIMILAR DEVICE TO REDUCE TURBIDITY TO ACCEPTABLE LEVELS, IN COMPLIANCE WITH PERMIT CONDITIONS, PRIOR TO DISCHARGE TO THE CREEK.

3 – ROCK SLOPE PROTECTION

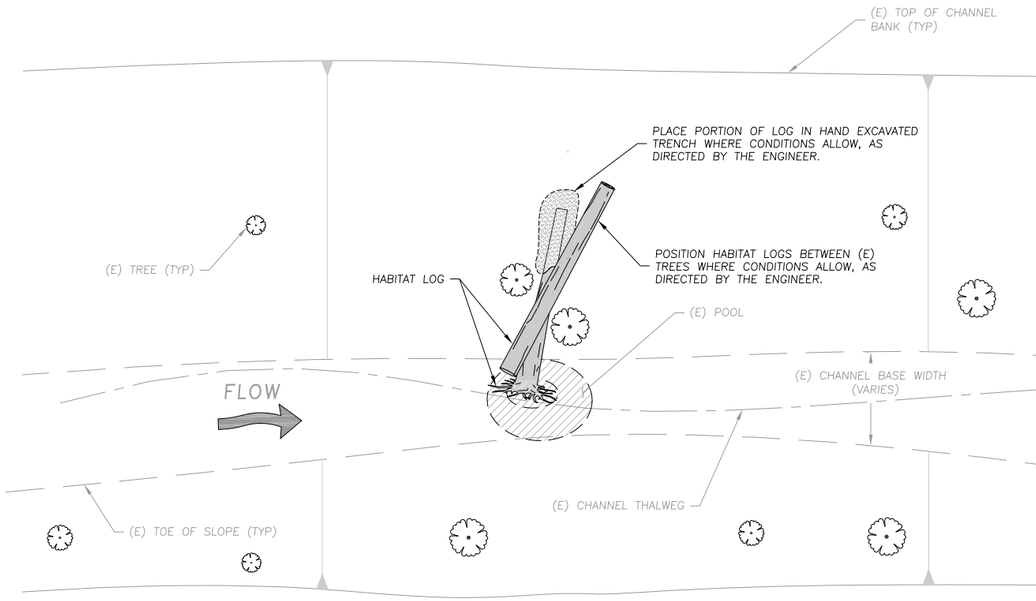
A) ROCK SLOPE PROTECTION SHALL CONFORM TO SECTION 72–2.02 MATERIALS OF THE STANDARD SPECIFICATIONS FOR 1/2 TON ROCK.

B) BACKFILL MATERIAL CONSISTING OF GRANULAR NATIVE STREAMBED MATERIAL SHALL BE USED TO BACKFILL VOIDS WITHIN THE ROCK SLOPE PROTECTION. IF GRANULAR NATIVE MATERIAL IS NOT AVAILABLE CONTRACTOR SHALL BLEND SAND, GRAVELS, AND NATIVE SOILS TO THE SATISFACTION OF THE ENGINEER FOR USE IN BACKFILLING THE RSP VOIDS.

C) BACKFILL MATERIAL SHALL BE PLACED TO MATCH THE FINISHED SURFACE OF THE RSP AND WATER JETTED TO FILL ALL VOIDS, AS DIRECTED BY THE ENGINEER.

ROCK SLOPE PROTECTION FABRIC
1. GEOTEXTILE FABRIC SHALL BE PLACED BELOW ROCK SLOPE PROTECTION.
2. GEOTEXTILE FABRIC SHALL BE NON–WOVEN, GEOTEX 1601, AS MANUFACTURED BY SYNTHETIC INDUSTRIES; OR MIRAFI 1160N, AS MANUFACTURED BY TC MIRAFI; OR APPROVED EQUAL.

INSTALLATION
1. PREPARE SURFACE TO RECEIVE THE GEOTEXTILE TO A RELATIVELY SMOOTH CONDITION, FREE OF OBSTRUCTIONS, DEPRESSIONS, DEBRIS, AND SOFT OR LOW DENSITY POCKETS OF MATERIAL.
2. PLACE AND SECURE A LAYER OF GEOTEXTILE FABRIC BELOW THE FIRST ROCK LAYER. AT THE TIME OF INSTALLATION, THE GEOTEXTILE SHALL BE REJECTED IF IT HAS DEFECTS, RIPS, HOLES, FLAWS, DETERIORATION, OR DAMAGE INCURRED DURING MANUFACTURE, TRANSPORTATION, OR STORAGE.
3. PLACE GEOTEXTILE WITH THE LONG DIMENSION PARALLEL TO FLOW AND LAID SMOOTH AND FREE OF TENSION, STRESS, FOLDS, WRINKLES, OR CREASES.



HABITAT LOG PLAN
SCALE: 1" = 5'

HABITAT LOG NOTES:

1. GENERAL

1.1. PLACE TWO HABITAT LOGS AT FOUR LOCATIONS PER REACH IN REACHES R14 TO R16 AND R19 TO R21 (SEE SHEET C2 FOR REACH LOCATIONS).

1.2. HABITAT LOGS SHALL BE LOCALLY SOURCED FROM EXISTING LIVE AND DEAD TREES. TREES TO BE SALVAGE WILL BE FLAGGED IN THE FIELD AT THE TIME OF CONSTRUCTION BY THE PROJECT ENGINEER AND ARBORIST. SALVAGE DOWNED TREES WHERE POSSIBLE, PREFERABLY WITH THE ROOTWAD INTACT. IF DOWNED LOGS ARE NOT AVAILABLE, THE PROJECT ARBORIST WILL IDENTIFY TREES TO BE FELLED. LOGS SHALL BE OAK, WILLOW, OR ALDER.

1.3. LOCATIONS FOR HABITAT LOG PLACEMENT WILL BE DETERMINED BY THE ENGINEER AND FISHERIES BIOLOGIST AT THE TIME OF CONSTRUCTION. FINAL LOCATIONS SHALL BE BASED ON LOCAL GEOMORPHIC CONDITIONS AND THE AVAILABILITY OF EXISTING POOLS AND SUITABLE LOGS, MEETING THE CRITERIA BELOW.

1.4. INCORPORATE HABITAT LOGS INTO EXISTING POOLS WHEN LOCALLY AVAILABLE.

2. LOG PLACEMENT AND DIMENSIONS

2.1. HABITAT LOG DESIGNS ARE SHOWN CONCEPTUALLY DUE TO THE INHERENT VARIABILITY OF MATERIAL PROPERTIES. THE DESIGN REQUIRES THAT THE ENGINEER OBSERVE INSTALLATION OF THE HABITAT LOGS TO ENSURE THE INTENT OF THE DESIGN IS MET. OBSERVATIONS WILL INCLUDE LOG SELECTION, PLACEMENT, AND ANCHORING STABILIZATION.

2.2. HABITAT LOGS SHALL BE A MINIMUM OF 12 FT. IN LENGTH AND 1 FT. IN DIAMETER, ALONG THE LENGTH OF THE LOG.

2.3. POSITION HABITAT LOGS BETWEEN EXISTING TREES WITH A PORTION OF THE LOG BURIED IN A TRENCH WHERE CONDITIONS ALLOW. CABLING WILL NOT BE EMPLOYED THEREFORE, LOGS MAY BE MOBILIZED DURING LARGE FLOODING EVENTS.

WATERWAYS CONSULTING INC.
509A SWIFT ST.
SANTA CRUZ, CA 95060
PH:(831)421-9291 // FAX:(888)819-6847
WWW.WATWAYS.COM

PRELIMINARY
NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT GROUP

HABITAT LOG DETAILS AND ROCK SPECIFICATIONS

PERMANENTE CREEK RESTORATION PLAN
70% DESIGN SUBMITTAL

DESIGNED BY: B.M.Z.
DRAWN BY: B.M.Z.
CHECKED BY: M.W.W.
DATE: 04/27/15
JOB NO.: 13-016

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

GENERAL NOTES CONTINUED

1. ALL CONSTRUCTION AND MATERIALS SHALL CONFORM TO THE MAY 2010 EDITION OF THE STATE OF CALIFORNIA STANDARD SPECIFICATIONS, ISSUED BY THE DEPARTMENT OF TRANSPORTATION (HEREAFTER REFERRED TO AS "STANDARD SPECIFICATIONS").

2. THE ENGINEER SHALL BE NOTIFIED AT LEAST 48 HOURS PRIOR TO CONSTRUCTION. THE ENGINEER OR A DESIGNATED REPRESENTATIVE SHALL MONITOR THE CONSTRUCTION PROCESS, AS NECESSARY, TO ENSURE PROPER INSTALLATION PROCEDURES.

3. EXISTING UNDERGROUND UTILITY LOCATIONS:

   A. PRIOR TO BEGINNING WORK, THE CONTRACTOR SHALL CONTACT ALL UTILITIES COMPANIES WITH REGARD TO WORKING OVER, UNDER, OR AROUND EXISTING FACILITIES AND TO OBTAIN INFORMATION REGARDING RESTRICTIONS THAT ARE REQUIRED TO PREVENT DAMAGE TO THE FACILITIES.

   B. LOCATIONS SHOWN ARE COMPILED FROM INFORMATION SUPPLIED BY THE APPROPRIATE UTILITY AGENCIES AND FROM FIELD MEASUREMENTS TO ABOVE GROUND FEATURES READILY VISIBLE AT THE TIME OF SURVEY. LOCATIONS SHOWN ARE APPROXIMATE. THE CONTRACTOR IS CAUTIONED THAT ONLY ACTUAL EXCAVATION WILL REVEAL THE DIMENSIONS, SIZES, MATERIALS, LOCATIONS, AND DEPTH OF UNDERGROUND UTILITIES.

   C. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR THE LOCATION AND/OR PROTECTION OF ALL EXISTING AND PROPOSED PIPING, UTILITIES, TRAFFIC SIGNAL EQUIPMENT (BOTH ABOVE GROUND AND BELOW GROUND), STRUCTURES, AND ALL OTHER EXISTING IMPROVEMENTS THROUGHOUT CONSTRUCTION.

   D. PRIOR TO COMMENCING FABRICATION OR CONSTRUCTION, CONTRACTOR SHALL DISCOVER OR VERIFY THE ACTUAL DIMENSIONS, SIZES, MATERIALS, LOCATIONS, AND ELEVATIONS OF ALL EXISTING UTILITIES AND POTHOLE THOSE AREAS WHERE POTENTIAL CONFLICTS ARE LIKELY OR DATA IS OTHERWISE INCOMPLETE.

   E. CONTRACTOR SHALL TAKE APPROPRIATE MEASURES TO PROTECT EXISTING UTILITIES DURING CONSTRUCTION OPERATIONS, AND SHALL BE SOLELY RESPONSIBLE FOR THE COST OF REPAIR/REPLACEMENT OF ANY EXISTING UTILITIES DAMAGED DURING CONSTRUCTION. CONTRACTOR TO CALL UNDERGROUND SERVICE ALERT (1-800-642-2444) TO LOCATE ALL UNDERGROUND UTILITY LINES PRIOR TO COMMENCING CONSTRUCTION.

   F. UPON LEARNING OF THE EXISTENCE AND/OR LOCATIONS OF ANY UNDERGROUND FACILITIES NOT SHOWN OR SHOWN INACCURATELY ON THE PLANS OR NOT PROPERLY MARKED BY THE UTILITY OWNER, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE UTILITY OWNER AND THE CITY BY TELEPHONE AND IN WRITING.

   G. UTILITY RELOCATIONS REQUIRED FOR THE CONSTRUCTION OF THE PROJECT FACILITIES WILL BE PERFORMED BY THE UTILITY COMPANY, UNLESS OTHERWISE NOTED.

12. SHOULD THE CONTRACTOR DISCOVER ANY DISCREPANCIES BETWEEN THE CONDITIONS EXISTING IN THE FIELD AND THE INFORMATION SHOWN ON THESE DRAWINGS, HE SHALL NOTIFY THE ENGINEER PRIOR TO PROCEEDING WITH CONSTRUCTION.

13. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO BE FULLY INFORMED OF AND TO COMPLY WITH ALL LAWS, ORDINANCES, CODES, REQUIREMENTS AND STANDARDS WHICH IN ANY MANNER AFFECT THE COURSE OF CONSTRUCTION OF THIS PROJECT, THOSE ENGAGED OR EMPLOYED IN THE CONSTRUCTION AND THE MATERIALS USED IN THE CONSTRUCTION.

14. ANY TESTS, INSPECTIONS, SPECIAL OR OTHERWISE, THAT ARE REQUIRED BY THE BUILDING CODES, LOCAL BUILDING DEPARTMENTS, OR THESE PLANS, SHALL BE DONE BY AN INDEPENDENT INSPECTION COMPANY. JOB SITE VISITS BY THE ENGINEER DO NOT CONSTITUTE AN OFFICIAL INSPECTION. OBSERVATION AND TESTING SERVICES ARE REQUIRED BY THE GEOTECHNICAL ENGINEER AS OUTLINED IN THE GEOTECHNICAL REPORT. IT IS THE CONTRACTORS RESPONSIBILITY TO ENSURE THAT THE WORK IS COORDINATED WITH THE GEOTECHNICAL ENGINEER AND THAT REQUIRED TESTS AND INSPECTIONS ARE PERFORMED.

15. PROJECT SCHEDULE: PRIOR TO COMMENCEMENT OF WORK, CONTRACTOR SHALL PROVIDE ENGINEER A DETAILED CONSTRUCTION SCHEDULE FOR APPROVAL. THE CONTRACTOR SHALL NOT BEGIN ANY CONSTRUCTION WORK UNTIL THE PROJECT SCHEDULE AND WORK PLAN IS APPROVED BY THE ENGINEER. ALL CONSTRUCTION SHALL BE CLOSELY COORDINATED WITH THE ENGINEER SO THAT THE QUALITY OF WORK CAN BE CHECKED FOR APPROVAL. THE CONTRACTOR SHALL PURSUE WORK IN A CONTINUOUS AND DILIGENT MANNER TO ENSURE A TIMELY COMPLETION OF THE PROJECT.

16. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DESIGN, PERMITTING, INSTALLATION, AND MAINTENANCE OF ANY AND ALL TRAFFIC CONTROL MEASURES DEEMED NECESSARY.

17. THE CONTRACTOR SHALL BE RESPONSIBLE FOR GENERAL SAFETY DURING CONSTRUCTION. ALL WORK SHALL CONFORM TO PERTINENT SAFETY REGULATIONS AND CODES. THE CONTRACTOR SHALL BE SOLELY AND COMPLETELY RESPONSIBLE FOR FURNISHING, INSTALLING, AND MAINTAINING ALL WARNING SIGNS AND DEVICES NECESSARY TO SAFEGUARD THE GENERAL PUBLIC AND THE WORK, AND PROVIDE FOR THE PROPER AND SAFE ROUTING OF VEHICULAR AND PEDESTRIAN TRAFFIC DURING THE PERFORMANCE OF THE WORK. THE CONTRACTOR SHALL BE SOLELY AND COMPLETELY RESPONSIBLE FOR COMPLIANCE WITH ALL APPLICABLE PROVISIONS OF OSHA IN THE CONSTRUCTION PRACTICES FOR ALL EMPLOYEES DIRECTLY ENGAGED IN THE CONSTRUCTION OF THIS PROJECT.

18. CONSTRUCTION CONTRACTOR AGREES THAT IN ACCORDANCE WITH GENERALLY ACCEPTED CONSTRUCTION PRACTICES, CONSTRUCTION CONTRACTOR WILL BE REQUIRED TO ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THE PROJECT, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY; THAT THIS REQUIREMENT SHALL BE MADE TO APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS, AND CONSTRUCTION CONTRACTOR FURTHER AGREES TO DEFEND, INDEMNIFY AND HOLD DESIGN PROFESSIONAL HARMLESS FROM ANY AND ALL LIABILITY, REAL OR ALLEGED, IN CONNECTION WITH THE PERFORMANCE OF WORK ON THIS PROJECT, EXCEPTION LIABILITY ARISING FROM THE SOLE NEGLIGENCE OF DESIGN PROFESSIONAL. NEITHER THE PROFESSIONAL ACTIVITIES OF CONSULTANT NOR THE PRESENCE OF CONSULTANT OR HIS OR HER EMPLOYEES OR SUB-CONSULTANTS AT A CONSTRUCTION SITE SHALL RELIEVE THE CONTRACTOR AND ITS SUBCONTRACTORS OF THEIR RESPONSIBILITIES INCLUDING, BUT NOT LIMITED TO, CONSTRUCTION MEANS, METHODS, SEQUENCE, TECHNIQUES OR PROCEDURES NECESSARY FOR PERFORMING, SUPERINTENDING OR COORDINATING ALL PORTIONS OF THE WORK OF CONSTRUCTION IN ACCORDANCE WITH THE CONTRACT DOCUMENTS AND APPLICABLE HEALTH OR SAFETY REQUIREMENTS OF ANY REGULATORY AGENCY OR OF STATE LAW.

19. THE CONTRACTOR SHALL MAINTAIN A CURRENT, COMPLETE, AND ACCURATE RECORD OF ALL AS-BUILT DEVIATIONS FROM THE CONSTRUCTION AS SHOWN ON THESE DRAWINGS AND SPECIFICATIONS, FOR THE PURPOSE OF PROVIDING THE ENGINEER OF RECORD WITH A BASIS FOR THE PREPARATION OF RECORD DRAWINGS.

20. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING THE SITE IN A NEAT AND ORDERLY MANNER THROUGHOUT THE CONSTRUCTION PROCESS. ALL MATERIALS SHALL BE STORED WITHIN APPROVED STAGING AREAS.

21. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION AND PRESERVATION OF ALL SURVEY MONUMENTS OR PROPERTY CORNERS. DISTURBED MONUMENTS SHALL BE RESTORED BACK TO THEIR ORIGINAL LOCATION AND SHALL BE CERTIFIED BY A REGISTERED CIVIL ENGINEER OR LAND SURVEYOR AT THE EXPENSE OF THE CONTRACTOR.

DEMOLITION NOTES

1. THE REMOVAL OF EXISTING IMPROVEMENTS SHALL BE PERFORMED IN ACCORDANCE WITH SECTION 15 OF THE STANDARD SPECIFICATIONS.

2. EXISTING IMPROVEMENTS, ADJACENT PROPERTY, TREES AND PLANTS, UTILITIES AND OTHER FACILITIES THAT ARE NOT REMOVED SHALL BE PROTECTED FROM INJURY OR DAMAGE RESULTING FROM THE CONTRACTOR'S OPERATIONS IN ACCORDANCE WITH SECTION 15.1 OF THE STANDARD SPECIFICATIONS.

EARTHWORK NOTES

1. GRADING SUMMARY:
   TOTAL CUT VOLUME = 420,000 CY
   TOTAL FILL VOLUME = 5,000 CY

THE ABOVE QUANTITIES ARE APPROXIMATE IN-PLACE VOLUMES CALCULATED AS THE DIFFERENCE BETWEEN EXISTING GROUND AND THE PROPOSED FINISH GRADE, PREPARED FOR PERMITTING PURPOSES ONLY. EXISTING GROUND IS DEFINED BY THE TOPOGRAPHIC CONTOURS AND/OR SPOT ELEVATIONS ON THE PLAN. PROPOSED FINISH GRADE IS DEFINED AS THE DESIGN SURFACE ELEVATION OF EARTH TO BE CONSTRUCTED, AS SHOWN ON THE DRAWINGS. THE QUANTITIES HAVE NOT BEEN FACTORED TO INCLUDE ALLOWANCES FOR BULKING, CLEARING AND GRUBBING, SUBSIDENCE, SHRINKAGE, OVER EXCAVATION, AND RECOMPACTION, UNDERGROUND UTILITY AND SUBSTRUCTURE SPOILS AND CONSTRUCTION METHODS. QUANTITIES ARE SUBJECT TO CHANGE, PENDING EXCAVATION AND INSPECTION OF SUBSURFACE CONDITIONS AT THE "ROCK PILE" AND "OVERBURDEN REMOVAL" AREAS, WHICH WILL ULTIMATELY DETERMINE FINISH GRADE AT THESE TWO AREAS.

THE CONTRACTOR SHALL PERFORM AN INDEPENDENT EARTHWORK ESTIMATE FOR THE PURPOSE OF PREPARING BID PRICES FOR EARTHWORK. THE BID PRICE SHALL INCLUDE COSTS FOR ANY NECESSARY IMPORT AND PLACEMENT OF EARTH MATERIALS OR THE EXPORT AND PROPER DISPOSAL OF EXCESS OR UNSUITABLE EARTH MATERIALS.

2. ALL EXCESS SOILS SHALL BE REMOVED TO AN APPROVED DUMP SITE OR DISPOSED OF ON SITE AT A LOCATION TO BE APPROVED BY THE ENGINEER, IN A MANNER THAT WILL NOT CAUSE EROSION,

3. CLEARING AND GRUBBING, SUBGRADE PREPARATION AND EARTHWORK SHALL BE PERFORMED IN ACCORDANCE WITH SECTION 19 OF THE STANDARD SPECIFICATIONS, THESE DRAWINGS, AND THE TECHNICAL SPECIFICATIONS.

4. UNSUITABLE SOIL OR MATERIALS, NOT TO BE INCLUDED IN THE WORK INCLUDE:

   A. ORGANIC MATERIALS SUCH AS PEAT, MULCH, ORGANIC SILT OR SOD.
   B. SOILS CONTAINING EXPANSIVE CLAYS.
   C. MATERIAL CONTAINING EXCESSIVE MOISTURE.
   D. POORLY GRADED COURSE MATERIAL, PARTICLE SIZE IN EXCESS OF 6 INCHES.
   E. MATERIAL WHICH WILL NOT ACHIEVE SPECIFIED DENSITY OR BEARING.

5. FINE GRADING ELEVATIONS AND SLOPES NOT SHOWN SHALL BE DETERMINED BY THE CONTRACTOR IN THE FIELD TO OBTAIN DRAINAGE IN THE DIRECTION INDICATED. ALL FINAL GRADING SHALL BE SUBJECT TO APPROVAL OF THE ENGINEER.

6. THE TOP 6" OF SUBGRADE UNDER ALL PAVED SURFACES SUBJECT TO VEHICULAR USE SHALL BE COMPACTED TO A MINIMUM OF 95% RELATIVE COMPACTION, IN ACCORDANCE WITH ASTM-D1557 STANDARD. ALL OTHER FILL TO BE COMPACTED TO A MINIMUM OF 90% MAXIMUM DENSITY AS DETERMINED BY ASTM-D1557 AND SO CERTIFIED BY TESTS AND REPORTS FROM THE ENGINEER IN CHARGE OF THE GRADING CERTIFICATION.

7. FILL MATERIAL SHALL BE SPREAD IN LIFTS OF APPROXIMATELY 8 INCHES, MOISTENED OR DRIED TO NEAR OPTIMUM MOISTURE CONTENT AND RECOMPACTED. THE MATERIALS FOR ENGINEERED FILL SHALL BE APPROVED BY A REGISTERED GEOTECHNICAL ENGINEER. ANY IMPORTED MATERIALS MUST BE APPROVED BEFORE BEING BROUGHT TO THE SITE. THE MATERIALS USED SHALL BE FREE OF ORGANIC MATTER AND OTHER DELETERIOUS MATERIALS.

8. ALL CONTACT SURFACES BETWEEN ORIGINAL GROUND AND RECOMPACTED FILL SHALL BE EITHER HORIZONTAL OR VERTICAL. ALL ORGANIC MATERIAL SHALL BE REMOVED AND THE REMAINING SURFACE SCARIFIED TO A DEPTH OF AT LEAST 12 INCHES, UNLESS DEEPER EXCAVATION IS REQUIRED BY THE ENGINEER.

GENERAL EROSION CONTROL NOTES

1. A DETAILED EROSION AND SEDIMENT CONTROL PLAN WILL BE PREPARED BY THE ENGINEER, PRIOR TO FINALIZATION OF THE CONSTRUCTION DOCUMENTS.

2. CONTRACTOR SHALL BE FAMILIAR WITH THE CONDITIONS OF APPROVAL OF ALL REQUIRED PROJECT PERMITS AND SHALL IMPLEMENT ALL REQUIRED BMP'S PRIOR TO COMMENCING GRADING OPERATIONS

3. CONTRACTOR SHALL UTILIZE ONLY THE APPROVED HAUL ROADS AND ACCESS POINTS (AS SHOWN ON THE DRAWINGS) FOR TRANSPORT OF MATERIALS AND EQUIPMENT.

4. BETWEEN OCTOBER 15 AND APRIL 15, EXPOSED SOIL SHALL BE PROTECTED FROM EROSION AT ALL TIMES. DURING CONSTRUCTION, SUCH PROTECTION MAY CONSIST OF MULCHING AND/OR PLANTING OF NATIVE VEGETATION OF ADEQUATE DENSITY. BEFORE COMPLETION OF THE PROJECT, ANY EXPOSED SOIL ON DISTURBED SLOPES SHALL BE PERMANENTLY PROTECTED FROM EROSION.

5. A STANDBY CREW SHALL BE AVAILABLE AT ALL TIMES FOR EMERGENCY WORK THAT MAY BE REQUIRED DURING THE RAINY SEASON (OCTOBER 15 THROUGH APRIL 15). NECESSARY MATERIALS SHALL BE AVAILABLE AND STOCKPILED AT CONVENIENT LOCATIONS TO FACILITATE RAPID CONSTRUCTION OF TEMPORARY DEVICES.

6. CONSTRUCT TEMPORARY EROSION CONTROL MEASURES AS SHOWN ON THE DRAWINGS AND/OR AS DIRECTED BY THE ENGINEER TO CONTROL DRAINAGE WHICH HAS BEEN AFFECTED BY GRADING AND/OR TRENCHING OPERATIONS.

7. CONSTRUCT AND MAINTAIN EROSION CONTROL MEASURES TO PREVENT THE DISCHARGE OF EARTHEN MATERIALS TO THE CREEK FROM DISTURBED AREAS UNDER CONSTRUCTION AND FROM COMPLETED CONSTRUCTION AREAS.

8. INSTALL ALL PROTECTIVE DEVICES AT THE END OF EACH WORK DAY WHEN THE FIVE-DAY RAIN PROBABILITY EQUALS OR EXCEEDS 50 PERCENT AS DETERMINED FROM THE NATIONAL WEATHER SERVICE FORECAST OFFICE: WWW.SRH.NOAA.GOV.

9. AFTER A RAINSTORM, ALL SILT AND DEBRIS SHALL BE REMOVED FROM SEDIMENT CONTROL MEASURES.

10. THE CONTRACTOR IS RESPONSIBLE TO KEEP IN FORCE ALL EROSION CONTROL DEVICES AND TO MODIFY THOSE DEVICES AS SITE PROGRESS DICTATES.

11. THE CONTRACTOR SHALL MONITOR THE EROSION CONTROL DEVICES DURING STORMS AND MODIFY THEM IN ORDER TO PREVENT PROGRESS OF ANY ONGOING EROSION.

12. THE CONTRACTOR SHALL CONTACT THE ENGINEER IN THE EVENT THAT THE EROSION CONTROL PLAN AS DESIGNED REQUIRES ANY SUBSTANTIAL REVISIONS.

DIVERSION NOTES

1. GENERAL
   1.1. DIVERSION SYSTEMS SHALL BE INSTALLED TO DEWATER THE INDIVIDUAL PROJECT AREAS TO FACILITATE IN-STREAM CONSTRUCTION AND TO REDUCE THE POTENTIAL IMPACTS TO WATER QUALITY DOWNSTREAM OF THE PROJECT SITES.
   1.2. THE CONTRACTOR SHALL CONFIRM THAT A FAVORABLE LONG TERM WEATHER FORECAST (1 WEEK MIN.) IS OBSERVED PRIOR TO PLACEMENT OF DIVERSION STRUCTURE.
   1.3. PRIOR TO PLACEMENT OF DIVERSION STRUCTURE, FISH SHALL BE REMOVED FROM THE DIVERTED REACH, IN ACCORDANCE WITH SECTION 2.
   1.4. DIVERSION SYSTEM INSTALLATION SHALL NORMALLY BEGIN IN THE DOWNSTREAM AREA AND CONTINUE IN AN UPSTREAM DIRECTION. THE FLOW SHALL BE DIVERTED ONLY WHEN THE DIVERSION CONSTRUCTION IS COMPLETE.
   1.5. FOLLOWING ENGINEER'S APPROVAL OF THE COMPLETED WORK, DIVERSION SHALL BE REMOVED IMMEDIATELY, IN AN UPSTREAM DIRECTION.
2. FISH REMOVAL
   2.1. FISH SHALL BE REMOVED FROM THE DIVERTED REACHES BY A QUALIFIED FISHERIES BIOLOGIST, LICENSED FOR SUCH ACTIVITIES BY THE NATIONAL MARINE FISHERIES SERVICE AND THE CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE.
   2.2. BLOCK NETS SHALL BE PROVIDED AND INSTALLED BY THE FISHERIES BIOLOGIST. BLOCK NETS SHALL BE MAINTAINED BY THE CONTRACTOR BOTH UPSTREAM AND DOWNSTREAM OF THE WORK AREA, THROUGHOUT THE PERIOD OF CONSTRUCTION. MAINTENANCE INCLUDES PERIODIC REMOVAL OF ACCUMULATED DEBRIS, AS NECESSARY TO ENSURE FUNCTION. BLOCK NETS SHALL BE REMOVED BY THE FISHERIES BIOLOGIST AFTER THE DIVERSION IS REMOVED AND THE IN CHANNEL WORK AREA IS RE-WATERED.
3. DIVERSION SYSTEM
   3.1. THE CONTRACTOR SHALL INSTALL A TEMPORARY SEALED SANDBAG DAM TO CAPTURE AND DIVERT STREAM FLOW UPSTREAM OF THE PROJECT SITE. THE DAM AND METHOD OF SEALING SHALL BE PLACED AT AN APPROPRIATE DEPTH TO CAPTURE SUBSURFACE STREAM FLOW, AS NEEDED TO DEWATER THE STREAMBED.
   3.2. THE CONTRACTOR SHALL MAINTAIN THE DIVERSION DAM DURING THE COURSE OF CONSTRUCTION WORK.
   3.3. THE DIVERSION STRUCTURE SHALL BE CONSTRUCTED AS SHOWN ON THE DRAWINGS, OR AS DIRECTED BY THE ENGINEER IN THE FIELD.
   3.4. IN THE EVENT OF A SIGNIFICANT STORM, THE CONTRACTOR SHALL BE PREPARED TO TAKE NECESSARY MEASURES TO INSURE SAFE PASSAGE OF STORM WATER FLOW THROUGH THE PROJECT AREA, WITHOUT DAMAGE TO EXISTING STRUCTURES, OR INTRODUCTION OF EXCESSIVE SEDIMENT. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL TEMPORARY EROSION CONTROL B.M.P.'S.
4. DEWATERING OF CONSTRUCTION AREAS
   4.1. ANY DEWATERING ACTIVITIES WHICH MAY BE REQUIRED FOR CONSTRUCTION PURPOSES SHALL BE CONDUCTED IN A MANNER WHICH DOES NOT RESULT IN AN EXCEEDANCE OF ANY WATER QUALITY REQUIREMENTS ESTABLISHED BY THE CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD.
   4.2. DISCHARGE OF WATER FROM THE DEWATERED CONSTRUCTION SITE, EITHER BY GRAVITY OR PUMPING, SHALL BE PERFORMED IN A MANNER TO PREVENT EXCESSIVE TURBIDITY FROM ENTERING THE RECEIVING WATERWAYS AND TO PREVENT SCOUR AND EROSION OUTSIDE OF THE CONSTRUCTION SITE. PUMPED WATER SHOULD BE PRE-FILTERED WITH SAND/GRAVEL PACK AROUND SUMPS FOR SUBSURFACE FLOWS AND A SILT FENCE OR HAY BALES AROUND PUMPS FOR SURFACE FLOW. PUMPED WATER SHALL BE DISCHARGED INTO ISOLATED LOCAL DEPRESSIONS, FILTER BAGS, SETTLING (BAKER) TANKS, OR TEMPORARY SEDIMENT BASINS, AS NECESSARY TO MEET WATER QUALITY REQUIREMENTS. WHERE WATER TO BE DISCHARGED INTO THE CREEK WILL CREATE EXCESSIVE TURBIDITY, THE WATER SHALL BE ROUTED THROUGH A SEDIMENT INTERCEPTOR OR OTHER FACILITIES TO REMOVE SEDIMENT FROM WATER.
   4.3. CONTRACTOR SHALL SUPPLY ALL NECESSARY PUMPS, PIPING, FILTERS, SHORING, AND OTHER TOOLS AND MATERIALS NECESSARY FOR DEWATERING.

WATERWAYS CONSULTING INC.
509A SWIFT ST.
SANTA CRUZ, CA 95060
PH:(831)421-9291 // FAX:(888)819-6847
WWW.WATWAYS.COM

PRELIMINARY
NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT GROUP

NOTES

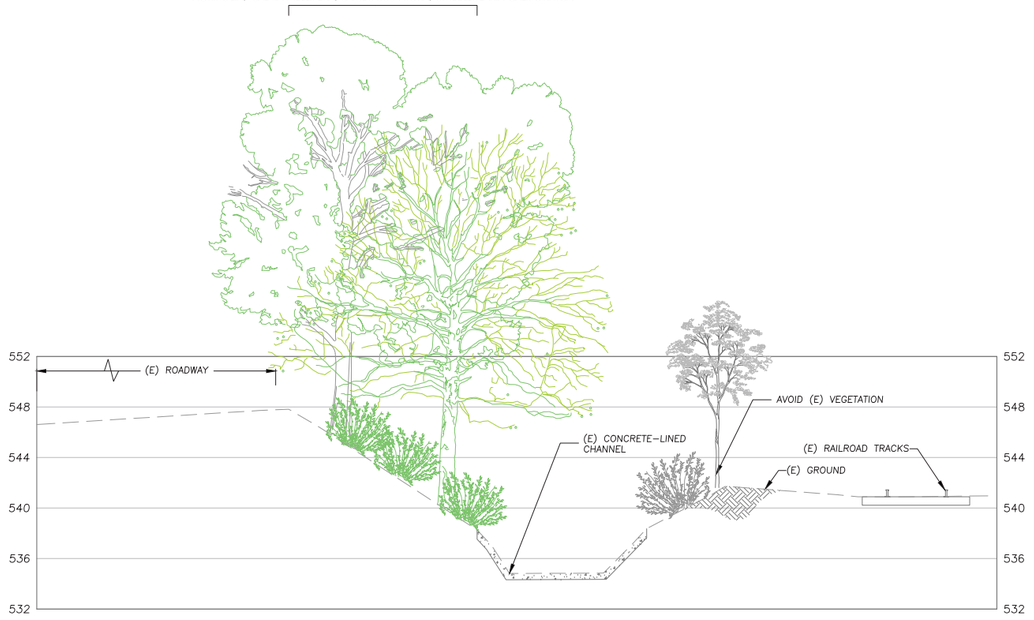
PERMANENTE CREEK
RESTORATION PLAN
70% DESIGN SUBMITTAL

DESIGNED BY:	-
DRAWN BY:	B.M.S.
CHECKED BY:	M.W.W.
DATE:	04/27/15
JOB NO.:	13-016

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

C25

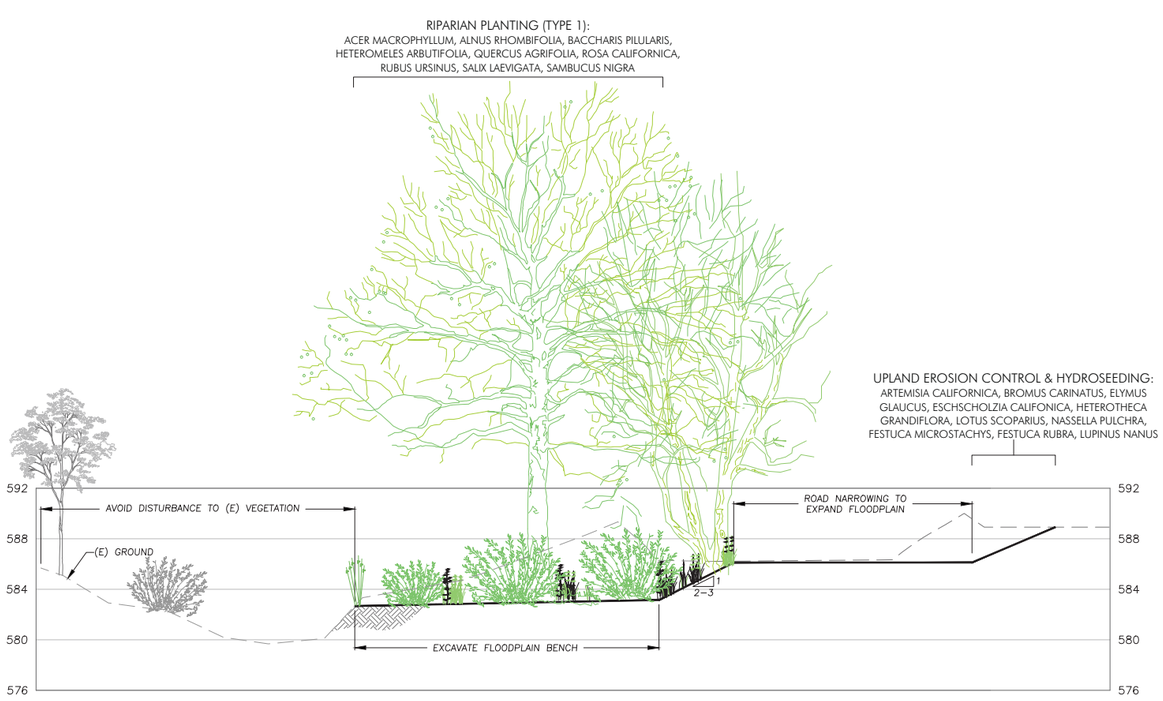
25 OF 25



TYPICAL CONCRETE-LINED CHANNEL BANK PLANTING SECTION A

PER SHEET C5

SCALE: 1" = 10'



TYPICAL CHANNEL WIDENING (ROAD NARROWING) RIPARIAN PLANTING SECTION

STATIONS 16+20 TO 29+20 AND 30+50 TO 49+30: PER SHEETS C6 TO C9, C12 AND C13

SCALE: 1" = 10'

NOTE: WHEREVER POSSIBLE, EXISTING TREES IN THE CHANNEL WIDENING AREA THAT CAN BE SAVED WILL BE FLAGGED BY A BIOLOGIST FOR PROTECTION PRIOR TO GRADING.

RIPARIAN PLANT LEGEND - TYPE 1

SYMBOL	BOTANICAL NAME	COMMON NAME	SIZE	SPACING (OC FEET)	ELEVATION RANGE
ACE MAC	*ACER MACROPHYLLUM*	BIG LEAF MAPLE	16" DEEPOT	25	+2.7' AND ABOVE
AES CAL	*AESCULUS CALIFORNICA*	CALIFORNIA BUCKEYE	16" DEEPOT	15	+2.7' AND ABOVE.
ALN RUB	*ALNUS RHOMBIFOLIA*	WHITE ALDER	16" DEEPOT	20	+2.7' TO +5.0'
BAC PIL	*BACCHARIS PILULARIS*	COYOTE BRUSH	1 GAL	8	+4.0' AND ABOVE
HET ARB	*HETEROMELES ARBUTIFOLIA*	TOYON	1 GAL	8	+4.0' AND ABOVE
QUE AGR	*QUERCUS AGRIFOLIA*	COAST LIVE OAK	16" DEEPOT, 5 GAL	12	+4.0' AND ABOVE
ROS CAL	*ROSA CALIFORNICA*	CALIFORNIA WILD ROSE	16" DEEPOT, 1 GAL	6	+4.0' AND ABOVE
RUB URS	*RUBUS URSINUS*	CALIFORNIA BLACKBERRY	1 GAL	5	+4.0' AND ABOVE
SAL LAE	*SALIX LAEVIGATA*	RED WILLOW	POLE CUTTINGS, 16" DEEPOT	12	+2.7' TO +6.0'
SAL MEL	*SALVIA MELLIFERA*	BLACK SAGE	1 GAL	5	+8.0' AND ABOVE
SAM NIG	*SAMBUCUS NIGRA SSP. CAERULEA*	BLUE ELDERBERRY	16" DEEPOT, 1 GAL	10	+4.0' AND ABOVE

NOTES:
1. RELATIVE ELEVATION DATUM: THALWEG OF STREAM = 0
2. Q2 WATER LINE IS APPROXIMATELY 2.7' ABOVE THALWEG

RIPARIAN PLANT LEGEND - TYPE 2

SYMBOL	BOTANICAL NAME	COMMON NAME	SIZE	SPACING (OC FEET)	ELEVATION RANGE
ACE MAC	*ACER MACROPHYLLUM*	BIG LEAF MAPLE	16" DEEPOT	25	+2.3' AND ABOVE
ARB MEN	*ARBUTUS MENZESII*	PACIFIC MADRONE	16" DEEPOT	12	+5.0' AND ABOVE
ART CAL	*ARTEMISIA CALIFORNICA*	CALIFORNIA SAGEBRUSH	1 GAL	3	+4.0' AND ABOVE
BAC PIL	*BACCHARIS PILULARIS*	COYOTE BRUSH	1 GAL	8	+4.0' AND ABOVE
QUE AGR	*QUERCUS AGRIFOLIA*	COAST LIVE OAK	16" DEEPOT, 5 GAL	12	+4.0' AND ABOVE
SAL LAE	*SALIX LAEVIGATA*	RED WILLOW	POLE CUTTINGS, 16" DEEPOT	12	+2.3' TO +6.0'
SAL MEL	*SALVIA MELLIFERA*	BLACK SAGE	1 GAL	5	+6.0' AND ABOVE
SAM NIG	*SAMBUCUS NIGRA SSP. CAERULEA*	BLUE ELDERBERRY	16" DEEPOT, 1 GAL	10	+4.0' AND ABOVE

NOTES:
1. RELATIVE ELEVATION DATUM: THALWEG OF STREAM = 0
2. Q2 WATER LINE IS APPROXIMATELY 2.7' ABOVE THALWEG

RIPARIAN PLANT LEGEND - TYPE 3

SYMBOL	BOTANICAL NAME	COMMON NAME	SIZE	SPACING (OC FEET)	ELEVATION RANGE
ART CAL	*ARTEMISIA CALIFORNICA*	CALIFORNIA SAGEBRUSH	1 GAL	3	+4.0' AND ABOVE
BAC PIL	*BACCHARIS PILULARIS*	COYOTE BRUSH	1 GAL	8	+4.0' AND ABOVE
PRU ILI	*PRUNUS ILICIFOLIA*	HOLLYLEAF CHERRY	2 GAL	10	+4.0' AND ABOVE
QUE AGR	*QUERCUS AGRIFOLIA*	COAST LIVE OAK	16" DEEPOT, 5 GAL	12	+4.0' AND ABOVE
SAL MEL	*SALVIA MELLIFERA*	BLACK SAGE	1 GAL	5	+6.0' AND ABOVE
SAM NIG	*SAMBUCUS NIGRA SSP. CAERULEA*	BLUE ELDERBERRY	16" DEEPOT, 1 GAL	10	+4.0' AND ABOVE
UMB CAL	*UMBELLULARIA CALIFORNICA*	CALIFORNIA BAY	16" DEEPOT, 1 GAL	12	+4.0' AND ABOVE

NOTES:
1. RELATIVE ELEVATION DATUM: THALWEG OF STREAM = 0
2. Q2 WATER LINE IS APPROXIMATELY 2.7' ABOVE THALWEG

UPLAND HYDROSEED MIX

BOTANICAL NAME	COMMON NAME	RATE OF APPLICATION PLS LBS / ACRE
ARTEMISIA CALIFORNICA	CALIFORNIA SAGEBRUSH	0.5
BROMUS CARINATUS	CALIFORNIA BROME	12.0
ELYMUS GLAUCUS	BLUE WILDRYE	10.0
ESCHSCHOLZIA CALIFORNICA	CALIFORNIA POPPY	1.5
HETEROTHECA GRADIFLORA	TELEGRAPH WEED	0.5
LOTUS SCOPARIUS	DEERWEED	3.0
NASELLA PULCHRA	PURPLE NEEDLEGRASS	5.0
FESTUCA MICROSTACHYS	THREE WEEKS FESCUE	6.0
FESTUCA RUBRA	RED FESCUE	5.0
LUPINUS NANUS	LUPINE	4.0
	TOTAL	47.5

wra
ENVIRONMENTAL CONSULTANTS
2169-G East Francisco Blvd.
San Rafael, CA 94901
(415) 454-8868 Phone
(415) 454-0129 Fax

PRELIMINARY
NOT FOR
CONSTRUCTION

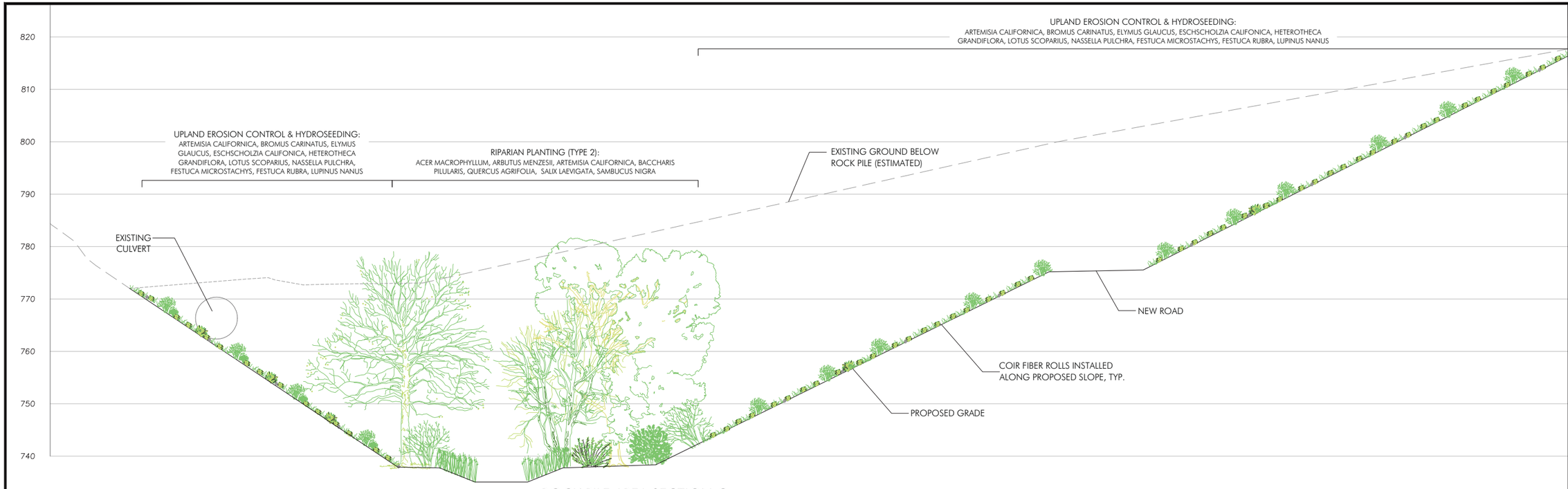
PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT GROUP

RIPARIAN
PLANTING
SECTIONS

PERMANENTE CREEK
RESTORATION PLAN
70% SUBMITTAL

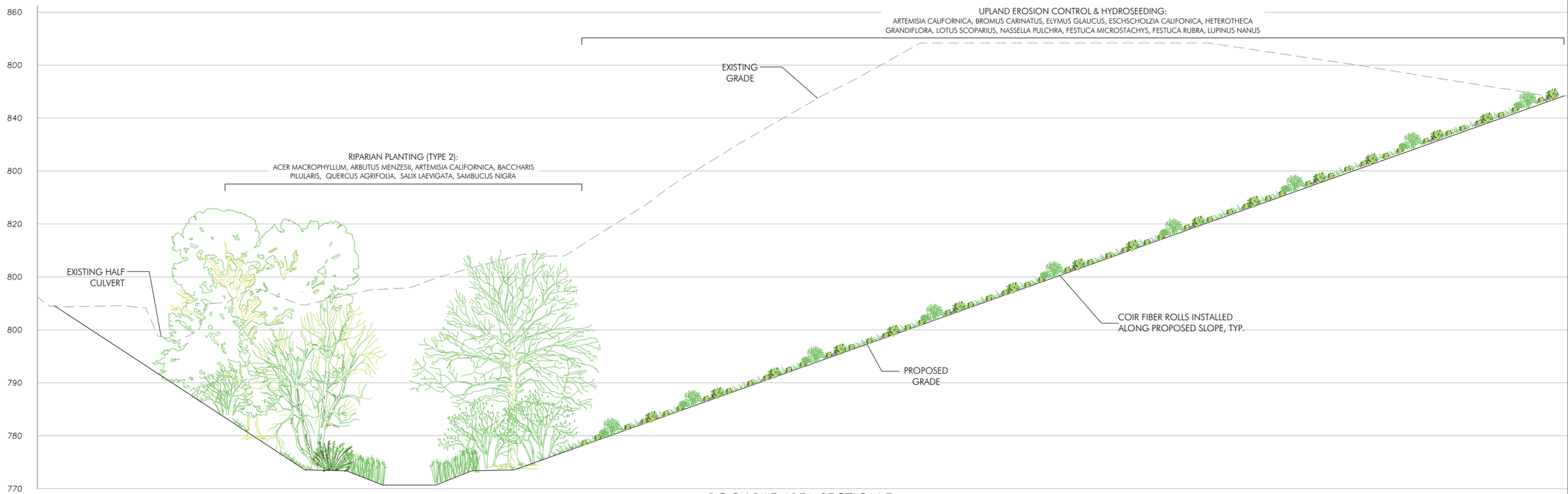
DESIGNED BY:
DRAWN BY: CES,GMG
CHECKED BY: MWS
DATE: 04/27/15
JOB NO.: 16143–5

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"



ROCK PILE AREA SECTION C

PER SHEET C14 AND C15
SCALE: 1" = 10'



ROCK PILE AREA SECTION E

PER SHEET C14 AND C15
SCALE: 1" = 10'

wra
ENVIRONMENTAL CONSULTANTS
2169-G East Francisco Blvd.
San Rafael, CA 94901
(415) 454-8868 Phone
(415) 454-0129 Fax

PRELIMINARY
NOT FOR
CONSTRUCTION

PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT GROUP

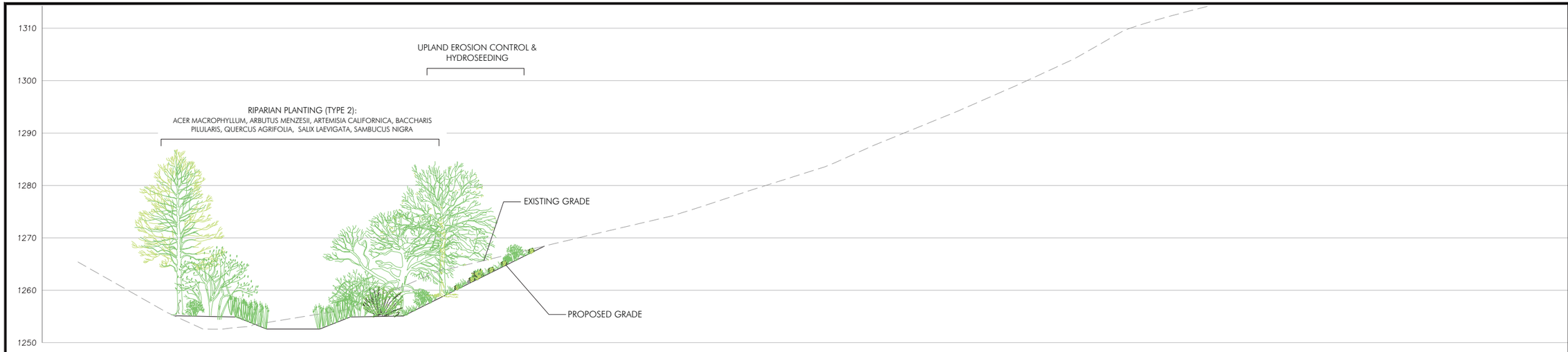
RIPARIAN PLANTING SECTIONS

PERMANENTE CREEK RESTORATION PLAN
70% SUBMITTAL

DESIGNED BY:
DRAWN BY: CES,GMG
CHECKED BY: MWS
DATE: 04/27/15
JOB NO.: 16143-5

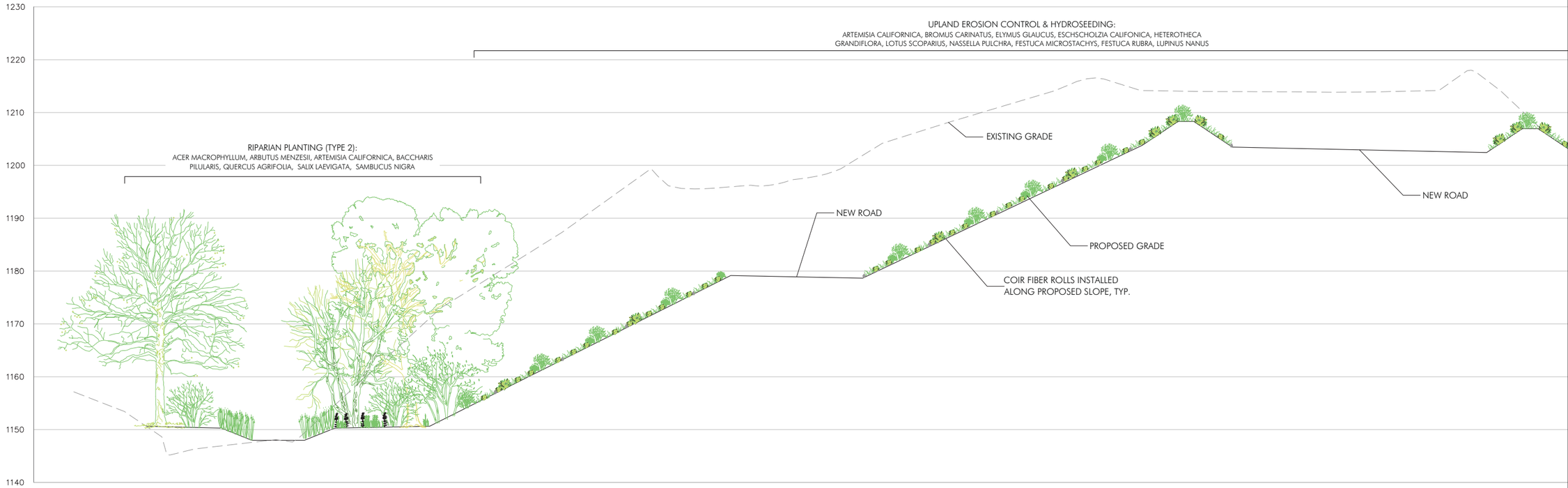
BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

L2



OVERBURDEN REMOVAL AREA SECTION E

PER SHEETS C16 T0 C19
SCALE: 1" = 10'



OVERBURDEN REMOVAL AREA SECTION B

PER SHEETS C16 TO C19
SCALE: 1" = 10'

wra
ENVIRONMENTAL CONSULTANTS
2169-G East Francisco Blvd.
San Rafael, CA 94901
(415) 454-8868 Phone
(415) 454-0129 Fax

PRELIMINARY
NOT FOR
CONSTRUCTION

PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT GROUP

RIPARIAN
PLANTING
SECTIONS

PERMANENTE CREEK
RESTORATION PLAN
70% SUBMITTAL

DESIGNED BY:
DRAWN BY: CES,GMG
CHECKED BY: MWS
DATE: 04/27/15
JOB NO.: 16143-5

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

L3

APPENDIX C

Representative Photographs of Aquatic Habitat for
California Red-Legged Frog

View of the canyon Permanente Creek flows through. Photograph taken in the vicinity of Pond 4A.

View of Permanente Creek. Photograph taken in the vicinity of Pond 4A.

Appendix C **Representative Photographs**

View of an ephemeral drainage flowing into Permanente Creek.

View of Permanente Creek upstream of T12.

Appendix C **Representative Photographs**

View of Permanente Creek and associated riparian vegetation at the downstream reaches of the study area.

View of a channelized portion of Permanente Creek south of Pond 13.

Appendix C **Representative Photographs**

View of Pond 20. This feature is used as a settling basin for industrial purposes.

View of Pond 9. This feature is used as a settling basin for industrial purposes.

Appendix C **Representative Photographs**

View of Dinky Shed Pond. This feature is used as a settling basin for industrial purposes.

View of Rockpile Basin. Rockpile Basin is used as a settling basin for industrial purposes.

Appendix C **Representative Photographs**

View of Pond 17. This feature is used as a settling basin for industrial purposes.

View of Pond 4A. Pond 4A is used as a water treatment basin for industrial purposes.

Appendix C **Representative Photographs**

View of the downstream end of Pond 13.

View of the upstream portion of Pond 13.

Appendix C **Representative Photographs**

View of Pond 21. This pond is fringed by narrowleaf cattail.

Appendix C **Representative Photographs**

E2. Effects to Waters of the United States (GEI Consultants, Inc., 2021)

ATTACHMENT B – EFFECTS TO WATERS OF THE UNITED STATES

REASONS FOR DISCHARGE

Discharge of materials into waters of the United States would be required to achieve the objective of restoring portions of Permanente Creek to a more natural state, in accordance with the proposed creek restoration plan. The materials to be discharged to waters of the United States include materials to restore streambed hydrology, geomorphology, and floodplain hydraulics, and to provide habitat for resident rainbow trout.

PROPOSED DISCHARGE OF DREDGE AND/OR FILL MATERIAL

The amount and types of material being dredged from, and/or discharged (filled) into, waters of the United States are provided in Table 1.

Table 1.
Volume and Types of Dredge and Fill Material within Waters of the United States for the Proposed Project

Project Element	Action	Approximate Volume (cy)	Type of Material
Culvert 7	Removal of existing culvert and reconstruction/reconfiguration of creek channel and bed.	143 fill	Engineered streambed material
Culvert 8	Removal of existing culvert and reconstruction/reconfiguration of creek channel and bed.	180 fill	Engineered streambed material
Culvert 9	Removal of existing culvert and reconstruction/reconfiguration of creek channel and bed.	264 fill	Engineered streambed material
Culvert 10	Complete removal of (buried) culvert and excavation of creek channel.	288 cut	Native soil
Culvert 11	Complete removal of (half-pipe) culvert and excavation of creek channel.	223 cut	Native soil
Pond 13	Removal of dam and reconfiguration of creek channel.	1,613 cut	Native soil

Source: Adapted by GEI Consultants, Inc. 2016, based on plans from WRA and Waterways Consulting, Inc. 2015.

U.S. ARMY CORPS OF ENGINEERS JURISDICTION WITHIN THE PROJECT AREA

A wetland delineation was conducted for the proposed project by AECOM in 2015. The wetland delineation report was sent to the San Francisco District of the U.S. Army Corps of Engineers (USACE) on August 3, 2015. USACE met with AECOM staff on September 10, 2015 to review the delineation at the project site. Revised wetland delineation maps, including changes from the field visit, were sent to USACE on September 17, 2015. Lehigh Hanson is requesting a preliminary jurisdictional determination (PJD) for this project area. USACE confirmed receipt of the revised delineation maps and is in the process of verifying the delineation.

EFFECTS TO JURISDICTIONAL WATERS OF THE U.S.

USACE jurisdictional acreages potentially affected by the proposed activity was calculated by placing the Computer-Assisted Design (CAD) engineering design information (provided by Waterways Consulting, Inc.) over the wetland delineation ArcGIS layers of the project area.

The proposed project would result in effects to a total of 2.052 acres of waters of the United States (see Figures 1 through 4). Effects to waters are a result of three main activities: native vegetation planting along the south slope (above bank) of the concrete-lined channelized portion of Permanente Creek, as shown on Figure 1; channel widening and reconstruction activities, as shown on Figures 2 and 3; and overburden material removal and stream reconstruction, as shown on Figure 4.

Within the native vegetation planting area, it is anticipated that there will be temporary effects to the concrete-lined portion of Permanente Creek. Approximately 0.43 acre of temporary effects would be a result of the need to use the creek channel for access to facilitate planting along the south slope above the channel. The area is very steep and the channel area is the best vantage to facilitate planting on the most downslope portions of the planting efforts.

The channel widening and stream reconstruction portion of the proposed project activities would have permanent effects to approximately 0.64 acres of non-wetland waters of the United States and 0.077 acre of wetlands. Permanent effects are a result of removal of existing in-stream culverts and replacement of these structures with a deeper and wider channel containing engineered streambed material that will restore stream hydraulics, hydrology, and geomorphology. Five culverts would be removed from the stream channel (Culverts 7, 8, 9, 10, and 11). Culvert removal would comprise excavating out the culverts and any fill materials covering the culverts, re-contouring the stream channel to design parameters, and placing the engineered streambed material on the bed and banks of the newly reconstructed channel. This would result in permanent effects to Permanente Creek due to permanent alteration of the existing channel conditions; however, the activities would not result in the net loss of waters of the United States. With the removal of the culvert, the overall restoration activities would include re-contouring the channel, as just mentioned, and creating a floodplain bench along the north bank of the creek with riparian plantings in the floodplain bench. This work would be done for approximately 4,770 linear feet of the stream channel. As part of this work, a tributary stream (T18) will also be re-contoured and reconstructed to have a more gradual and even slope. Currently, the confluence of the tributary and Permanente Creek is a small floodplain where a wetland (W4) has established. This is the circumstance of the creek channel being narrow and not able to accommodate all of the flows from the current tributary. With the reconstruction work in both channels occurring, it is expected that the wetland will be disturbed as part of the construction activities and once the streams have been restored, the wetland will not be re-established due to post-condition changes in hydrology, hydraulics, and geomorphology of the stream. Again, this will result in permanent effects to the wetland, but would not result in a net loss of waters as the stream channel would be replacing the wetland.

This is also the case for three wetlands (W5, W6, and W7) established on the margin of the existing creek channel within this channel widening area. It is expected that these wetlands will be removed (lost) due to post-condition changes in hydrology, hydraulics, and geomorphology of the stream. However, because there is no direct, physical disturbance anticipated to these wetlands, the effects are considered to be indirect permanent effects and changes. Finally, there is a “pond” at the upper limit of the channel widening area which is really an impoundment of the creek behind a dam. As part of the channel widening restoration design, the dam would be

removed and the “pond” area would be re-contoured and reconstructed as part of the creek channel. This would again result in permanent change to the pond area, resulting in loss of the pond, but not a net loss of waters of the United States.

Within the channel widening area, it is also anticipated that there would be 0.513 acre of temporary effects to non-wetland waters. The temporary effects would be a result of temporary disturbance within the creek channel for access and temporary work space to facilitate the restoration efforts. It is anticipated that the creek channel would be both the work area (for restoration), but because of the terrain, it would also need to be the access area for equipment to enter the channel.

The final area of work is the material removal area. Here overburdened material from historic operations has entered into the creek and is present along the banks and upland slopes adjacent to the creek and has changed the topography in the area significantly. The proposed activities include removal of the overburden material and deposition of the material in the quarry area within the cement plant for future use. Removal of the overburden material would be followed by reconstruction of the stream channel to a more natural profile and revegetation of the banks of the channel. This would result in temporary effects to five non-wetland waters (T6, P14, T7, P15, and T8) to improve the stream channels of these waters. There is also one wetland (W8) on the downstream end of T8, a tributary to Permanente Creek. Like W4, mentioned previously, this wetland would be permanently lost as a result of reconstruction of the tributary and creek stream channels, but there would not be a net loss of waters as the streams would replace the wetland area.

The acreages of effects to waters of the United States for the proposed project are shown in Table 2.

Table 2.
Acreages of Jurisdictional Waters of the United States
Affected by the Proposed Project

Effect Type	Feature	USACE JD Category[1]	Action	Approximate Acreage
Direct Permanent	Culvert 7	RPW	Culvert removal and streambed reconstruction	0.01
	Culvert 8	RPW	Culvert removal and streambed reconstruction	0.01
	Wetland (W4)	Wetland	Loss from excavation and streambed reconstruction	0.06
	Culvert 9	RPW	Culvert removal and streambed reconstruction	0.01
	Culvert 10	RPW	Culvert removal and streambed reconstruction	0.04
	Culvert 11	RPW	Culvert removal and streambed reconstruction	0.07
	Pond 13	Impoundment of RPW	Loss from excavation and streambed reconstruction	0.50
	Wetland (W8)	Wetland	Loss from excavation and streambed reconstruction	0.01
			Subtotal	**0.71**
Indirect Permanent	Wetland (W5)	Wetland	Habitat conversion	0.01
	Wetland (W6)	Wetland	Habitat conversion	0.003
	Wetland (W7)	Wetland	Habitat conversion	0.004
			Subtotal	**0.017**
Direct Temporary	P4	RPW	Temporary disturbance for construction access	0.43
	P8	RPW	Temporary disturbance for construction access	0.26
	T18	Non-RPW	Streambed reconstruction	0.01
	P9	RPW	Temporary disturbance for construction access	0.09
	P10	RPW	Existing riprap removal and streambed reconstruction	0.15
	P12	RPW	Streambed reconstruction	0.003
	T6	Non-RPW	Streambed reconstruction	0.01
	P14	RPW	Streambed reconstruction	0.02
	T7	Non-RPW	Streambed reconstruction	0.001
	P15	RPW	Streambed reconstruction	0.35
	T8	Non-RPW	Streambed reconstruction	0.001
			Subtotal	**1.325**
			Direct Permanent Effects Total	**0.71**
			Indirect Permanent Effects Total	**0.017**
			Direct Temporary Effects Total	**1.325**

Source: Adapted by GEI Consultants, Inc. 2016, based on drawings from Waterways Consulting, Inc. 2015.

AVOIDANCE AND MINIMIZATION MEASURES

Lehigh Hanson would implement the following measures to avoid and minimize impacts to waters of the U.S.

Avoidance and Containment of Shallow Slumps and/or Fallback of Overburden Material

In all areas requiring the use of excavators for grading (e.g., access road in-sloping, installation/repair of sedimentation basins, and removal of slide debris), Lehigh Hanson and/or its contractor shall begin excavations from the top of slope and proceed downward. Lehigh Hanson and/or its contractor shall begin excavations from the top of slope and proceed downward. Lehigh Hanson and/or its contractor shall not undercut sloped materials unless no other option is feasible as determined by a registered geotechnical engineer (e.g., excessively sloped or otherwise inaccessible terrain). In all areas where excavations would occur in sloped materials, Lehigh Hanson and/or its contractor shall install barriers immediately downslope of the activity. Downslope barriers shall be designed and installed in a manner that would be adequate to prevent overburden and/or native materials from falling, sloughing or sliding further downslope, or into Permanente Creek. Such measures may consist of temporary interlocking soldier piles, wooden shoring systems, wire mesh or other containment measures(s), and Lehigh Hanson and/or its contractor shall not be permitted to conduct excavation or grading activities downgradient of the barrier, or prior to its installation. The ultimate location, design and installation method of such measures shall be prepared and certified, or reviewed and approved by a California State registered geotechnical engineer.

Interim Stormwater Control and Sediment Management

To minimize the discharge of sedimentation and metal constituents, particularly selenium, to watercourses, Lehigh Hanson shall implement the following stormwater and sediment management controls in addition to general best management practices (BMPs) required by the stormwater pollution prevention plan (SWPPP) in active and inactive reclamation areas. Lehigh Hanson shall:

- Segregate limestone materials from the non-limestone materials (breccia, graywacke, chert, and greenstone) by way of operational phasing to ensure that limestone materials are placed beneath and are covered by non-limestone materials. A California Professional Geologist shall oversee stockpiling, segregation, and placement of non-limestone materials.

- Stabilize inactive areas, such as temporary stockpiles or dormant excavations that drain directly or indirectly to Permanente Creek using an appropriate combination of BMPs to cover the exposed rock material, intercept runoff reduce its flow velocity, release runoff as sheet flow, and provide a sediment control mechanism (such as silt fencing, fiber rolls, or hydroseeded vegetation). Standard soil stabilization BMPs include geotextiles, mats, erosion control blankets, vegetation, silt fence surrounding the stockpile perimeter, and fiber rolls at the base and on side slopes.

- Temporarily stabilize active, disturbed reclamation areas undergoing fill placement before and during qualifying rain events expected to produce site runoff. Stabilization methods include combined BMPs that protect materials from rain, manage runoff, and reduce erosion. Reclamation activities involving grading, hauling, and placement of backfill materials cannot take place during periods of rain.

- In areas where fill slopes are steep and composed of loose material, controls shall be in place to prevent material from sloughing off into the Permanente Creek Restoration Area and Permanente Creek. These controls shall include debris/silt fencing placed on outer edge of grading and excavation operations back-

sloping excavations to prevent grade slope towards the creek, operations buffer areas that require the use of smaller grading equipment, temporary berms along the outer extent of operations closest to the creek, operator training regarding the prevention of triggering debris slides.

- Cover active haul roads with non-limestone materials where exposed limestone surfaces are present. Roads that undergo dust control by watering must have fiber rolls or equivalent runoff protection installed along the road side to reduce runoff and avoid drainage to Permanente Creek.

- Divert all runoff generated from disturbed active and inactive restoration areas to temporary basins, the Quarry pit, or temporary vegetated infiltration basins and kept away from drainage pathways directly entering Permanente Creek. To the extent possible, drainage of the non-limestone materials shall be diverted directly to sediment control facilities and natural surface drainages.

- Install up-gradient berms where limestone fines or stockpiles are placed, to protect against stormwater run-on, and install ditches and down-gradient berms to promote infiltration rather than run-off.

- Cover large limestone surfaces associated with restoration activities that would remain exposed during the rainy season with interim covers composed of non-limestone rock types.

- Inspect and maintain BMPs after each qualifying rain event to ensure their integrity.

- Regularly inspect all stormwater and erosion controls, especially before and following qualifying rain events. Inspections shall be documented and periodically reported. Any violations shall be corrected immediately.

- Provide adequate erosion control training to all equipment operators, site superintendents, and managers to ensure that stormwater and erosion controls are maintained and remain effective.

- Use only jute netting or other suitable replacement for erosion control in the Permanente Creek Restoration Area; no plastic monofilament shall be used for erosion control or other purposes, as California Red Legged Frogs and other wildlife may become entangled in it.

- Ensure that all stormwater, erosion, and sediment control BMPs are installed, inspected, maintained, and repaired under the direction of either a California certified engineer, geologist, or landscape architect, an American Institute of Hydrology registered professional hydrologist, or a certified erosion control specialist.

PROPOSED COMPENSATORY MITIGATION

Although Lehigh Hansen proposes to permanently impact approximately 0.727 acre of waters of the United States (wetland and non-wetland waters combined), the proposed project, as designed, would result in enhancement of the 0.727 acre of waters of the United States resulting in functional lift of the existing jurisdictional acreage. The enhancements include improving the configuration and hydrology of Permanente Creek, removing an impoundment of the creek, removing culverts and restoring the creek bed under the culverts, creating a floodplain bench alongside the creek in select areas, and planting native riparian vegetation along the creek banks. The text of Nationwide Permit 27 states that if the proposed activities result in functional lift of the existing aquatic habitat, no compensatory mitigation is required. Lehigh Hansen believes the restoration effort will result in functional lift in upper Permanente Creek. Therefore, the proposed activities meet the specification of Nationwide Permit 27 and compensatory mitigation is not required for the project.

ADDITIONAL INFORMATION,

EFFECTS ON FEDERALLY LISTED SPECIES

The proposed project would result in potential adverse effects to the Federally listed California red-legged frog. A Biological Assessment has been prepared for the species and is included as Attachment D to this application package. The Biological Assessment only addresses USFWS-managed species.

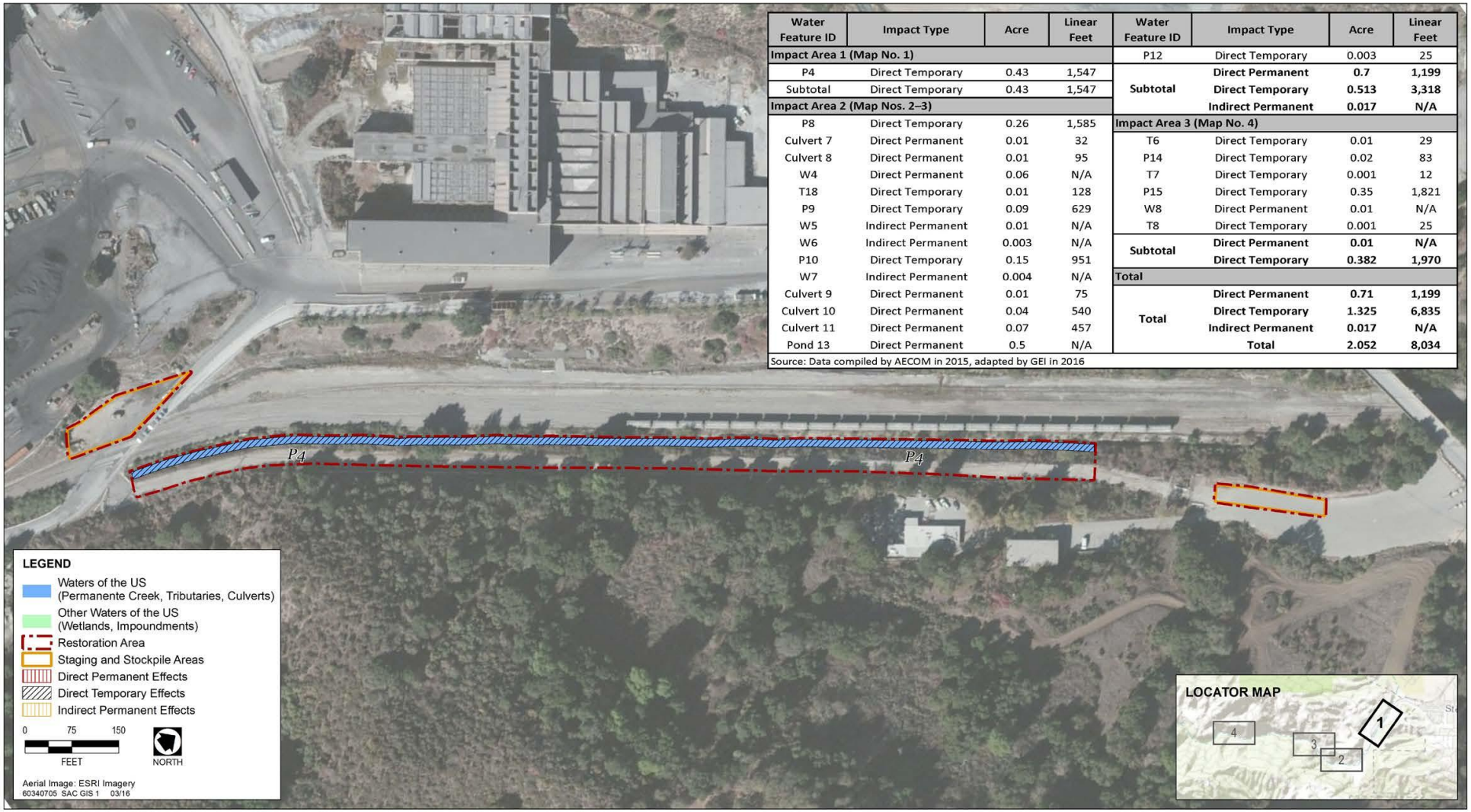
The proposed project location is within a region mapped as Essential Fish Habitat (EFH) for Pacific salmon (specifically *Oncorhynchus kisutch* and *O. tshawytscha*) and critical habitat for Central California Coastal (CCC) steelhead (*O. mykiss irideus*) DPS. These USFWS- and NMFS-managed species cannot access habitat near the project site in upper Permanente Creek because the downstream Permanente Creek Diversion Channel is a highly effective barrier to fish passage since most of the creek's flow culminates in a 10-foot drop at the diversion fish can no longer ascend the stream.

Permanente Creek is a natural channel from its headwater downstream to Heritage Oaks Park, near Portland and Miramonte avenues, where the creek enters a concrete channel and eventually becomes the Permanente Creek Diversion Channel. The channel was built by the Santa Clara Valley Water District in 1959 and runs 1.3 miles to the east until passing into a culvert underneath Highway 85 to Stevens Creek. Virtually all winter flows from upper Permanente Creek are diverted east to Stevens Creek in order to prevent floodwaters from flowing in the original creek channel that runs through urban residential areas.

The diversion channel has altered the course of flow and the total length of Permanente Creek from 13.3 miles (from the headwaters to San Francisco Bay) to 9.3 miles (from the headwaters to the diversion channel’s junction with Stevens Creek just past Highway 85), and has essentially cut off the upper portion of Permanente Creek from the lower reaches. In addition, a combination of lack of flows and significant modification in the lower portion of the creek have degraded fish habitat such that no spawning or rearing habitat exists for these species.

CULTURAL RESOURCES AND HISTORIC PROPERTIES

The proposed action was analyzed for cultural resources and historic properties and a cultural resources inventory report has been prepared. The final Cultural Resources Inventory Report is included as Attachment E.



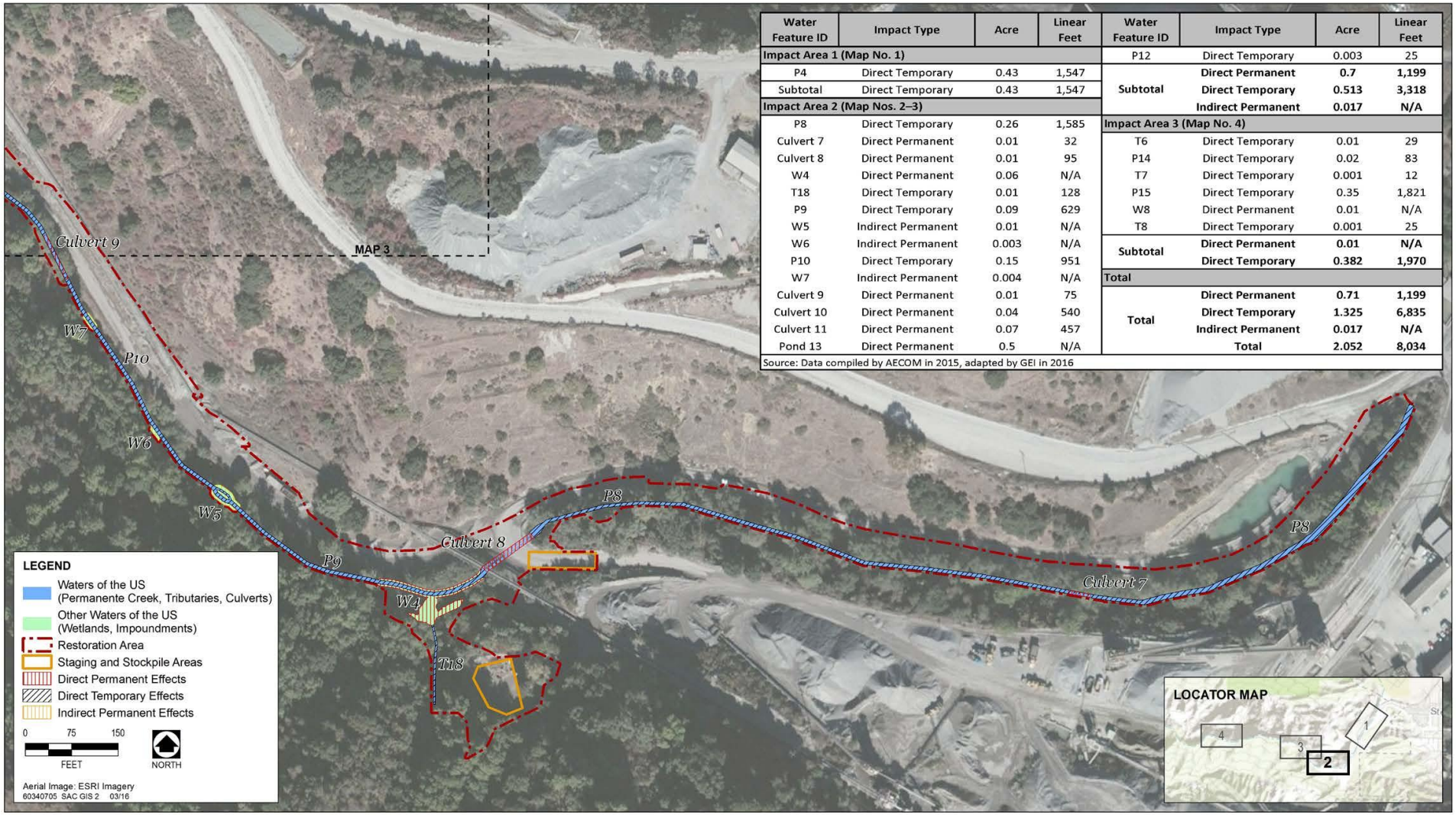
Water Feature ID	Impact Type	Acre	Linear Feet
Impact Area 1 (Map No. 1)			
P4	Direct Temporary	0.43	1,547
Subtotal	Direct Temporary	0.43	1,547
Impact Area 2 (Map Nos. 2–3)			
P8	Direct Temporary	0.26	1,585
Culvert 7	Direct Permanent	0.01	32
Culvert 8	Direct Permanent	0.01	95
W4	Direct Permanent	0.06	N/A
T18	Direct Temporary	0.01	128
P9	Direct Temporary	0.09	629
W5	Indirect Permanent	0.01	N/A
W6	Indirect Permanent	0.003	N/A
P10	Direct Temporary	0.15	951
W7	Indirect Permanent	0.004	N/A
Culvert 9	Direct Permanent	0.01	75
Culvert 10	Direct Permanent	0.04	540
Culvert 11	Direct Permanent	0.07	457
Pond 13	Direct Permanent	0.5	N/A

Water Feature ID	Impact Type	Acre	Linear Feet
P12	Direct Temporary	0.003	25
Subtotal	**Direct Permanent**	**0.7**	**1,199**
	Direct Temporary	**0.513**	**3,318**
	Indirect Permanent	**0.017**	**N/A**
Impact Area 3 (Map No. 4)			
T6	Direct Temporary	0.01	29
P14	Direct Temporary	0.02	83
T7	Direct Temporary	0.001	12
P15	Direct Temporary	0.35	1,821
W8	Direct Permanent	0.01	N/A
T8	Direct Temporary	0.001	25
Subtotal	**Direct Permanent**	**0.01**	**N/A**
	Direct Temporary	**0.382**	**1,970**
Total			
Total	**Direct Permanent**	**0.71**	**1,199**
	Direct Temporary	**1.325**	**6,835**
	Indirect Permanent	**0.017**	**N/A**
	Total	**2.052**	**8,034**

Source: Data compiled by AECOM in 2015, adapted by GEI in 2016

Source: AECOM 2015, adapted by GEI Consultants, Inc. 2016

Figure 1. Effects to Waters of the United States Map 1

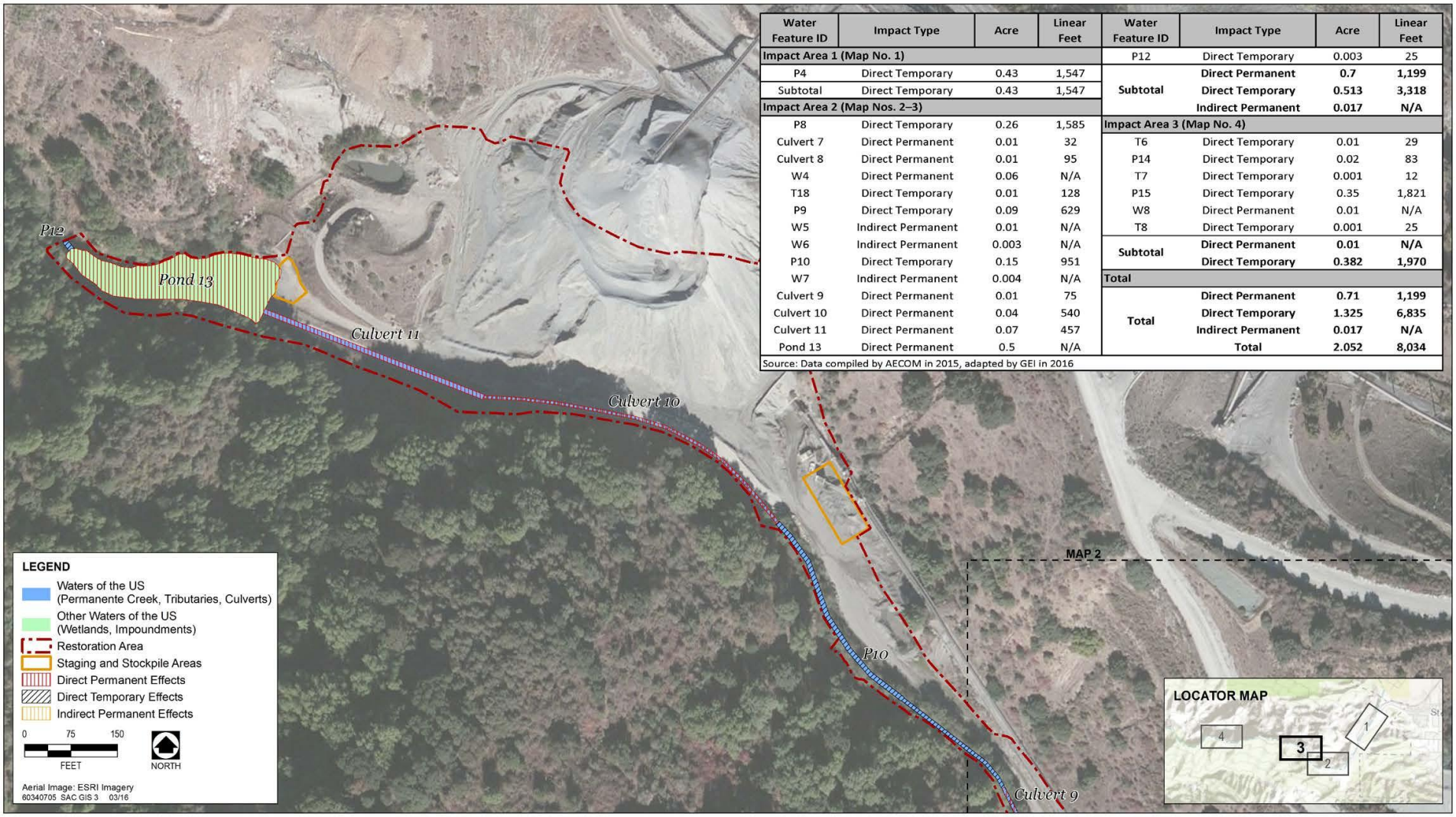


Water Feature ID	Impact Type	Acre	Linear Feet
Impact Area 1 (Map No. 1)			
P4	Direct Temporary	0.43	1,547
Subtotal	Direct Temporary	0.43	1,547
Impact Area 2 (Map Nos. 2–3)			
P8	Direct Temporary	0.26	1,585
Culvert 7	Direct Permanent	0.01	32
Culvert 8	Direct Permanent	0.01	95
W4	Direct Permanent	0.06	N/A
T18	Direct Temporary	0.01	128
P9	Direct Temporary	0.09	629
W5	Indirect Permanent	0.01	N/A
W6	Indirect Permanent	0.003	N/A
P10	Direct Temporary	0.15	951
W7	Indirect Permanent	0.004	N/A
Culvert 9	Direct Permanent	0.01	75
Culvert 10	Direct Permanent	0.04	540
Culvert 11	Direct Permanent	0.07	457
Pond 13	Direct Permanent	0.5	N/A
P12	Direct Temporary	0.003	25
Subtotal	**Direct Permanent**	**0.7**	**1,199**
	Direct Temporary	**0.513**	**3,318**
	Indirect Permanent	**0.017**	**N/A**
Impact Area 3 (Map No. 4)			
T6	Direct Temporary	0.01	29
P14	Direct Temporary	0.02	83
T7	Direct Temporary	0.001	12
P15	Direct Temporary	0.35	1,821
W8	Direct Permanent	0.01	N/A
T8	Direct Temporary	0.001	25
Subtotal	**Direct Permanent**	**0.01**	**N/A**
	Direct Temporary	**0.382**	**1,970**
Total			
Total	**Direct Permanent**	**0.71**	**1,199**
	Direct Temporary	**1.325**	**6,835**
	Indirect Permanent	**0.017**	**N/A**
	Total	**2.052**	**8,034**

Source: Data compiled by AECOM in 2015, adapted by GEI in 2016

Source: AECOM 2015, adapted by GEI Consultants, Inc. 2016

Figure 2. Effects to Waters of the United States Map 2



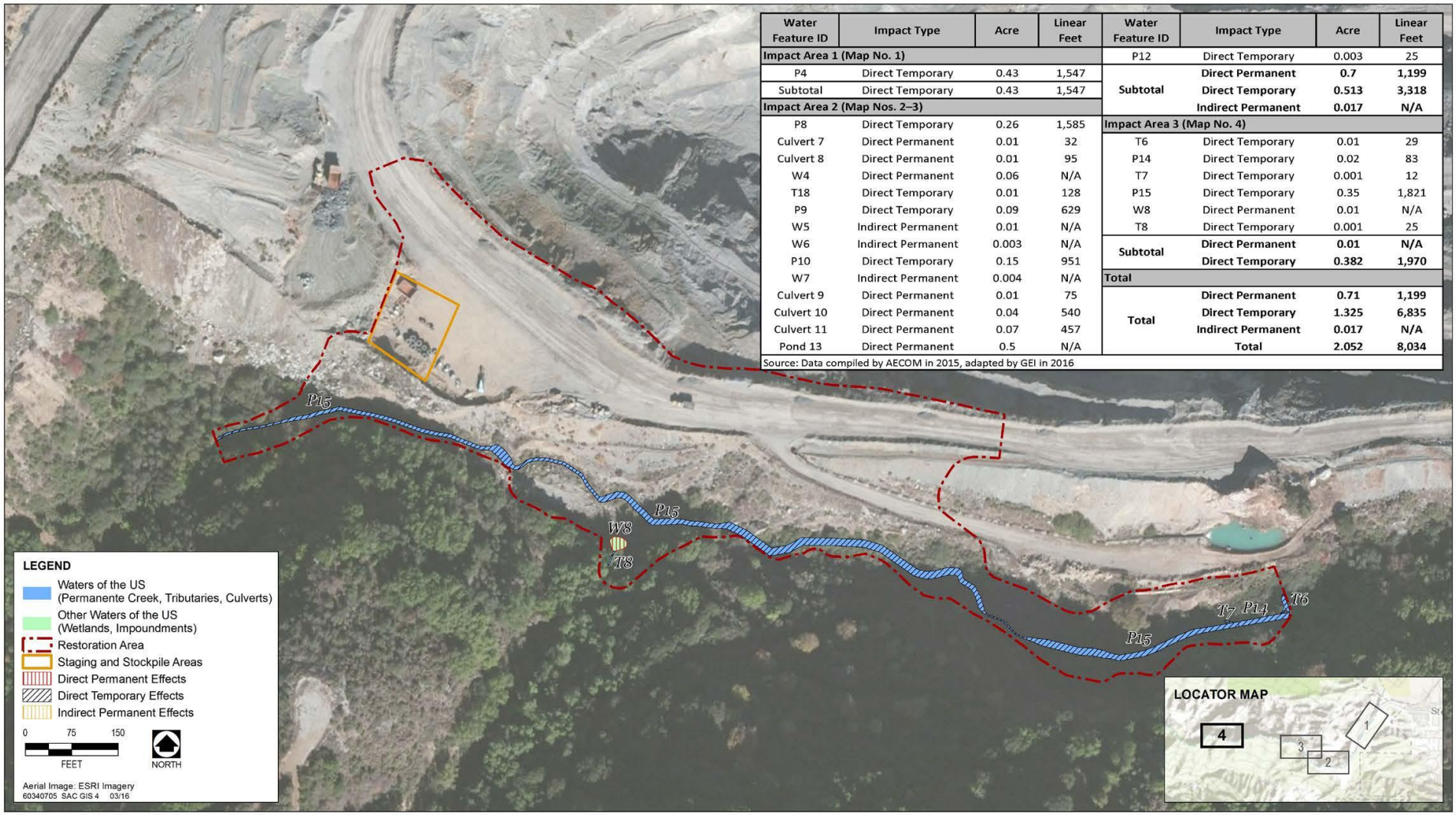
Water Feature ID	Impact Type	Acre	Linear Feet
Impact Area 1 (Map No. 1)			
P4	Direct Temporary	0.43	1,547
Subtotal	Direct Temporary	0.43	1,547
Impact Area 2 (Map Nos. 2–3)			
P8	Direct Temporary	0.26	1,585
Culvert 7	Direct Permanent	0.01	32
Culvert 8	Direct Permanent	0.01	95
W4	Direct Permanent	0.06	N/A
T18	Direct Temporary	0.01	128
P9	Direct Temporary	0.09	629
W5	Indirect Permanent	0.01	N/A
W6	Indirect Permanent	0.003	N/A
P10	Direct Temporary	0.15	951
W7	Indirect Permanent	0.004	N/A
Culvert 9	Direct Permanent	0.01	75
Culvert 10	Direct Permanent	0.04	540
Culvert 11	Direct Permanent	0.07	457
Pond 13	Direct Permanent	0.5	N/A

Water Feature ID	Impact Type	Acre	Linear Feet
P12	Direct Temporary	0.003	25
Subtotal	**Direct Permanent**	**0.7**	**1,199**
	Direct Temporary	**0.513**	**3,318**
	Indirect Permanent	**0.017**	**N/A**
Impact Area 3 (Map No. 4)			
T6	Direct Temporary	0.01	29
P14	Direct Temporary	0.02	83
T7	Direct Temporary	0.001	12
P15	Direct Temporary	0.35	1,821
W8	Direct Permanent	0.01	N/A
T8	Direct Temporary	0.001	25
Subtotal	**Direct Permanent**	**0.01**	**N/A**
	Direct Temporary	**0.382**	**1,970**
Total			
Total	**Direct Permanent**	**0.71**	**1,199**
	Direct Temporary	**1.325**	**6,835**
	Indirect Permanent	**0.017**	**N/A**
	Total	**2.052**	**8,034**

Source: Data compiled by AECOM in 2015, adapted by GEI in 2016

Source: AECOM 2015, adapted by GEI Consultants, Inc. 2016

Figure 3. Effects to Waters of the United States Map 3



Water Feature ID	Impact Type	Acre	Linear Feet
Impact Area 1 (Map No. 1)			
P4	Direct Temporary	0.43	1,547
Subtotal	Direct Temporary	0.43	1,547
Impact Area 2 (Map Nos. 2–3)			
P8	Direct Temporary	0.26	1,585
Culvert 7	Direct Permanent	0.01	32
Culvert 8	Direct Permanent	0.01	95
W4	Direct Permanent	0.06	N/A
T18	Direct Temporary	0.01	128
P9	Direct Temporary	0.09	629
W5	Indirect Permanent	0.01	N/A
W6	Indirect Permanent	0.003	N/A
P10	Direct Temporary	0.15	951
W7	Indirect Permanent	0.004	N/A
Culvert 9	Direct Permanent	0.01	75
Culvert 10	Direct Permanent	0.04	540
Culvert 11	Direct Permanent	0.07	457
Pond 13	Direct Permanent	0.5	N/A

Water Feature ID	Impact Type	Acre	Linear Feet
P12	Direct Temporary	0.003	25
Subtotal	**Direct Permanent**	**0.7**	**1,199**
	Direct Temporary	**0.513**	**3,318**
	Indirect Permanent	**0.017**	**N/A**
Impact Area 3 (Map No. 4)			
T6	Direct Temporary	0.01	29
P14	Direct Temporary	0.02	83
T7	Direct Temporary	0.001	12
P15	Direct Temporary	0.35	1,821
W8	Direct Permanent	0.01	N/A
T8	Direct Temporary	0.001	25
Subtotal	**Direct Permanent**	**0.01**	**N/A**
	Direct Temporary	**0.382**	**1,970**
Total			
Total	**Direct Permanent**	**0.71**	**1,199**
	Direct Temporary	**1.325**	**6,835**
	Indirect Permanent	**0.017**	**N/A**
	Total	**2.052**	**8,034**

Source: Data compiled by AECOM in 2015, adapted by GEI in 2016

Figure 4. Effects to Waters of the United States Map 4

E3. Revegetation Plan (WRA, Inc. September 29, 2017)

TECHNICAL MEMORANDUM

PERMANENTE CREEK RESTORATION PLAN: PLANTING PROGRAM

September 29, 2017

INTRODUCTION

This technical memorandum describes the conceptual planting program that will be a component of the Permanente Creek Restoration Plan. The Riparian Planting Sections (Sheets L1-L3) on the accompanying drawings have been completed in conjunction with the Stream Restoration Plan prepared by Waterways Consulting. The revegetation design is intended to meet the requirements of the Consent Decree between Lehigh Southwest Cement Company and Hanson Permanent Cement, Inc. and the Sierra Club effective June 18, 2013 and amended on February 22, 2016. This work is also informed by the extensive site investigations and pilot revegetation work that has been performed and documented in the Revegetation Plan (WRA 2012) prepared in conjunction with the Reclamation Plan for the facility. This plan was prepared by Megan Stromberg, Landscape Architect (California License 5535).

RIPARIAN PLANTING

Proposed planting palettes and representative cross sections are provided in the attached drawings. The goal of the planting effort will be to create a native plant dominated habitat within restored sections of the creek that are similar to the surrounding natural areas. The representative cross sections are conceptual at this time, but are sufficient to demonstrate the level of planting needed for agency review and for initial permit applications. Additional detail will be provided as needed to complete the permitting process. Final drawings will be prepared after permit approval.

The north-facing banks along Permanente Creek can support a wider variety of tree and shrub species since they have less solar radiation and higher soil moisture. In addition, some reaches of the creek experience intermittent flows (Reaches 17 through 21) while the reaches below Pond 4A are mostly perennial. These conditions have been considered in the development of the riparian planting palettes. Specific planting plans identifying the best locations for each species will be developed in the final drawings.

Each riparian species was observed within the existing riparian habitat and evaluated for its proximity to the thalweg of the existing creek. Our plant palette tables provide the recommended elevation range above the design thalweg of the creek.

Trees and shrubs will be planted as container plants or seeds in the revegetation areas. Tree and shrub container plantings may require application of a layer of topsoil and/or soil-building materials to ensure adequate space for root development. In addition, irrigation or other watering methods will be included within a final plan as well as erosion control practices while plant materials are becoming established. Plants will be planted at a higher density than is expected at the end of the performance period to account for expected die-off. Replanting in subsequent years may be required to achieve desired stem density and cover. Adaptive management and the results from the Reclamation Plan pilot plantings will be used to determine which tree and shrub species will be planted, the most effective spacing and location, and species to use in replacement plantings if

necessary. The need for herbivory protection for specific vegetation species will be evaluated based on prior planting efforts. Weed mats or several inches of mulch may be placed around planted trees and shrubs to reduce competition and retain moisture.

UPLAND REVEGETATION AND EROSION CONTROL

A preliminary erosion control stage will be incorporated prior to the riparian revegetation establishment to protect against sediment entering the creek and allow time for plants to establish. Bare surfaces will be covered with native grass, herb, and shrub species via hydroseeding a homogenous slurry of mulch, fertilizer, seed, and a binding agent over the areas to be revegetated. Other appropriate erosion control methods such as slope cross-drains, erosion control matting, and coir fibre rolls will be used. The native seed mix shown in Table 1 includes species that have proven successful in other revegetation efforts on the Permanente Quarry property and is recommended to provide erosion control and initial establishment of native shrubs, grasses and herbaceous species as needed in temporarily disturbed riparian areas. In upland areas, hydroseed with species listed in Table 2 will be applied to areas that have been disturbed.

Table 1. Erosion Control Species for Permanente Creek Riparian Areas

SCIENTIFIC NAME	COMMON NAME	PURE LIVE SEED (lb / acre)	BULK SEED (lb / acre)
SHRUBS			
Artemisia californica	California sagebrush	1	10
Baccharis pilularis	Coyote brush	.1	6
Lotus scoparius	Deerweed	1.5	2
Salvia mellifera	black sage	1.5	4.3
GRASSES AND HERBS			
Achillea millefolium	Yarrow	.75	2
Artemisia douglasiana	Mugwort	.15	1.9
Bromus carinatus	California brome	8	10
Clarkia purpurea ssp. quadrivulnera	winecup clarkia	1	1
Elymus glaucus	blue wildrye	4.6	6
Heterotheca grandiflora	telegraph weed	0.2	1
Lotus purshianus	Spanish clover	3	3.6
Plantago erecta	dotseed plantain	2.5	3
Sisyrinchium bellum	western blue-eyed grass	1	1.4
Vulpia microstachys	small fescue	8	10
Total		34.8	62.2

Table 2. Upland Erosion Control Hydroseeding Mix.		
SCIENTIFIC NAME	COMMON NAME	Rate of application (lb / acre)
SHRUBS		
Artemisia californica	California sagebrush	0.5
Baccharis pilularis	coyote brush	0.1
GRASSES AND HERBS		
Bromus carinatus	California brome	12
Elymus glaucus	blue wildrye	10
Eschscholzia californica	California poppy	1.5
Heterotheca grandiflora	telegraph weed	0.5
Lotus scoparius	deerweed	3.0
Nassella pulchra	purple needlegrass	5.0
Vulpia microstachys	three weeks fescue	6.0
Festuca rubra	red fescue	5.0
Lupines nanus (innoc)	lupine	4.0
Plantago erecta	plantain	4.0
Total		**52.6**

E4. Temporary Riparian Vegetation Impact Assessment (Waterways Consulting, Inc., August 26, 2022)

TECHNICAL MEMORANDUM

To: Carolina Addison, Lehigh Hanson Inc.

From: Waterways Consulting, Inc.

Date: August 26, 2022

Re: Permanente Creek Restoration Project, Temporary Riparian Vegetation Impact Assessment

Introduction

This memorandum has been prepared in response to comments provided to the County of Santa Clara on May 13, 2021 by the California Department of Fish and Wildlife (CDFW) in response to the County's Notice of Preparation of the Supplemental Draft Environmental Impact Report for the Permanente Creek Restoration Project (PRCP).[1] The comments are regarding impacts to riparian vegetation associated with implementation of the PRCP included under the "Biological Resources, Long-term Impacts to Riparian Sensitive Community" section of the letter. The relevant paragraph under the "Riparian Vegetation Impacts" subsection has been reproduced below for reference.

> The revised 90% engineering designs appear to indicate that approximately 30 trees will be removed during Project construction. However, only larger trees to be removed were included in the designs (e.g., non-oak trees equal to or greater than 12-inch diameter). Sapling (1-inch to 4-inch diameter) and pole sized (5-inch to 11-inch diameter) trees are important to riparian vegetation structural complexity and habitat succession. Based on the current designs, impacts of the Project to riparian habitat may be underestimated. CDFW recommends that analysis of riparian vegetation impacts include trees less than 12 inches in diameter or based on area calculations for seedlings and saplings and understory vegetation. As discussed in the previous section of this letter, the long-term (e.g., 10-year) post-construction monitoring and adaptive management plan should include monitoring of revegetated areas and include performance standards to ensure establishment or maintenance of riparian habitat.

Background

Waterways Consulting, Inc. (Waterways) staff completed an evaluation of riparian vegetation within the limits of areas to be impacted during implementation of the PCRP. This included field work to determine the species, size and number of trees and shrubs that will be removed during project construction as outlined below.

Methods

Waterways walked the extents of each component project area to evaluate riparian impacts during July and August 2022. This included the Channel Widening Area, Rock Pile Area and Material Removal Area. Each project area was broken into multiple smaller areas for determining riparian vegetation impacts as

[1] The subject of the May 13, 2021 letter from CDFW to Mr. Robert Salisbury at the County of Santa Clara is "Permanente Creek Restoration Project, Notice of Preparation of a Supplemental Draft Environmental Impact Report, SCH No. 2021040331, Santa Clara County".

shown on Figures 1-10. Representative sample areas were evaluated where vegetation was very dense, and the findings were proportioned for estimating the impacts for the applicable reach of channel. Where the riparian corridor was reasonably open and Waterways staff were able to traverse a reach of channel, sample areas were not used and the riparian corridor within the limits of proposed grading was evaluated to determine vegetation impacts.

Species and diameter of trees and shrubs observed were recorded on field sheets for each riparian area assessed. Figure 1 provides an overview of the assessment area and Figures 2 - 10 show the limits of each riparian vegetation impact area. The upstream and downstream limits of each area were surveyed using a total station. Individual trees and shrubs were not surveyed as part of this assessment. Trees from the original mapping effort are shown on the drawings.[2] Solid lines shown on the Figures represent the limits of an assessment area. Dashed lines represent the boundary of sample areas within a larger assessment area with the color matching that of the assessment area. The boundary lines fall within the grading limits where an area is devoid of vegetation.

Results

A table listing the area, species, diameter, and number of trees and shrubs documented in each assessment area is included on the attached Figures. A summary table is included below with the total estimated number of trees and shrubs that will be removed at each component project area and the estimated total for the project. Detailed summary tables that include species and diameter of trees and shrubs that would be removed at each component project area are attached.

Table 1. Total Number of Trees and Shrubs Removed During Project Implementation

Project Location	Number of Trees/Shrubs Removed
Channel Widening Area	271
Rock Pile Area	49
Material Removal Area	550
Estimated Project Total =	870

Conclusion

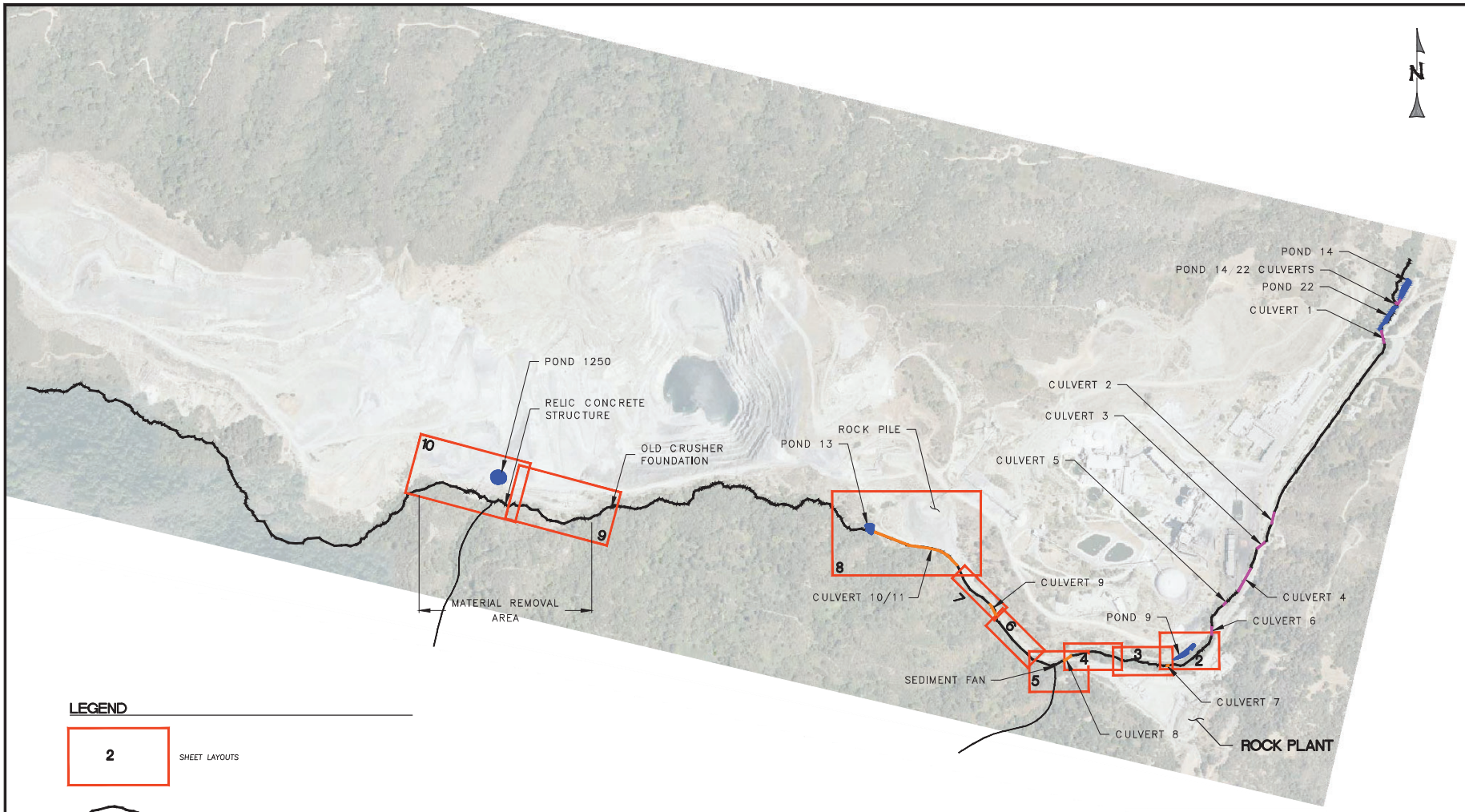
The PCRP includes a robust revegetation effort to reestablish riparian vegetation along the restored channel reaches to help stabilize graded areas, provide cover and establish habitat complexity. While approximately 870 tree and shrubs will be removed during project implementation throughout an area of approximately 5.5 acres, over 7,000 tree and shrubs will be planted to reestablish and expand the riparian corridor along approximately 7.6 acres of restored riparian area.

[2] The trees shown on the Riparian Vegetation Impact Assessment Figures include trees surveyed during mapping efforts completed during 2013-2015. Some trees may have died since the initial mapping effort. Additional trees meeting the survey threshold used during the original mapping efforts may now exist within the mapped areas and are not shown on the figures.

CHANNEL WIDENING AREA		
RIPARIAN VEGETATION IMPACT SUMMARY		
AREA =	1.55	ACRE
SPECIES	(DIA. IN.)	COUNT
ALDER	0-2	5
ALDER	2-4	1
ALDER	4-8	10
ALDER	8-12	5
BAY	2-4	1
BAY	4-8	14
BIG LEAF MAPLE	2-4	6
BIG LEAF MAPLE	4-8	1
BUCKEYE SAPLING	<1	5
COFFEEBERRY	0-2	1
ELDERBERRY	0-2	18
ELDERBERRY	4-6	1
MADRONE	2-4	2
OAK	0-2	11
OAK	2-4	5
OAK SAPPLING	<1	12
SYCAMORE	32	1
TOYON	0-2	9
WALNUT	0-2	11
WILLOW	0-4	43
WILLOW	4-8	56
WILLOW	8-12	52
WILLOW	24+	1
	TOTAL COUNT =	271

ROCK PILE AREA RIPARIAN VEGETATION IMPACT SUMMARY		
AREA =	1.11	ACRE
SPECIES	(DIA. IN.)	COUNT
BIG LEAF MAPLE	0-2	2
ELDERBERRY	0-2	5
WILLOW	0-4	27
WILLOW	4-8	6
WILLOW	8-12	9
	TOTAL COUNT =	49

MATERIAL REMOVAL AREA RIPARIAN VEGETATION IMPACT SUMMARY		
AREA =	2.80	ACRE
SPECIES	(DIA. IN.)	COUNT
BAY	0-2	25
BAY SAPLING	<1	9
BIG LEAF MAPLE SAPLING	<1	28
BIG LEAF MAPLE	1-2	29
BIG LEAF MAPLE	4-6	9
BIG LEAF MAPLE	6-8	23
CEANOTHUS	0-2	10
MADRONE	0-2	21
MADRONE	2-4	34
MADRONE	4-6	2
TOYON	0-2	32
WILLOW	0-4	266
WILLOW	4-8	53
WILLOW	8-12	8
	TOTAL COUNT =	550



LEGEND

- 2 — SHEET LAYOUTS
- PERMANENTE CREEK THALWEG ALIGNMENT 2013
- TRIBUTARY (RELEVANT TO PROJECT)
- EXISTING CULVERT TO BE REMOVED
- EXISTING CULVERT TO REMAIN

SHEET LAYOUT OVERVIEW
SCALE:1" = 500'

RIPARIAN IMPACT ASSESSMENT ANALYSIS:

THESE DRAWINGS HAVE BEEN PREPARED TO ACCOMPANY THE TECHNICAL MEMORANDUM TITLED "PERMANENTE CREEK RESTORATION PROJECT, TEMPORARY RIPARIAN VEGETATION IMPACT ASSESSMENT", DATED 8/26/22, AND ASSIST WITH ESTIMATING TEMPORARY RIPARIAN VEGETATION IMPACTS THAT WOULD OCCUR DURING IMPLEMENTATION OF THE PERMANENTE CREEK RESTORATION PLAN. THE QUANTITY, SIZE AND SPECIES OF EXISTING TREES AND SHRUBS THAT WILL BE REMOVED DURING PROJECT IMPLEMENTATION WERE DOCUMENTED WITHIN THE AREAS SHOWN ON THE FOLLOWING FIGURES. SEE THE REFERENCED TECHNICAL MEMORANDUM FOR A DESCRIPTION OF ASSESSMENT METHODS AND RESULTS.

WATERWAYS CONSULTING INC.
Santa Cruz, CA | waterways.com | Portland, OR

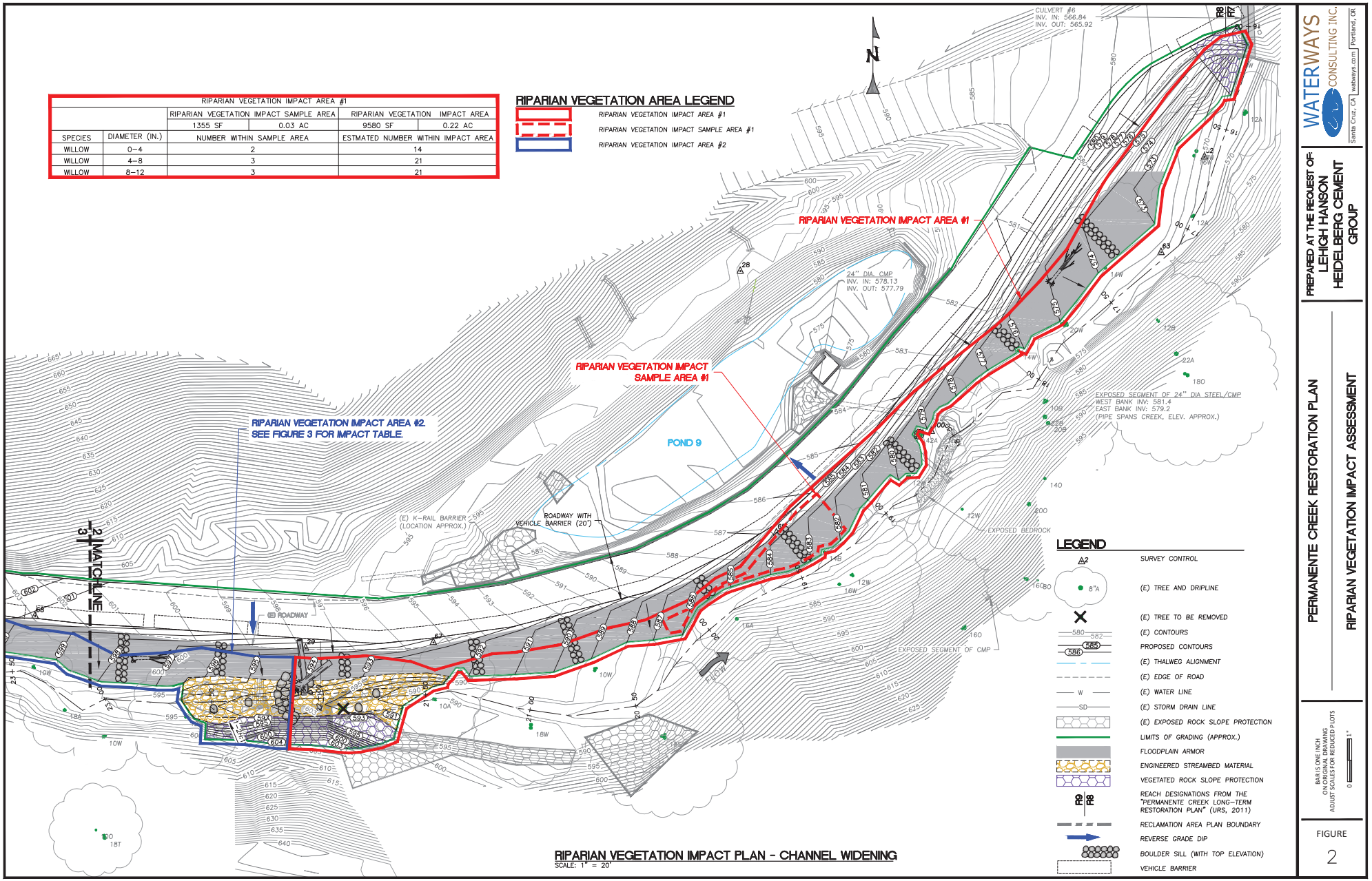
PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT GROUP

PERMANENTE CREEK RESTORATION PLAN

RIPARIAN VEGETATION IMPACT ASSESSMENT

BAR IS ONE INCH ON ORIGINAL DRAWING
ADJUST SCALES FOR REDUCED PLOTS
0 1"

FIGURE
1



RIPARIAN VEGETATION IMPACT PLAN - CHANNEL WIDENING

SCALE: 1" = 20'

WATERWAYS CONSULTING INC.
Santa Cruz, CA | waterways.com | Portland, OR

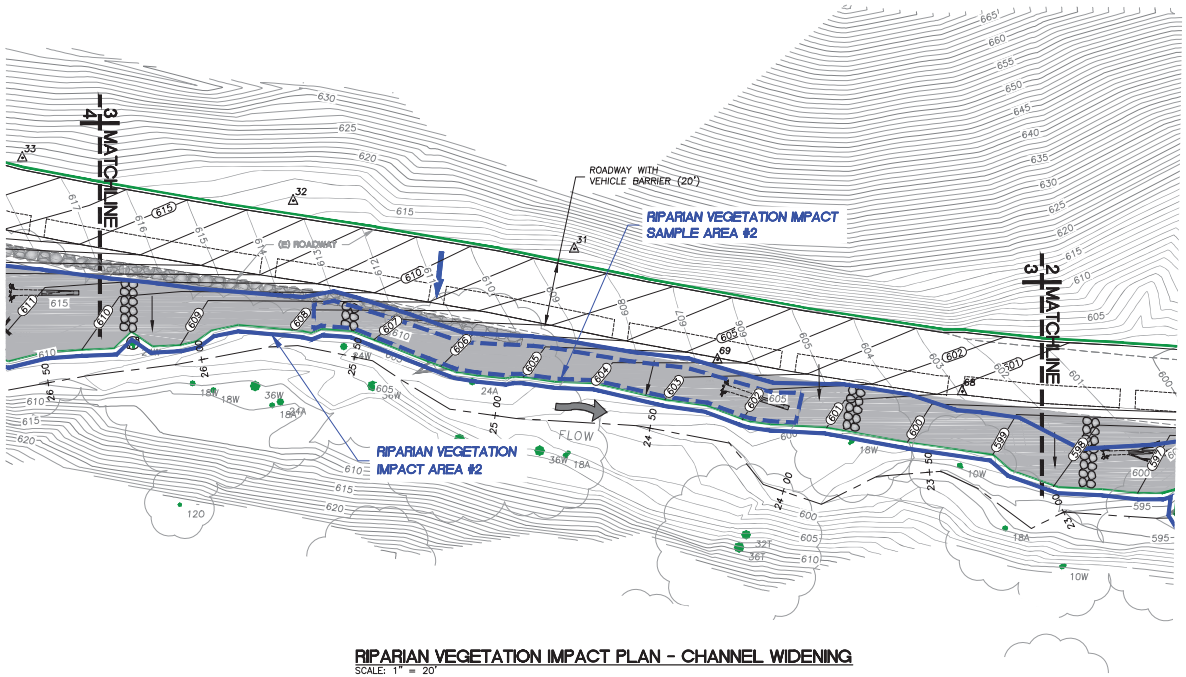
PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT GROUP

PERMANENTE CREEK RESTORATION PLAN

RIPARIAN VEGETATION IMPACT ASSESSMENT

BAR IS ONE INCH ON ORIGINAL DRAWING
ADJUST SCALES FOR REDUCED PLOTS
0 1"

FIGURE
2



RIPARIAN VEGETATION IMPACT PLAN - CHANNEL WIDENING

SCALE: 1" = 20'

LEGEND

- SURVEY CONTROL
- (E) TREE AND DRIPLINE
- (E) TREE TO BE REMOVED
- (E) CONTOURS
- PROPOSED CONTOURS
- (E) THALWEG ALIGNMENT
- (E) EDGE OF ROAD
- (E) WATER LINE
- (E) STORM DRAIN LINE
- (E) EXPOSED ROCK SLOPE PROTECTION
- LIMITS OF GRADING (APPROX.)
- FLOODPLAIN ARMOR
- ENGINEERED STREAMBED MATERIAL
- VEGETATED ROCK SLOPE PROTECTION
- REVERSE GRADE DIP
- BOULDER SILL (WITH TOP ELEVATION)

RIPARIAN VEGETATION AREA LEGEND

- RIPARIAN VEGETATION IMPACT AREA #2
- RIPARIAN VEGETATION IMPACT SAMPLE AREA #2

		RIPARIAN VEGETATION IMPACT AREA #2			
		RIPARIAN VEGETATION IMPACT SAMPLE AREA		RIPARIAN VEGETATION IMPACT AREA	
		1785 SF	0.04 AC	9010 SF	0.21 AC
SPECIES	DIAMETER (IN.)	NUMBER WITHIN SAMPLE AREA		ESTMATED NUMBER WITHIN IMPACT AREA	
ALDER	0-2	1		5	
ALDER	4-8	2		10	
ALDER	8-12	1		5	
WALNUT	0-2	2		10	
WILLOW	0-4	3		15	
WILLOW	4-8	2		10	

WATERWAYS CONSULTING INC.
Santa Cruz, CA | waterways.com | Portland, OR

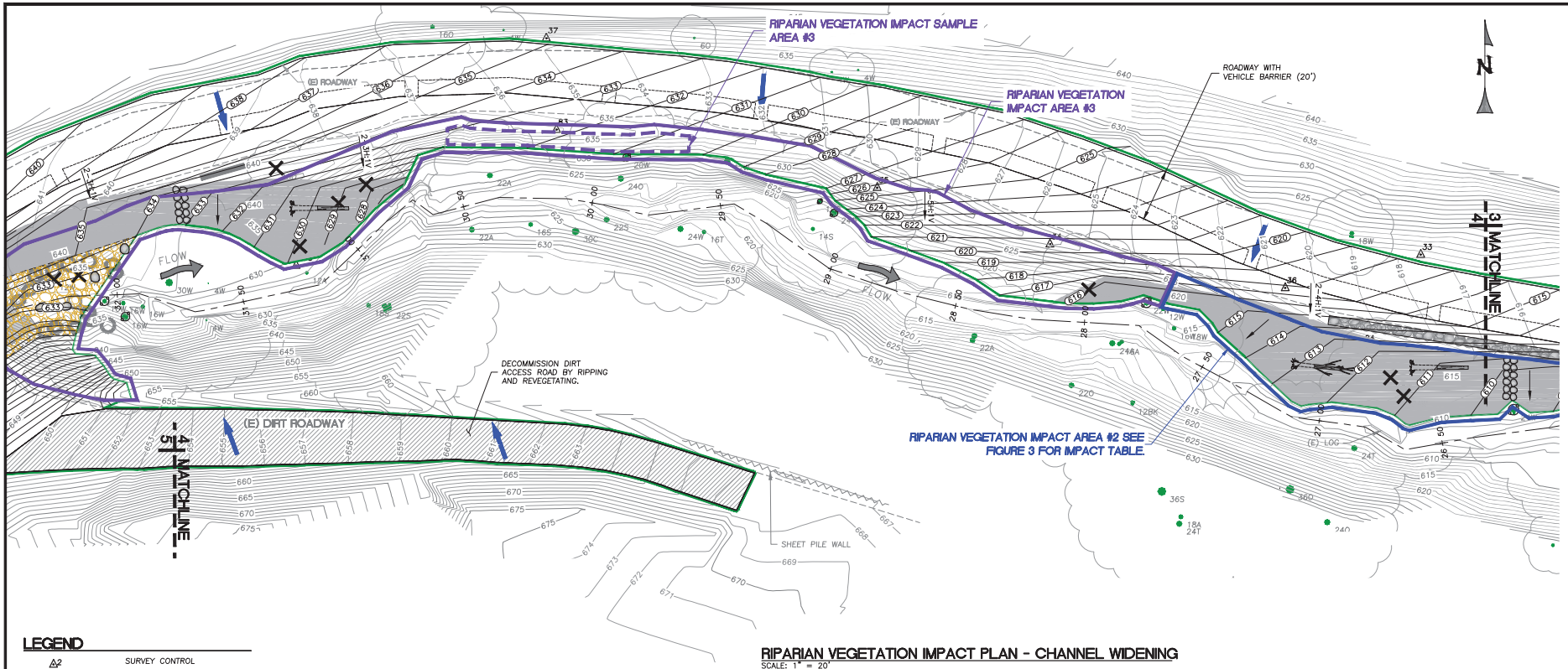
PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT GROUP

PERMANENTE CREEK RESTORATION PLAN

RIPARIAN VEGETATION IMPACT ASSESSMENT

BAR IS ONE INCH ON ORIGINAL DRAWING
ADJUST SCALES FOR REDUCED PLOTS
0 1"

FIGURE
3



LEGEND

- SURVEY CONTROL
- (E) TREE AND DRIPLINE
- (E) TREE TO BE REMOVED
- (E) CONTOURS
- PROPOSED CONTOURS
- (E) THALWEG ALIGNMENT
- (E) EDGE OF ROAD
- (E) WATER LINE
- (E) STORM DRAIN LINE
- (E) EXPOSED ROCK SLOPE PROTECTION
- LIMITS OF GRADING (APPROX.)
- FLOODPLAIN ARMOR
- ENGINEERED STREAMBED MATERIAL
- VEGETATED ROCK SLOPE PROTECTION
- ROAD DECOMMISSIONING AREA
- REACH DESIGNATIONS FROM THE "PERMANENTE CREEK LONG-TERM RESTORATION PLAN" (URS, 2011)
- RECLAMATION AREA PLAN BOUNDARY
- REVERSE GRADE DIP
- BOULDER SILL (WITH TOP ELEVATION)
- VEHICLE BARRIER

RIPARIAN VEGETATION IMPACT PLAN - CHANNEL WIDENING

SCALE: 1" = 20'

RIPARIAN VEGETATION AREA LEGEND

- RIPARIAN VEGETATION IMPACT AREA #2
- RIPARIAN VEGETATION IMPACT AREA #3
- RIPARIAN VEGETATION IMPACT SAMPLE AREA #3

RIPARIAN VEGETATION IMPACT AREA #3					
		RIPARIAN VEGETATION IMPACT SAMPLE AREA		RIPARIAN VEGETATION IMPACT AREA	
		800 SF	0.02 AC	8670 SF	0.20 AC
SPECIES	DIAMETER (IN.)	NUMBER WITHIN SAMPLE AREA		ESTMATED NUMBER WITHIN IMPACT AREA	
BAY	4-8	1		11	
ELDERBERRY	0-2	1		11	
WILLOW	0-4	1		11	
WILLOW	4-8	1		11	
WILLOW	8-12	2		22	

WATERWAYS CONSULTING INC.
Santa Cruz, CA | waterways.com | Portland, OR

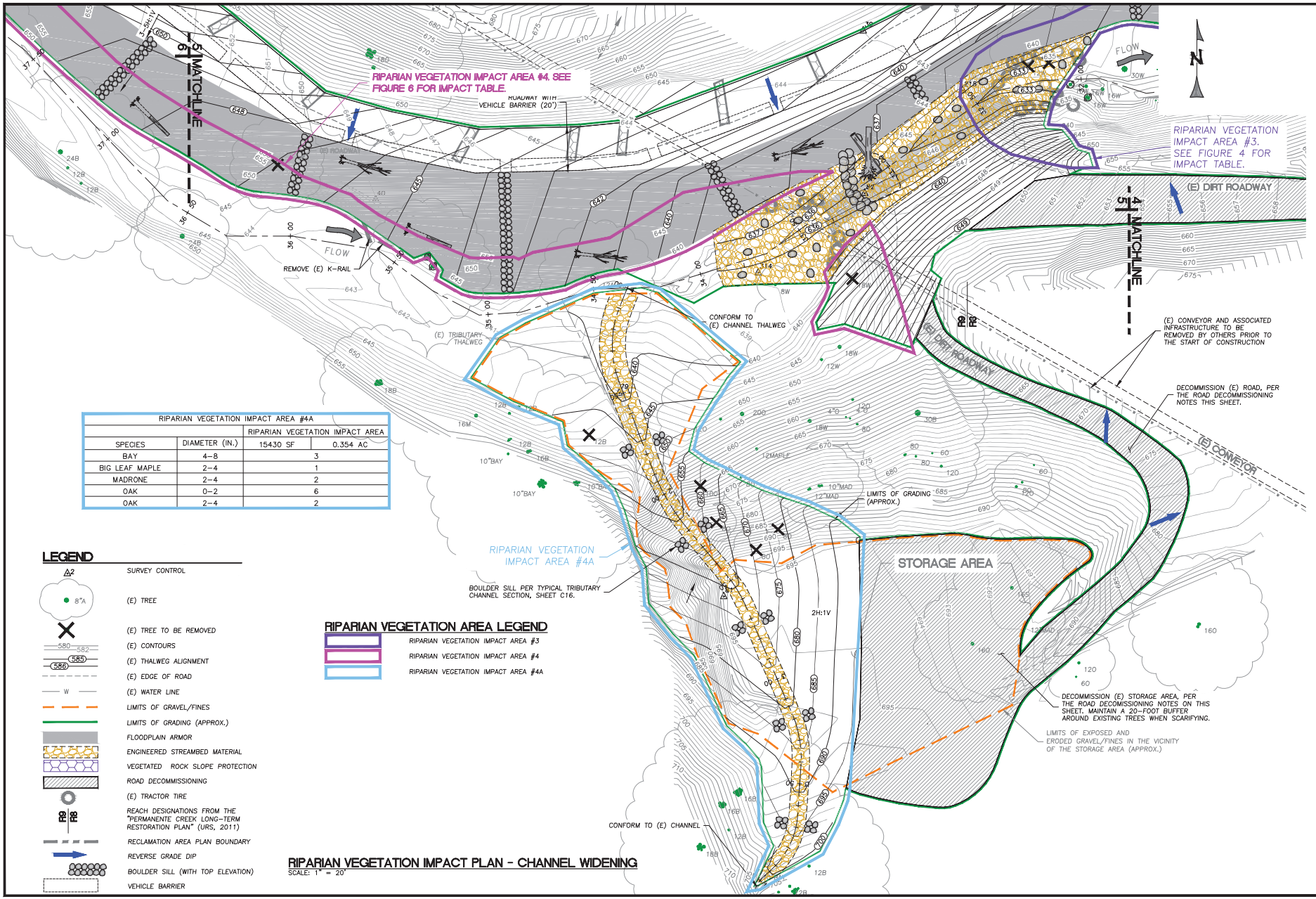
PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT GROUP

PERMANENTE CREEK RESTORATION PLAN

RIPARIAN VEGETATION IMPACT ASSESSMENT

BAR IS ONE INCH ON ORIGINAL DRAWING
ADJUST SCALES FOR REDUCED PLOTS
0 1"

FIGURE
4



RIPARIAN VEGETATION IMPACT AREA #4A			
		RIPARIAN VEGETATION IMPACT AREA	
SPECIES	DIAMETER (IN.)	15430 SF	0.354 AC
BAY	4–8	3	
BIG LEAF MAPLE	2–4	1	
MADRONE	2–4	2	
OAK	0–2	6	
OAK	2–4	2	

LEGEND

- SURVEY CONTROL
- (E) TREE
- (E) TREE TO BE REMOVED
- (E) CONTOURS
- (E) THALWEG ALIGNMENT
- (E) EDGE OF ROAD
- (E) WATER LINE
- LIMITS OF GRAVEL/FINES
- LIMITS OF GRADING (APPROX.)
- FLOODPLAIN ARMOR
- ENGINEERED STREAMBED MATERIAL
- VEGETATED ROCK SLOPE PROTECTION
- ROAD DECOMMISSIONING
- (E) TRACTOR TIRE
- REACH DESIGNATIONS FROM THE "PERMANENTE CREEK LONG-TERM RESTORATION PLAN" (URS, 2011)
- RECLAMATION AREA PLAN BOUNDARY
- REVERSE GRADE DIP
- BOULDER SILL (WITH TOP ELEVATION)
- VEHICLE BARRIER

RIPARIAN VEGETATION AREA LEGEND

- RIPARIAN VEGETATION IMPACT AREA #3
- RIPARIAN VEGETATION IMPACT AREA #4
- RIPARIAN VEGETATION IMPACT AREA #4A

RIPARIAN VEGETATION IMPACT PLAN - CHANNEL WIDENING

SCALE: 1" = 20'

WATERWAYS CONSULTING INC.
Santa Cruz, CA | waterways.com | Portland, OR

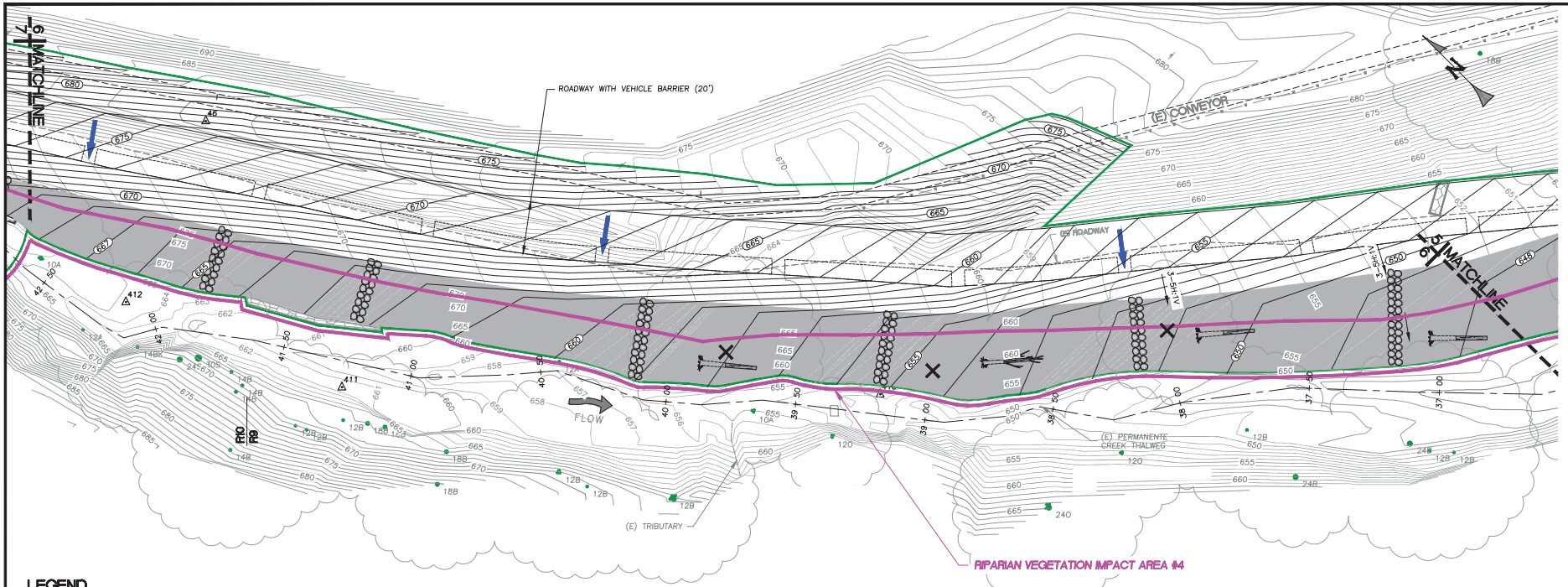
PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT GROUP

PERMANENTE CREEK RESTORATION PLAN

RIPARIAN VEGETATION IMPACT ASSESSMENT

BAR IS ONE INCH ON ORIGINAL DRAWING
ADJUST SCALES FOR REDUCED PLOTS
0 1"

FIGURE
5



LEGEND

- SURVEY CONTROL
- (E) TREE AND DRIPLINE
- (E) TREE TO BE REMOVED
- (E) CONTOURS
- PROPOSED CONTOURS
- (E) THALWEG ALIGNMENT
- (E) EDGE OF ROAD
- (E) WATER LINE
- (E) STORM DRAIN LINE
- (E) EXPOSED ROCK SLOPE PROTECTION
- LIMITS OF GRADING (APPROX.)
- FLOODPLAIN ARMOR
- ENGINEERED STREAMBED MATERIAL
- REACH DESIGNATIONS FROM THE "PERMANENTE CREEK LONG-TERM RESTORATION PLAN" (URS, 2011)
- RECLAMATION AREA PLAN BOUNDARY
- REVERSE GRADE DIP
- BOULDER SILL (WITH TOP ELEVATION)
- VEHICLE BARRIER

RIPARIAN VEGETATION IMPACT PLAN - CHANNEL WIDENING

SCALE: 1" = 20'

RIPARIAN VEGETATION AREA LEGEND

RIPARIAN VEGETATION IMPACT AREA #4

RIPARIAN VEGETATION IMPACT AREA #4			
		RIPARIAN VEGETATION IMPACT AREA	
SPECIES	DIAMETER (IN.)	24,715 SF	0.57 AC
ALDER	2-4	1	
BAY	2-4	1	
BIG LEAF MAPLE	2-4	5	
BIG LEAF MAPLE	4-8	1	
BUCKEYE SAPPLING	0-2	5	
COFFEEBERRY	0-2	1	
ELDERBERRY	0-2	7	
ELDERBERRY	4-6	1	
OAK SAPPLING	<1	12	
OAK	0-2	5	
OAK	2-4	3	
SYCAMORE	32	1	
TOYON	0-2	9	
WALNUT	0-2	1	
WILLOW	0-4	3	
WILLOW	4-8	14	
WILLOW	8-12	9	
WILLOW	24+	1	

WATERWAYS CONSULTING INC.
Santa Cruz, CA | waterways.com | Portland, OR

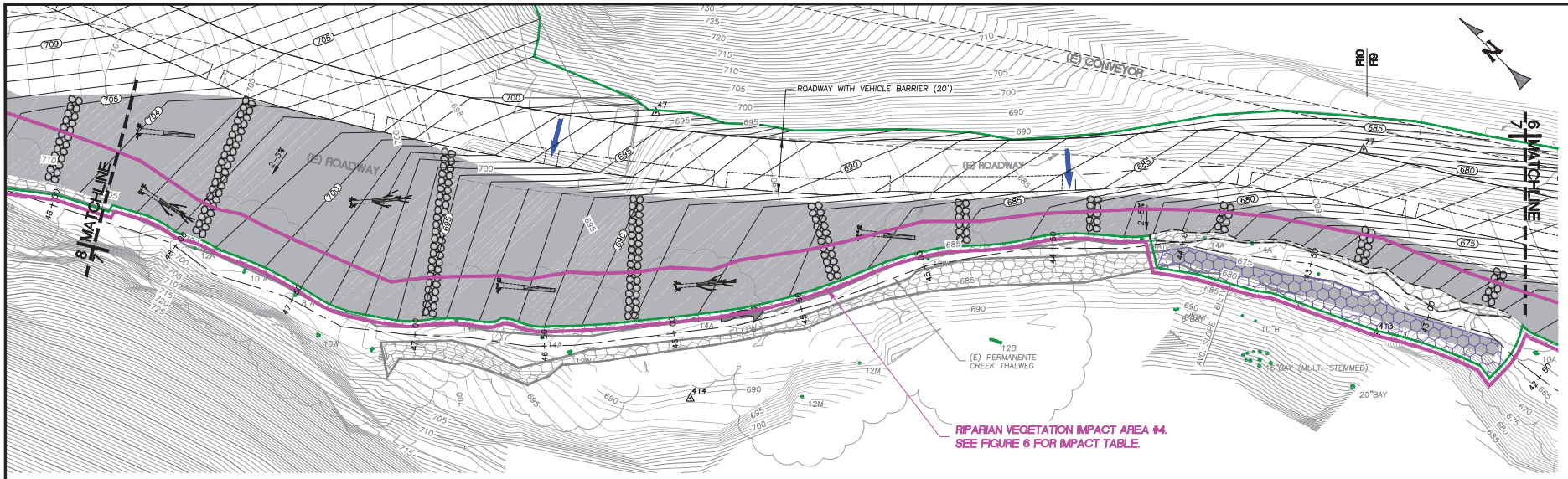
PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT GROUP

PERMANENTE CREEK RESTORATION PLAN

RIPARIAN VEGETATION IMPACT ASSESSMENT

BAR IS ONE INCH ON ORIGINAL DRAWING
ADJUST SCALES FOR REDUCED PLOTS
0 1"

FIGURE
6



RIPARIAN VEGETATION IMPACT PLAN - CHANNEL WIDENING
SCALE:1" = 20'

LEGEND

- SURVEY CONTROL
- (E) TREE AND DRIPLINE
- (E) TREE TO BE REMOVED
- (E) CONTOURS
- PROPOSED CONTOURS
- (E) THALWEG ALIGNMENT
- (E) EDGE OF ROAD
- (E) WATER LINE
- (E) STORM DRAIN LINE
- (E) EXPOSED ROCK SLOPE PROTECTION
- LIMITS OF GRADING (APPROX.)
- FLOODPLAIN ARMOR
- ENGINEERED STREAMBED MATERIAL
- VEGETATED ROCK SLOPE PROTECTION
- ROAD DECOMMISSIONING AREA
- REACH DESIGNATIONS FROM THE "PERMANENTE CREEK LONG-TERM RESTORATION PLAN" (URS, 2011)
- REVERSE GRADE DIP
- BOULDER SILL (WITH TOP ELEVATION)
- VEHICLE BARRIER

RIPARIAN VEGETATION AREA LEGEND

RIPARIAN VEGETATION IMPACT AREA #4

WATERWAYS CONSULTING INC.
Santa Cruz, CA | waterways.com | Portland, OR

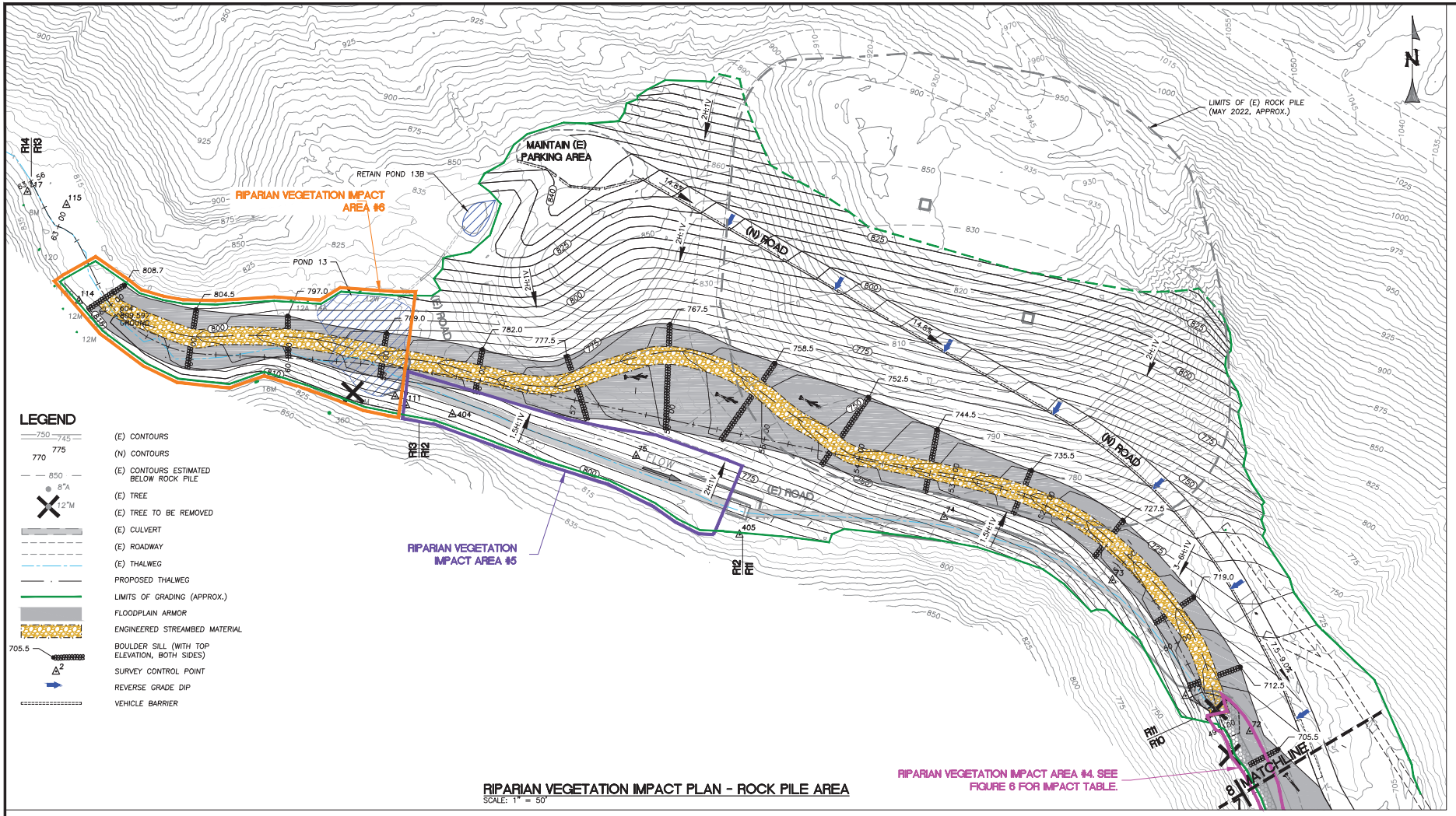
PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT GROUP

PERMANENTE CREEK RESTORATION PLAN

RIPARIAN VEGETATION IMPACT ASSESSMENT

BAR IS ONE INCH ON ORIGINAL DRAWING
ADJUST SCALES FOR REDUCED PLOTS
0 1"

FIGURE
7



RIPARIAN VEGETATION IMPACT PLAN - ROCK PILE AREA

SCALE: 1" = 50'

RIPARIAN VEGETATION IMPACT AREA #5			
		RIPARIAN VEGETATION IMPACT AREA	
SPECIES	DIAMETER (IN.)	19050 SF	0.437 AC
BIG LEAF MAPLE	0–2	1	
WILLOW	0–4	1	

RIPARIAN VEGETATION AREA LEGEND

- RIPARIAN VEGETATION IMPACT AREA #4
- RIPARIAN VEGETATION IMPACT AREA #5
- RIPARIAN VEGETATION IMPACT AREA #6

RIPARIAN VEGETATION IMPACT AREA #6			
		RIPARIAN VEGETATION IMPACT AREA	
SPECIES	DIAMETER (IN.)	29200 SF	0.670 AC
BIG LEAF MAPLE	0–2	1	
ELDERBERRY	0–2	5	
WILLOW	0–4	26	
WILLOW	4–8	6	
WILLOW	8–12	9	

WATERWAYS CONSULTING INC.
Santa Cruz, CA | waterways.com | Portland, OR

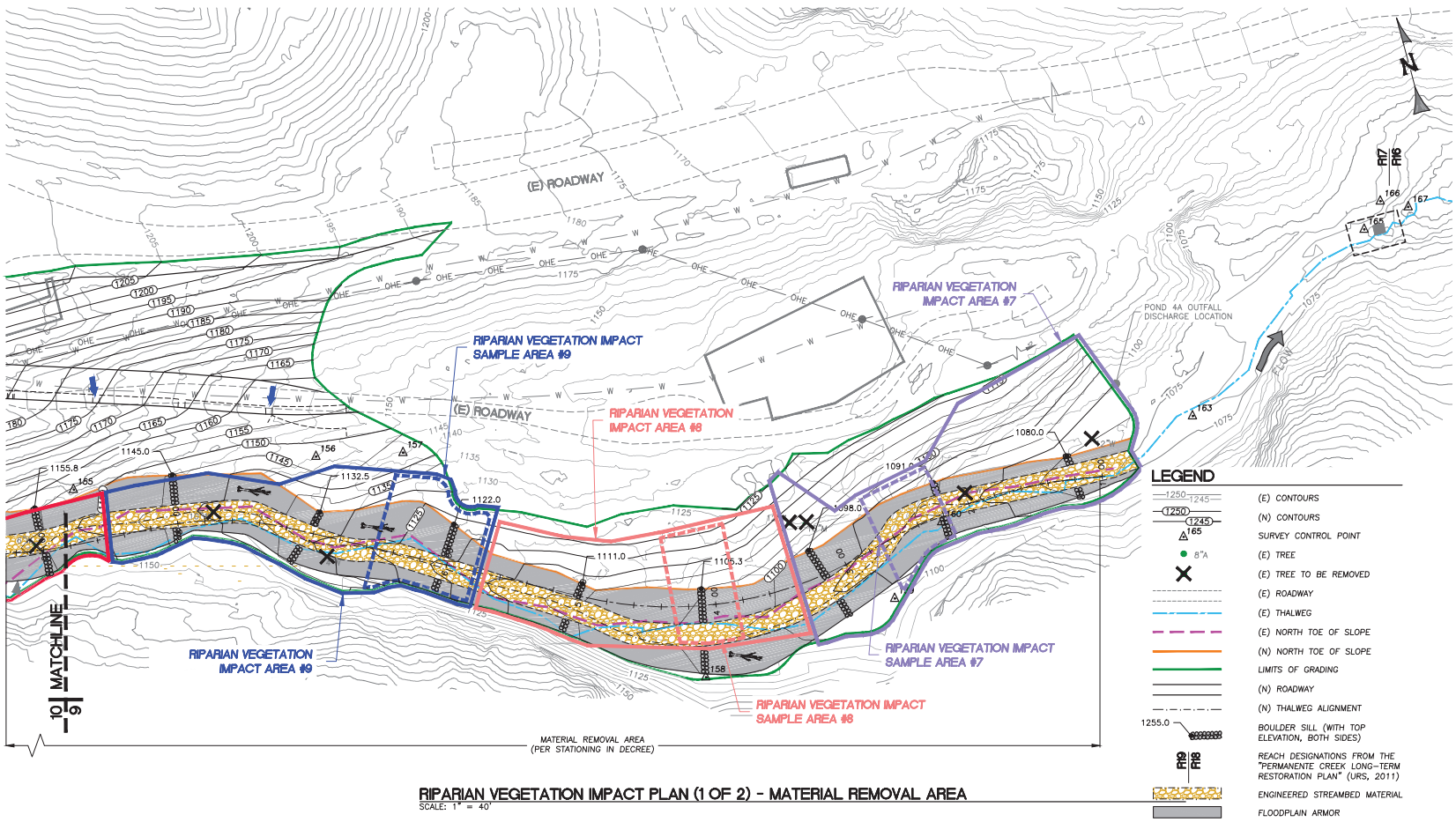
PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT GROUP

PERMANENTE CREEK RESTORATION PLAN

RIPARIAN VEGETATION IMPACT ASSESSMENT

BAR IS ONE INCH ON ORIGINAL DRAWING
ADJUST SCALES FOR REDUCED PLOTS
0 1"

FIGURE
8



RIPARIAN VEGETATION IMPACT PLAN (1 OF 2) - MATERIAL REMOVAL AREA

SCALE: 1" = 40'

RIPARIAN VEGETATION IMPACT AREA #7					
		RIPARIAN VEGETATION IMPACT SAMPLE AREA		RIPARIAN VEGETATION IMPACT AREA	
		3495 SF	0.080 AC	24540 SF	0.563 AC
SPECIES	DIAMETER (IN.)	NUMBER WITHIN SAMPLE AREA		ESTMATED NUMBER WITHIN IMPACT AREA	
BIG LEAF MAPLE	4–6	1		8	
BIG LEAF MAPLE	6–8	3		23	
CEANOTHUS	0–2	1		8	
MADRONE	2–4	1		8	
TOYONE	0–2	3		23	
WILLOW	0–4	6		47	

RIPARIAN VEGETATION IMPACT AREA #8					
		RIPARIAN VEGETATION IMPACT SAMPLE AREA		RIPARIAN VEGETATION IMPACT AREA	
		3,995 SF	0.091 AC	18,310 SF	0.420 AC
SPECIES	DIAMETER (IN.)	NUMBER WITHIN SAMPLE AREA		ESTMATED NUMBER WITHIN IMPACT AREA	
BAY	0–2	3		14	
BIG LEAF MAPLE	0–2	2		9	
MADRONE	0–2	3		14	
MADRONE	2–4	2		9	
TOYONE	0–2	1		5	
WILLOW	0–4	9		41	

RIPARIAN VEGETATION IMPACT AREA #9					
		RIPARIAN VEGETATION IMPACT SAMPLE AREA		RIPARIAN VEGETATION IMPACT AREA	
		5,945 SF	0.136 AC	18,775 SF	0.431 AC
SPECIES	DIAMETER (IN.)	NUMBER WITHIN SAMPLE AREA		ESTMATED NUMBER WITHIN IMPACT AREA	
WILLOW	0–4	24		76	
WILLOW	4–8	9		28	

RIPARIAN VEGETATION AREA LEGEND

- RIPARIAN VEGETATION IMPACT AREA #7
- RIPARIAN VEGETATION IMPACT SAMPLE AREA #7
- RIPARIAN VEGETATION IMPACT AREA #8
- RIPARIAN VEGETATION IMPACT SAMPLE AREA #8
- RIPARIAN VEGETATION IMPACT AREA #9
- RIPARIAN VEGETATION IMPACT SAMPLE AREA #9

WATERWAYS CONSULTING INC.
Santa Cruz, CA | waterways.com | Portland, OR

PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT GROUP

PERMANENTE CREEK RESTORATION PLAN

RIPARIAN VEGETATION IMPACT ASSESSMENT

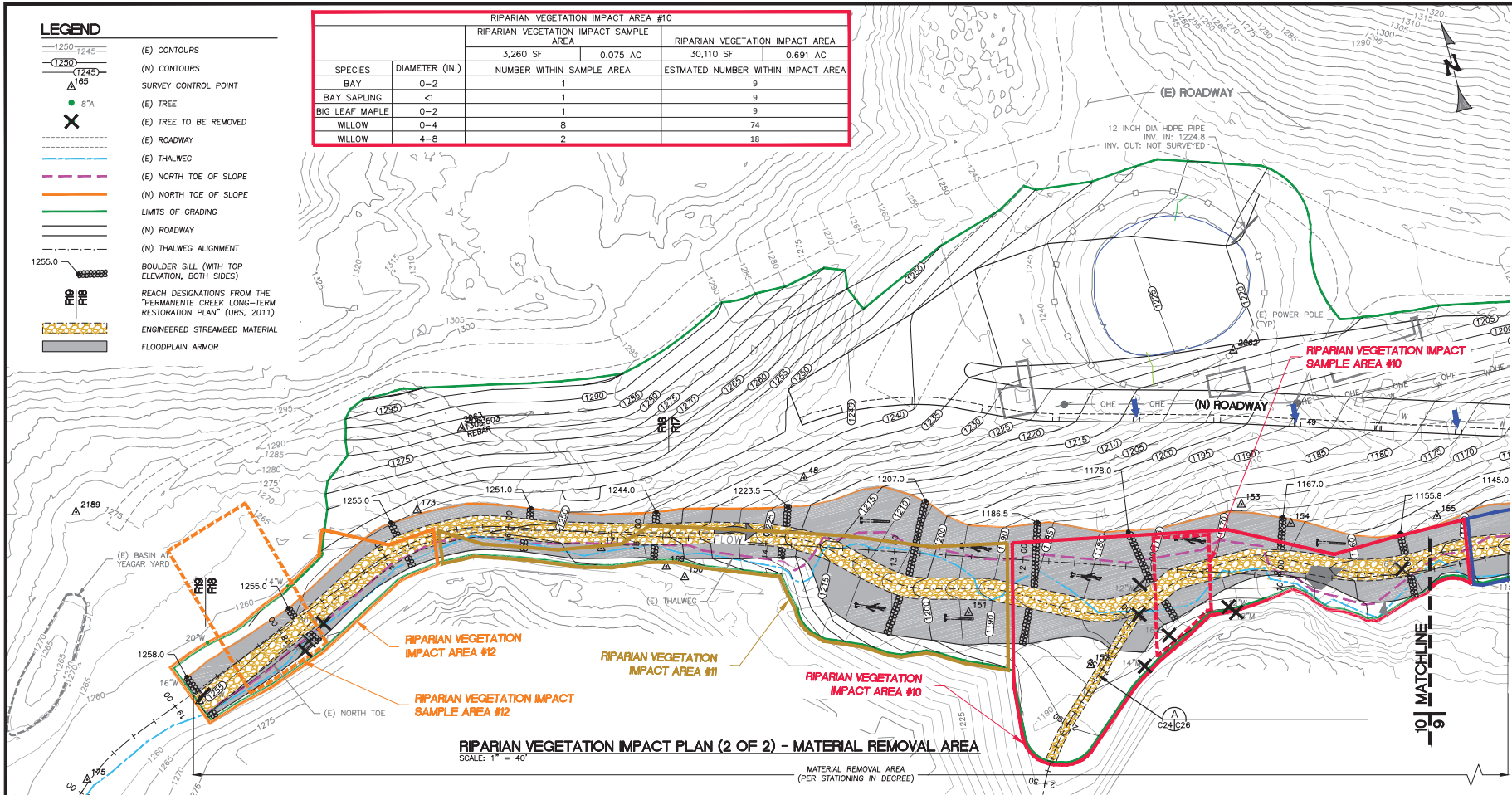
BAR IS ONE INCH ON ORIGINAL DRAWING
ADJUST SCALES FOR REDUCED PLOTS
0 1"

FIGURE
9

LEGEND

- (E) CONTOURS
- (N) CONTOURS
- SURVEY CONTROL POINT
- (E) TREE
- (E) TREE TO BE REMOVED
- (E) ROADWAY
- (E) THALWEG
- (E) NORTH TOE OF SLOPE
- (N) NORTH TOE OF SLOPE
- LIMITS OF GRADING
- (N) ROADWAY
- (N) THALWEG ALIGNMENT
- BOULDER SILL (WITH TOP ELEVATION, BOTH SIDES)
- REACH DESIGNATIONS FROM THE "PERMANENTE CREEK LONG-TERM RESTORATION PLAN" (URS, 2011)
- ENGINEERED STREAMBED MATERIAL
- FLOODPLAIN ARMOR

RIPARIAN VEGETATION IMPACT AREA #10					
		RIPARIAN VEGETATION IMPACT SAMPLE AREA		RIPARIAN VEGETATION IMPACT AREA	
		3,260 SF	0.075 AC	30,110 SF	0.691 AC
SPECIES	DIAMETER (IN.)	NUMBER WITHIN SAMPLE AREA		ESTMATED NUMBER WITHIN IMPACT AREA	
BAY	0-2	1		9	
BAY SAPLING	<1	1		9	
BIG LEAF MAPLE	0-2	1		9	
WILLOW	0-4	8		74	
WILLOW	4-8	2		18	



RIPARIAN VEGETATION IMPACT PLAN (2 OF 2) - MATERIAL REMOVAL AREA

SCALE: 1" = 40'

RIPARIAN VEGETATION AREA LEGEND

- RIPARIAN VEGETATION IMPACT AREA #10
- RIPARIAN VEGETATION IMPACT SAMPLE AREA #10
- RIPARIAN VEGETATION IMPACT AREA #11
- RIPARIAN VEGETATION IMPACT SAMPLE AREA #11
- RIPARIAN VEGETATION IMPACT AREA #12
- RIPARIAN VEGETATION IMPACT SAMPLE AREA #12

RIPARIAN VEGETATION IMPACT AREA #11			
		RIPARIAN VEGETATION IMPACT AREA	
		19425 SF	0.446 AC
SPECIES	DIAMETER (IN.)		
BAY	0-2	2	
CEANOTHUS	0-2	2	
MADRONE	0-2	2	
TOYON	0-2	2	
WILLOW	0-4	25	

RIPARIAN VEGETATION IMPACT AREA #12			
		RIPARIAN VEGETATION IMPACT SAMPLE AREA	
		8,955 SF	0.205 AC
SPECIES	DIAMETER (IN.)	NUMBER WITHIN SAMPLE AREA	
BIG LEAF MAPLE	<1	23	
BIG LEAF MAPLE	0-2	9	
BIG LEAF MAPLE	4-6	1	
MADRONE	0-2	4	
MADRONE	2-4	14	
MADRONE	4-6	2	
TOYONE	0-2	2	
WILLOW	0-4	3	
WILLOW	4-8	5	
WILLOW	8-12	7	

RIPARIAN VEGETATION IMPACT AREA #12	
RIPARIAN VEGETATION IMPACT AREA	
10,735 SF	0.246 AC
ESTMATED NUMBER WITHIN IMPACT AREA	
28	
11	
1	
5	
17	
2	
2	
4	
6	
8	

WATERWAYS CONSULTING INC.
Santa Cruz, CA | waterways.com | Portland, OR

PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT GROUP

PERMANENTE CREEK RESTORATION PLAN

RIPARIAN VEGETATION IMPACT ASSESSMENT

BAR IS ONE INCH ON ORIGINAL DRAWING
ADJUST SCALES FOR REDUCED PLOTS
0 1"

FIGURE
10

Appendix F
Energy: Fuel Use Calculations

SEIR Fuel Use Summary Tables

2012 EIR

Scenario	Diesel	Gasoline
Baseline Fuel Use	822,554	12,615
Reclamation Plan Amendment Phase 1 Fuel Use	2,327,866	7,933
Maximum Annual Incremental Change	1,505,312	-4,682
Percent Incremental Change	183%	-37%

PCRP Fuel Use

Scenario	Diesel	Gasoline
Reclamation Plan Amendment Incremental Change Disclosed in 2012 EIR[a]	1,505,312	-4,682
PCRP Fuel Use not Evaluated in the 2012 EIR	38,077	898
Net Fuel Use	1,543,389	-3,784
Percent Incremental Change	2.5%	19.2%

PCRP Construction Fuel Use Estimates

Total Fuel Use During Contruction

Fuel Type	Fuel Consumed (gal/proj)	Fuel Consumed (av. gal/yr)	Gallons Sold in Santa Clara County in 2020	% Project gallons comp. to Co. gallons
Gasoline	5,388	898	511,000,000	0.00018%
Diesel	228,462	38,077	71,000,000	0.054%

Diesel Fuel Use for Off-road Construction Equipment

Phase Name	Equipment Type	HP	Units	Hours/day	Days	Total Hours	Use Factor (Gal/hr)	Total Gallons	Applicability Factors	Gallons Covered in SEIR
	Concrete/Industrial Saws	81	1	0.2	132	26.4	1.75	46	100%	46
Concrete Channel										
	Excavators	286	1	2.9	132	382.8	6.45	2,470		
	Excavators	108	1	1.4	132	184.8	1.60	295		
	Off-Highway Trucks	402	1	0.3	132	39.6	7.40	293		
	Off-Highway Trucks	452	1	5.4	132	712.8	7.40	5,274		
	Off-Highway Trucks	402	1	0.1	132	13.2	7.40	98		
	Off-Highway Trucks	402	1	1.8	132	237.6	7.40	1,758		
	Rubber Tired Dozers	347	1	0.6	132	79.2	7.34	582		
	Rubber Tired Loaders	393	1	0.2	132	26.4	5.93	157		
Channel Widening	Rubber Tired Loaders	110	1	2.9	132	382.8	1.59	610		
(Phase 1)	Total					2,059		11,536	89%	10,267
	Excavators	286	1	8.7	132	1148.4	6.46	7,420		
	Excavators	108	1	4.3	132	567.6	1.60	906		
	Off-Highway Trucks	402	1	0.4	132	52.8	7.39	390		
	Off-Highway Trucks	452	1	23	132	3036	7.39	22,450		
	Off-Highway Trucks	402	1	0.1	132	13.2	7.39	98		
	Off-Highway Trucks	402	1	1.8	132	237.6	7.39	1,757		
	Rollers	156	1	0.4	132	52.8	2.79	147		
	Rubber Tired Dozers	347	1	0.9	132	118.8	7.34	872		
	Rubber Tired Loaders	393	1	0.4	132	52.8	5.94	314		
Rock Pile Area (Phase	Rubber Tired Loaders	110	1	1.4	132	184.8	1.59	294		
1)	Total					5,465		34,647	89%	30,836
	Excavators	286	1	8.7	132	1148.4	6.46	7,422		
	Excavators	108	1	4.3	132	567.6	1.60	906		
	Off-Highway Trucks	402	1	0.4	132	52.8	7.40	391		
	Off-Highway Trucks	452	1	23	132	3036	7.40	22,467		
	Off-Highway Trucks	402	1	0.1	132	13.2	7.40	98		
	Off-Highway Trucks	402	1	1.8	132	237.6	7.40	1,758		
	Rollers	156	1	0.4	132	52.8	2.79	147		
	Rubber Tired Dozers	347	1	0.9	132	118.8	7.33	870		
	Rubber Tired Loaders	393	1	0.4	132	52.8	5.94	314		
Rock Pile Area (Phase	Rubber Tired Loaders	110	1	1.4	132	184.8	1.59	295		
2)	Total					5,465		34,667	89%	30,854
	Excavators	286	1	2.9	132	382.8	6.46	2,475		
	Excavators	108	1	1.4	132	184.8	1.60	295		
	Off-Highway Trucks	402	1	0.3	132	39.6	7.40	293		
	Off-Highway Trucks	452	1	5.4	132	712.8	7.40	5,272		
	Off-Highway Trucks	402	1	0.1	132	13.2	7.40	98		
	Off-Highway Trucks	402	1	1.8	132	237.6	7.40	1,757		
	Rubber Tired Dozers	347	1	0.6	132	79.2	7.33	580		
	Rubber Tired Loaders	393	1	0.2	132	26.4	5.94	157		
Channel Widening	Rubber Tired Loaders	110	1	2.9	132	382.8	1.59	610		
(Phase 2)	Total					2,059		11,537	89%	10,268
Old Crusher	Generator Sets	84	1	0.3	130	39	1.75	68		
Foundation	Total					39		68	0%	0
	Excavators	286	1	7.5	130	975	6.46	6,299		
	Excavators	108	1	3.7	130	481	1.60	769		
	Off-Highway Trucks	402	1	0.3	130	39	7.39	288		
	Off-Highway Trucks	452	1	20.2	130	2626	7.39	19,416		
	Off-Highway Trucks	402	1	0.2	130	26	7.39	192		
	Off-Highway Trucks	402	1	1.8	130	234	7.39	1,730		
	Rubber Tired Dozers	347	1	0.9	130	117	7.32	857		
	Rubber Tired Loaders	393	1	0.4	130	52	5.93	308		
Material Removal	Rubber Tired Loaders	110	1	1.1	130	143	1.59	228		
Area (Phase 1)	Total					4,693		30,087	20%	6,017

	Excavators	286	1	7.5	131	982.5	6.46	6,348		
	Excavators	108	1	3.7	131	484.7	1.60	774		
	Off-Highway Trucks	402	1	0.3	131	39.3	7.40	291		
	Off-Highway Trucks	452	1	20	131	2620	7.40	19,378		
	Off-Highway Trucks	402	1	0.2	131	26.2	7.40	194		
	Off-Highway Trucks	402	1	1.8	131	235.8	7.40	1,744		
	Rubber Tired Dozers	347	1	0.9	131	117.9	7.32	863		
	Rubber Tired Loaders	393	1	0.4	131	52.4	5.93	310		
Material Removal	Rubber Tired Loaders	110	1	1.1	131	144.1	1.60	230		
Area (Phase 2)	Total					4,703		30,132	20%	6,026
					Total Hours	24,509	Total	152,721	Total	94,315
fuel use rates derived from the Off-road 2011 model.					Ave. Gal/hr	6.23	Ave. Gal./yr.	25,453	Ave. Gal./yr.	15,719

Fuel Use for Vehicles During Construction

Trip Type	Total Miles	Vehicle Type	Fuel Type	miles /gallon	Gallon /project	Ave. Gal. Year
Worker Trips	91,599	light-duty vehicles	gasoline	17	5,388	898
Vendor Trips	767,193	heavy-duty trucks	diesel	6	127,866	21,311
Haul Trips	37,694	heavy-duty trucks	diesel	6	6,282	1,047
Total	804,887				134,148	22,358

Fuel economy obtained from U.S. Energy Information Administration, 2021.

Total Worker, Vendor, and Haul Trip Mileage

Phases	# of Worker Trips	Worker Trip Distance (mi)	Total Worker Trip Miles	Total # of Vendor Trips	Vendor Trip Distance (mi)	Total Vendor Trip Miles	Total # of Haul Trips	Haul Trip Distance (mi)	Total Haul Trip Miles
Concrete Channel	1,056	10.8	11,405	3,300	6.6	21,780	2	20	40
Channel Widening (Phase 1)	1,584	10.8	17,107	28,512	6.6	188,179	172	20	3,440
Rock Pile Area (Phase 1)	2,112	10.8	22,810	28,512	6.6	188,179	740	20	14,800
Rock Pile Area (Phase 2)	2,112	10.8	22,810	28,512	6.6	188,179	741	20	14,820
Channel Widening (Phase 2)	1,584	10.8	17,107	28,512	6.6	188,179	172	20	3,440
Old Crusher Foundation	1,040	10.8	11,232	3,250	6.6	21,450	2	20	40
Material Removal Area (Phase 1)	2,080	10.8	22,464	28,080	6.6	185,328	638	20	12,760
Material Removal Area (Phase 2)	2,096	10.8	22,637	28,296	6.6	186,754	638	20	12,760
		Total	147,571		Total	1,168,028		Total	62,100

Worker, Vendor, and Haul Trip Mileage Covered In SEIR

Phases	Applicability Factors	Worker Trip Miles	Total Vendor Trip Miles	Total Haul Trip Miles
Concrete Channel	100%	11,405	21,780	40
Channel Widening (Phase 1)	89%	15,253	167,781	3,067
Rock Pile Area (Phase 1)	89%	20,337	167,781	13,196
Rock Pile Area (Phase 2)	89%	20,337	167,781	13,214
Channel Widening (Phase 2)	89%	15,225	167,479	3,062
Old Crusher Foundation	0%	0	0	0
Material Removal Area (Phase 1)	20%	4,493	37,066	2,552
Material Removal Area (Phase 2)	20%	4,549	37,526	2,564
	Total	91,599	767,193	37,694
	Average/year	15,266	127,866	6,282

Offroad 2011 Fuel Consumption Factors

Calendar Year	Equipment Type	HP Bin	BSFC (lbs/yr)	Activity (hrs/yr)	BSFC (gal/hr)*
2024	Excavators	120	2382474.55	209941.9666	1.60
2024	Excavators	175	5017341.45	244930.297	2.88
2024	Excavators	500	10563913.4	230487.3669	6.45
2024	Off-Highway Trucks	120	89020.1088	7399.999991	1.69
2024	Off-Highway Trucks	175	1723353.38	77681.16287	3.12
2024	Off-Highway Trucks	500	14993283.4	285330.4598	7.40
2024	Other Construction Equipment	120	1287076.57	103494.6561	1.75
2024	Other Construction Equipment	175	699023.789	30229.63231	3.26
2024	Other Construction Equipment	500	3069645.17	55898.36967	7.73
2024	Rollers	120	1612454.27	134256.9613	1.69
2024	Rollers	175	1667105.86	84212.72837	2.79
2024	Rollers	500	166075.702	3557.537695	6.57
2024	Rubber Tired Dozers	120	216765.534	18085.6323	1.69
2024	Rubber Tired Dozers	175	180777.608	8299.258826	3.07
2024	Rubber Tired Dozers	500	2159941.65	41407.77582	7.34
2024	Rubber Tired Loaders	120	3493355.99	308830.4764	1.59
2024	Rubber Tired Loaders	175	8266086.66	416531.0278	2.79
2024	Rubber Tired Loaders	500	14894333.4	353531.5345	5.93
2025	Excavators	120	2483473.15	219145.1416	1.60
2025	Excavators	175	5238044.58	255667.2469	2.88
2025	Excavators	500	11040631.7	240591.1855	6.46
2025	Off-Highway Trucks	120	92947.0812	7724.391991	1.69
2025	Off-Highway Trucks	175	1797903.89	81086.45311	3.12
2025	Off-Highway Trucks	500	15642289.3	297838.4218	7.39
2025	Other Construction Equipment	120	1345270.34	108031.5262	1.75
2025	Other Construction Equipment	175	730130.585	31554.80135	3.26
2025	Other Construction Equipment	500	3202945.07	58348.77291	7.73
2025	Rollers	120	1682584.19	140142.351	1.69
2025	Rollers	175	1740030.36	87904.34127	2.79
2025	Rollers	500	173237.338	3713.48861	6.57
2025	Rubber Tired Dozers	120	226276.696	18878.44776	1.69
2025	Rubber Tired Dozers	175	188936.716	8663.071417	3.07
2025	Rubber Tired Dozers	500	2253205.11	43222.95842	7.34
2025	Rubber Tired Loaders	120	3647194.69	322368.6029	1.59
2025	Rubber Tired Loaders	175	8630329.36	434790.3972	2.79
2025	Rubber Tired Loaders	500	15568162.8	369029.2104	5.94
2026	Excavators	120	2591442.01	228504.9154	1.60
2026	Excavators	175	5462016.15	266586.8939	2.88

2026	Excavators	500	11515501.6	250866.9282	6.46
2026	Off-Highway Trucks	120	96944.7147	8054.303763	1.69
2026	Off-Highway Trucks	175	1875190.78	84549.68691	3.12
2026	Off-Highway Trucks	500	16322595.4	310559.2161	7.40
2026	Other Construction Equipment	120	1401498	112645.5945	1.75
2026	Other Construction Equipment	175	761842.783	32902.51913	3.26
2026	Other Construction Equipment	500	3336321.85	60840.87158	7.72
2026	Rollers	120	1755255.54	146127.8851	1.69
2026	Rollers	175	1814559.92	91658.7697	2.79
2026	Rollers	500	180853.245	3872.093145	6.58
2026	Rubber Tired Dozers	120	236020.086	19684.75357	1.69
2026	Rubber Tired Dozers	175	197018.768	9033.07455	3.07
2026	Rubber Tired Dozers	500	2344815.64	45069.0277	7.33
2026	Rubber Tired Loaders	120	3806308.06	336137.0907	1.59
2026	Rubber Tired Loaders	175	9000129.28	453360.4633	2.80
2026	Rubber Tired Loaders	500	16232006.7	384790.5908	5.94
2027	Excavators	120	2700174.9	238021.2881	1.60
2027	Excavators	175	5688373.9	277689.2382	2.88
2027	Excavators	500	11998108.3	261314.5948	6.46
2027	Off-Highway Trucks	120	101013.629	8389.735306	1.70
2027	Off-Highway Trucks	175	1952548.15	88070.86426	3.12
2027	Off-Highway Trucks	500	16993233.6	323492.8426	7.40
2027	Other Construction Equipment	120	1460007.22	117336.861	1.75
2027	Other Construction Equipment	175	793759.437	34272.78565	3.26
2027	Other Construction Equipment	500	3478075.38	63374.66569	7.73
2027	Rollers	120	1828246.75	152213.5634	1.69
2027	Rollers	175	1890065.25	95476.01368	2.79
2027	Rollers	500	188258.554	4033.351302	6.57
2027	Rubber Tired Dozers	120	245776.451	20504.54973	1.69
2027	Rubber Tired Dozers	175	205230.287	9409.268225	3.07
2027	Rubber Tired Dozers	500	2443145.2	46945.98367	7.33
2027	Rubber Tired Loaders	120	3963886.37	350135.9398	1.59
2027	Rubber Tired Loaders	175	9378124.74	472241.2262	2.80
2027	Rubber Tired Loaders	500	16908164.9	400815.6757	5.94
2028	Excavators	120	2811028.33	247694.2596	1.60
2028	Excavators	175	5917846.56	288974.2796	2.88
2028	Excavators	500	12477354.8	271934.1854	6.46
2028	Off-Highway Trucks	120	105633.348	8730.68662	1.70
2028	Off-Highway Trucks	175	2031019.67	91649.98515	3.12
2028	Off-Highway Trucks	500	17677794.3	336639.3015	7.39

2028	Other Construction Equipment	120	1517051.96	122105.3257	1.75
2028	Other Construction Equipment	175	825898.143	35665.6009	3.26
2028	Other Construction Equipment	500	3621617.41	65950.15523	7.73
2028	Rollers	120	1902839.13	158399.3861	1.69
2028	Rollers	175	1966997.16	99356.0732	2.79
2028	Rollers	500	196008.887	4197.26308	6.58
2028	Rubber Tired Dozers	120	255771.37	21337.83623	1.69
2028	Rubber Tired Dozers	175	213735.32	9791.652443	3.07
2028	Rubber Tired Dozers	500	2541630.05	48853.82632	7.32
2028	Rubber Tired Loaders	120	4126961.76	364365.1502	1.59
2028	Rubber Tired Loaders	175	9759645.79	491432.6859	2.80
2028	Rubber Tired Loaders	500	17575291.8	417104.4651	5.93
2029	Excavators	120	2920609.77	257523.8301	1.60
2029	Excavators	175	6152024.37	300442.0183	2.88
2029	Excavators	500	12974157.2	282725.7001	6.46
2029	Off-Highway Trucks	120	109475.078	9077.157706	1.70
2029	Off-Highway Trucks	175	2112104.61	95287.04959	3.12
2029	Off-Highway Trucks	500	18386173.7	349998.5926	7.40
2029	Other Construction Equipment	120	1577470.61	126950.9887	1.75
2029	Other Construction Equipment	175	858435.117	37080.96489	3.26
2029	Other Construction Equipment	500	3766804.22	68567.34022	7.73
2029	Rollers	120	1978544.96	164685.353	1.69
2029	Rollers	175	2044749.97	103298.9483	2.79
2029	Rollers	500	203736.564	4363.828478	6.57
2029	Rubber Tired Dozers	120	265928.995	22184.61308	1.69
2029	Rubber Tired Dozers	175	221958.579	10180.2272	3.07
2029	Rubber Tired Dozers	500	2639588.94	50792.55566	7.32
2029	Rubber Tired Loaders	120	4293373.85	378824.7219	1.60
2029	Rubber Tired Loaders	175	10154157.7	510934.8423	2.80
2029	Rubber Tired Loaders	500	18249807.6	433656.959	5.93

*There is 1.874 pounds/liter of diesel, and 3.79 liters/gallon.

Fuel use factors for San Francisco Bay Area Air Basin; BSFC = brake specific fuel consumption

Appendix G
Geology and Hydrology

G1. Geotechnical and Geomorphic Assessment of Permanente Creek (Golder Associates, October 21, 2019)

TECHNICAL MEMORANDUM

DATE October 31, 2019 **Project No.** 179018601

TO Erika Guerra, Talia Flagan
Lehigh Permanente

CC Brent Zacharia, Waterways Consulting, Inc.

FROM Robert Humphries; William Fowler, PG 4401, CEG 1401 **EMAIL bfowler@golder.com**

GEOLOGIC AND GEOMORPHIC ASSESSMENT OF PERMANENTE CREEK, LEHIGH HANSON PERMANENTE QUARRY, SANTA CLARA COUNTY, CA

1.0 INTRODUCTION

This technical memorandum provides the results of our geologic and geomorphic assessment of the Permanente Creek Restoration Plan – 90% Level Submittal, Waterways Consulting, Inc., dated 11/15/18 and updated 10/31/19 (the Project). The focus of the study was to determine if there were any specific areas of the proposed project which require further subsurface geotechnical exploration and testing to refine the project restoration design, so as to respond to comments dated February 14, 2019 from the County of Santa Clara Planning Office ("County"). Specifically, this work focused on a field assessment of the proposed alignment and longitudinal gradient of the proposed stream channel and how it compares to existing conditions. Particular attention was placed on the Rock Pile and Material Removal Area and the proposed depth of excavations required and stability of the adjacent creek sideslopes.

The scope of work for our study included a desktop data review, and site reconnaissance and mapping of the project area to evaluate the geologic conditions in conjunction with the proposed restoration design. The work product from our investigation includes a geologic map and cross sections of the project area, along with this technical memorandum. This memorandum includes:

- A brief presentation of the methods applied in this assessment
- A summary of pertinent supporting data from our previous investigations throughout the facility
- A geologic map and a description of the earth materials encountered along Permanente Creek
- A geologic and geomorphic assessment of the Permanente Creek channel profile
- A discussion of these results and their significance to the proposed Permanente Creek Restoration Plan
- Golder Associates Inc.'s (Golder) conclusions and recommendations regarding this assessment

Golder and the G logo are trademarks of Golder Associates Corporation

2.0 METHODS

2.1 Data Compilation and Review

Golder reviewed available existing data pertaining to the project including aerial photographs, historical USGS topographic and geologic maps, site boring logs, seismic data from previously completed work within the project area, the Waterways 90% plan set, and pertinent site and regional geologic data.

2.2 Site Reconnaissance

Golder conducted a site visit over three days from July 25 to 27, 2019. The field team consisted of three primary members, including a fluvial geomorphologist, a geohazards geologist, and a staff geologist. The field team was given a site orientation and tailgate safety briefing by a locally based senior technician with long term familiarity with the site and specific knowledge of creek access points and safety. Creek access is difficult, and locally hazardous, because of very steep terrain, heavy vegetation, and other obstacles such as loose rock, fallen trees, etc. This rugged terrain also severely limits access for drill rigs to many of the reaches of the creek.

Golder communicated with Waterways to discuss our initial opinions and received feedback as to what specific reaches or features needed further study, or have the most uncertainty, with respect to the 90% design effort to focus our field mapping efforts. The field mapping efforts focused on the reaches that include the following two areas: 1) Rockpile and 2) Material Removal Area. Note, however, that the entire project area was traversed on foot by the field reconnaissance team.

2.3 Field Mapping

The mapping focused on defining areas of mining disturbance, (e.g., overburden, roads, structures, etc.) versus native slopes and development of geologic cross sections in key locations (e.g., Rockpile and Materials Removal Area). The mapping also identified other pertinent geomorphic features such as native slope angles, natural shallow slides, areas of erosion, sediment accumulation, bedrock exposures, etc.

3.0 REGIONAL GEOLOGIC AND GEOMORPHIC SETTING

3.1 Bedrock Geologic Units

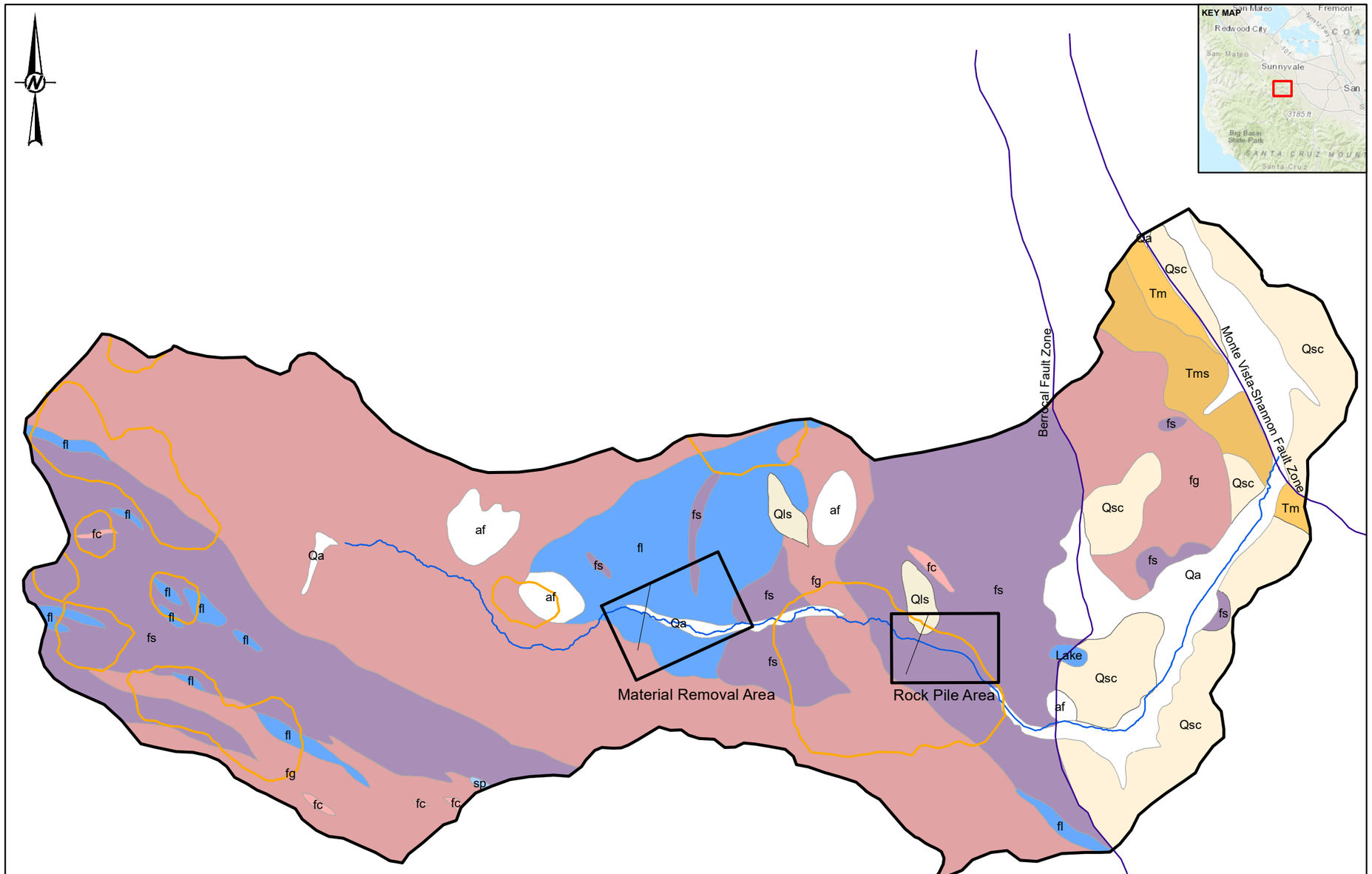
The bedrock materials exposed in the Quarry are part of the Permanente Terrane of the Franciscan Assemblage. The Franciscan Assemblage is comprised of highly deformed and variably metamorphosed, marine sedimentary rocks with submarine basalt (greenstone), chert, and limestone. The Franciscan is considered a tectonic mélange that was formed in the subduction zone between the Pacific tectonic plate and the North American plate. This plate boundary is now a transform, strike-slip plate boundary defined by the San Andreas Fault zone located about two miles southwest of the Quarry.

Golder has referenced two geologic map sources in our presentation of the geology of the Permanente Creek Basin (Figure 1). One set of maps comes from the Cupertino and Mindego Hills quadrangles (Dibblee and Minch 2007a and b), and the other comes from the San Francisco Bay Landslide Mapping Team (USGS 1997). Previous researchers have mapped the basin (Brabb 1970, Pulver 1979a and b).

3.2 Surficial Geologic Units

3.2.1 Overburden and Fill

Many of the south-facing slopes that flank Permanente Creek are mantled with varying thicknesses of overburden. These are generally described as side-cast fills that mantle existing canyon slopes and fill small



LEGEND

- Areas of Interest
- Cross Sections
- Permanente Creek
- PermCrkBasin_V2
- Mostly Landslides
- Faults
- Earthquake Epicenter Location

Geologic Units

UnitNam

- Lake
- af
- Qa
- Qls
- Qsc
- Tm
- Tms
- sp
- fg
- fs
- fc
- fl

0 2,000 4,000

1 IN = 1,667 FT FEET

NOTE(S)
1. LINE NOTES
2. LINE NOTES
3. LINE NOTES

REFERENCE(S)

1. USGS (LANDSLIDES, 1997; FAULTS, 2000, 2002)
2. CALIFORNIA DIVISION OF MINES AND GEOLOGY (EARTHQUAKES, 1982)
3. WATERWAYS CONSULTING, INC. (PERMANENTE CREEK, 2018)
4. CALIFORNIA DEPARTMENT OF FORESTRY (GEOLOGY AND LANDSLIDES, 1979)
5. COORDINATE SYSTEM: NAD 1983 STATE PLANE CALIFORNIA III (FT)
6. SERVICE LAYER CREDITS: SOURCES: ESRI, HERE, GARMIN, INTERMAP, INCREMENT P CORP., GEBCO, USGS, FAO, NPS, NRCAN, GEOBASE, IGN, KADASTER NL, ORDNANCE SURVEY, ESRI JAPAN, METI, ESRI CHINA (HONG KONG), SWISSTOPO, © OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY

CLIENT
LEHIGH SOUTHWEST CEMENT COMPANY AND HANSON PERMANENTE CEMENT, INC.

PROJECT
GEOLOGIC AND GEOMORPHIC ASSESSMENT OF PERMANENTE CREEK

TITLE
GEOLOGIC MAP OF PERMANENTE CREEK BASIN

CONSULTANT
GOLDER

YYYY-MM-DD	2019-10-02
DESIGNED	RPH/BVJ
PREPARED	RPH/BVJ
REVIEWED	BF/CJ/RPH
APPROVED	BF

PROJECT NO.	PHASE	REV.	FIGURE
179018601	100	0	1

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

PATH: G:\Lehigh\Hanson\PermanenteCreek\699_PROJECTS\179018601_GeomorphMap\100\02_PRODUCTION\MXD\FIGURES\Rev0\179018601_100_001_Fx_Rev0_GeologyMap.mxd PRINTED ON: 2019-10-02 AT: 10:44:12 AM

drainages and swales that formerly reported to Permanente Creek. The overburden deposits are of highly variable thickness, starting at the Rock Pile Area and continuing up through the Material Removal Area. A large percentage of this material within the Project area will be removed as part of the restoration effort.

The Rock Pile area is comprised of stockpiled material for production. The character of the overburden is variable but generally consists of fine to coarse gravel to angular cobble sized rock fragments. Elsewhere, overburden is a heterogeneous mixture of fines, sand, gravel and cobble sized fragments (i.e., greenstone, graywacke, cherts, and soil materials) but with small percentages of limestone.

3.2.2 Alluvium

This includes modern unconsolidated alluvial deposits along the active stream channel of Permanente Creek. These deposits are comprised of a poorly sorted mixture of cobbles, gravels, sand, silt and clay. Deposits range from a few inches thick in the upper reaches of the watershed where erosion has cut the channel down into bedrock, to tens of feet thick where the channel widens and deepens as it approaches the flatter terrain of the Santa Clara Valley.

3.2.3 Colluvium

Colluvial and slope wash deposits are common throughout the steep terrain of the Santa Cruz Mountains. In general, the natural slopes in the region are overlain with approximately one to two feet of soil and colluvial materials, which thicken to several feet or more in the larger natural swales in the region. Colluvium is generally described as predominantly clayey sand with gravel to clayey gravel, with some gravelly clay.

3.2.4 Ancient Natural Landslide Deposits

Several large, ancient landslides have been mapped by various investigators in various areas of the 3,510-acre Lehigh property, and throughout the broader foothill's region (Figure 1). These landslides are generally described as possible old landslides and considered to be early Holocene or possibly late- Pleistocene features. These are naturally occurring landslides that are not related to any modern day mining activities. Along the south flank of Permanente Creek, two large landslides are identified by Sorg and McLaughlin (1975) while Rogers and Armstrong (1973) map only one of the landslide features.

The presence of these ancient landslides, as well as much smaller surficial slides that occur along the canyon walls, and in steep zero-order drainages that report to Permanent Creek, reflects the young, steep geologic terrain that comprises the Santa Cruz Mountains. The relatively thin surficial failures that are common in this terrain are to be expected going forward with this Project both from natural sources—like the zero-order drainages along the south canyon wall—and potentially from restored natural grades once overburden is removed as part of the Project. Note that one of the primary goals of the creek restoration program is to remove specified overburden and fill materials and restore, to the extent practicable, natural slope angles both along the longitudinal profile of the creek and transverse to the creek (i.e., the creek banks).

3.3 Faulting and Seismicity

The San Andreas Fault zone is located approximately two miles southwest of the Quarry (Figure 1). The Sargent-Berrocal Fault Zone (SBFZ), part of the Santa Cruz Mountains front-range thrust fault system, parallels the San Andreas to the east and forms the eastern-most structural boundary to the Permanente Terrain.

Near the Quarry, the SBFZ consists of two northwest-trending, sub-parallel faults, namely the northeastern-most Monta Vista Fault Zone and the southwestern-most Berrocal Fault Zone (Sorg and McLaughlin, 1975) (Figure 1).

The Monta Vista Fault Zone is located approximately 1 mile to the northeast of the Quarry. A strand of the Berrocal Fault Zone lies beneath the Permanente Cement Plant area to the south of the EMSA, and extends west to other portions of the Quarry (Mathieson, 1982; Sorg and McLaughlin, 1975).

Using the 2008 Update of the United States National Seismic Hazard Maps (Peterson, et.al., 2008), which incorporates the findings of the Next Generation Attenuation Relation Project, Golder estimates that design peak ground accelerations should be approximately 0.57g for the site.

4.0 BASIN GEOMORPHOLOGY

The geomorphology of the Permanente Creek basin is influenced by multiple active geologic processes. The highly active tectonics of the San Andreas Fault and other nearby faults and fault zones result in a high rate of uplift and relatively frequent, high magnitude earthquakes. The tectonic activity has modified both the headwater basins and offsets lower elevations of landscape in juxtaposition to each other. The relatively frequent occurrence of high magnitude earthquakes is likely to have increased magnitude and occurrence of ancient, naturally-occurring landslides within the basin. Additionally, the highly variable rock types, tectonic histories, and geomechanical properties of the accretionary island arc geology of the Franciscan mélange have resulted in highly differential rates of erosion. These differential erosion rates are expressed in the varying morphologic characteristics of the basin.

As an added complexity, the carbonate units of the Franciscan complex have resulted in carbonate-rich water precipitating travertine deposits on the bed and banks of Permanente Creek. These travertine deposits interact with the self-forming step-pools of the steeper portions of the channel and contribute to a repeating cycle of travertine dam formation and breaching (Fuller et al. 2010). Additionally, the subsurface precipitation of travertine in the interstitial voids between sediment grains in sediment deposits increases the intergranular bond strength, making the sediment more resistant to erosion and potentially decreasing the rippability of the material.

In addition to the natural processes interacting with the basin morphology, the long history of mining in the basin has also substantially interacted with the surface processes defining the basin morphology. The very high rate of sediment supplied to the channel, in the form of overburden and fill placed along the margin of the stream channel during the early history of mining (1940s and 1950s), has resulted in aggradation of the channel in lower gradient portions of the channel.

4.1 Fault Influence

The drainage basins of the northeast side of the Santa Cruz mountains are characterized by geomorphic features that are controlled by faulting. The features include right-lateral deflected and offset drainages, drainages that follow lineaments, sidehill benches, closed depressions, aligned benches, linear scarps, linear troughs, saddles, and linear vegetation contrasts (Smith 1981).

In the downstream portion of the basin, the Monte Vista-Shannon fault zone defines geomorphic features. These features are believed to have been formed during the Pleistocene and possible Holocene. They include the reverse displacement of lower elevation sediment to higher elevations than those of their original deposition, forming benches, saddles, linear valleys, faceted spurs, scarps, linear range fronts, linear depressions, and associated vegetation contrasts (Bedrossian 1980, Hitchcock et al. 1994).

Similarly, the Jurassic and Cretaceous aged rocks of the Franciscan Complex are thrust over Pliocene and Pleistocene alluvial sediment of the Santa Clara Formation and younger Quaternary deposits (Sorg and

McLaughlin 1975, Wesling and Helley 1989, McLaughlin et al. 1991, Hitchcock et al. 1994). On the site, colluvial deposits are thrust over fluvial gravel of Permanente Creek, indicating late Pleistocene and possible Holocene displacement (Hitchcock et al. 1994).

Hitchcock and Kelson (1999) noted that coseismic deformation associated with the 1989 Loma Prieta earthquake, was coincident with geomorphic features suggestive of faulting along the Monte Vista-Shannon fault zone (Haugerud and Ellen 1990, Hitchcock et al. 1994, Langenheim et al. 1997). This could indicate that repeated localized contraction is in part coincident with the occurrence of Loma Prieta-type earthquakes. This would suggest a recurrence interval of about 400 years (Working Group on California Earthquake Probabilities 1996). Hitchcock et al. (1994) reported a late Pleistocene displacement rate across the Monte Vista fault zone of 0.3 ±0.2 mm/yr.

4.2 Hillslopes and Landslide Processes

The Santa Cruz Mountains are a steep and rugged terrain with a long history of landslide activity. The geomorphology of the Permanente Creek basin exhibits a high rate of dynamic change. This high rate of change, termed morphodynamics, is driven by the complex interaction between the dual processes of rapid uplift associated with the compressional tectonics along the San Andreas Fault system (as discussed above) and the relatively weak, easily erodible, and highly variable rocks of the Franciscan Complex.

The resulting topography forms narrow, steep sided, and actively eroding canyons. The Santa Cruz Mountains, and Permanente Creek canyon, are subject to both shallow (e.g., debris flows or “mudslides”) and deep landslides (e.g., large rotational slumps or translational block glides). Average slope angles in the canyon are approximately 25 degrees (or 2H:1V) which is reflective of the natural stability of the highly broken and sheared greenstone and mélange terrane. Steeper slopes, greater than 35 to 40 degrees, are locally observed in areas underlain by more competent limestone and graywacke bedrock but these are the exception.

4.3 Geotechnical Background and Considerations

Golder has a long history of geologic and geotechnical investigations at the Permanente Site starting in 2006 and continuing to present. The investigations include (but are not limited to) sector specific investigations of the quarry pitshell including existing landslides, both the EMSA and WMSA overburden stockpiles and foundation conditions, several investigations for updated storm water basins, a new crusher location and foundation, and a proposed water treatment plant location. In summary, we have an extensive library of material properties and corresponding stability analyses and therefore a good understanding of slope behavior for different types of materials and slope angles. Our geotechnical recommendations for slope design, discussed below, are based on this extensive background. A summary of material types and properties based on a number of our previous investigations is included in Appendix A.

From a geotechnical perspective, the proposed project primarily involves excavation and removal of man-made surficial deposits (i.e., overburden and artificial fills) to restore the creek channel and creek banks back to a more natural state. The intent is to remove the man-made surficial materials down to bedrock (or native soils) while minimizing excavations/cuts into bedrock or soil slopes. In general, excavations onto canyon slopes will only be done where the surfaces have been altered or affected by mining activities. Existing natural slopes will not be modified or excavated.

Our geotechnical recommendations for the Project include:

- Rock Slopes: Slopes greater than 20 feet in height in greenstone materials should not exceed slope angles of 2H:1V if possible. Slopes less than 20 feet should perform adequately at 1.5H:1V; however, localized areas of instability may be encountered. Cutslopes in limestone and graywacke greater than 20 feet in height should not exceed 1H:1V and slopes less than 20 feet should be limited to no steeper than 3/4H:1V.
- Fill or Soil Slopes: For planning purposes, permanent slopes comprised of overburden, alluvium, colluvium or other site-derived fill should not exceed 2H:1V.

Earlier versions of the Project included construction of retaining structures, or engineered structural elements, that warranted more detailed geotechnical investigations for design purposes. Retaining structures have been eliminated from the Project (with the exception of the Material Removal Area), and with other modifications, the main geotechnical considerations are limited to recommended slope angles for final slopes of previously filled or otherwise disturbed surfaces.

The Material Removal Area, and the Rock Pile Area, present the largest challenges due to depths of the cuts that are required, and the steep natural terrain underlying and comprising the hillslopes that are overlain by overburden. In some locations along creek banks, it is anticipated that cuts will expose natural surficial materials (i.e., colluvium and slope wash) as opposed to bedrock and may require localized cuts steeper than 2H:1V in order to daylight the cuts into natural slopes.

The Material Removal Area may require a retaining structure, depending on timing of the creek restoration project with respect to site operations, to preserve infrastructure and access associated with the Upper Water Treatment System (UTS). This is discussed in further detail in Section 6.2.

5.0 SITE RECONNAISSANCE AND GEOMORPHIC CHARACTERIZATION

The following section provides a summary of our geomorphic observations of the Project. All station references in this report are coincident with that used by Waterways on Sheets C2-C4 in their 90% restoration plan report (2019).

5.1 Overview of Permanente Creek Profile

The profile of Permanente Creek can broadly be classified into depositional reaches and bedrock reaches (delineated on Figure 2 as Reach A, Reach B, etc.). The processes that define these reaches are the rate that sediment is supplied to the channel and the rate at which the channel can convey the supplied sediment. The rate of sediment supply is controlled by hillslope processes and the rate that sediment is delivered to the channel. The rate of sediment transport is controlled by the channel geometry and the hydraulic characteristics of the reach. The channel hydraulics are directly coupled to the rate at which water is delivered to the channel.

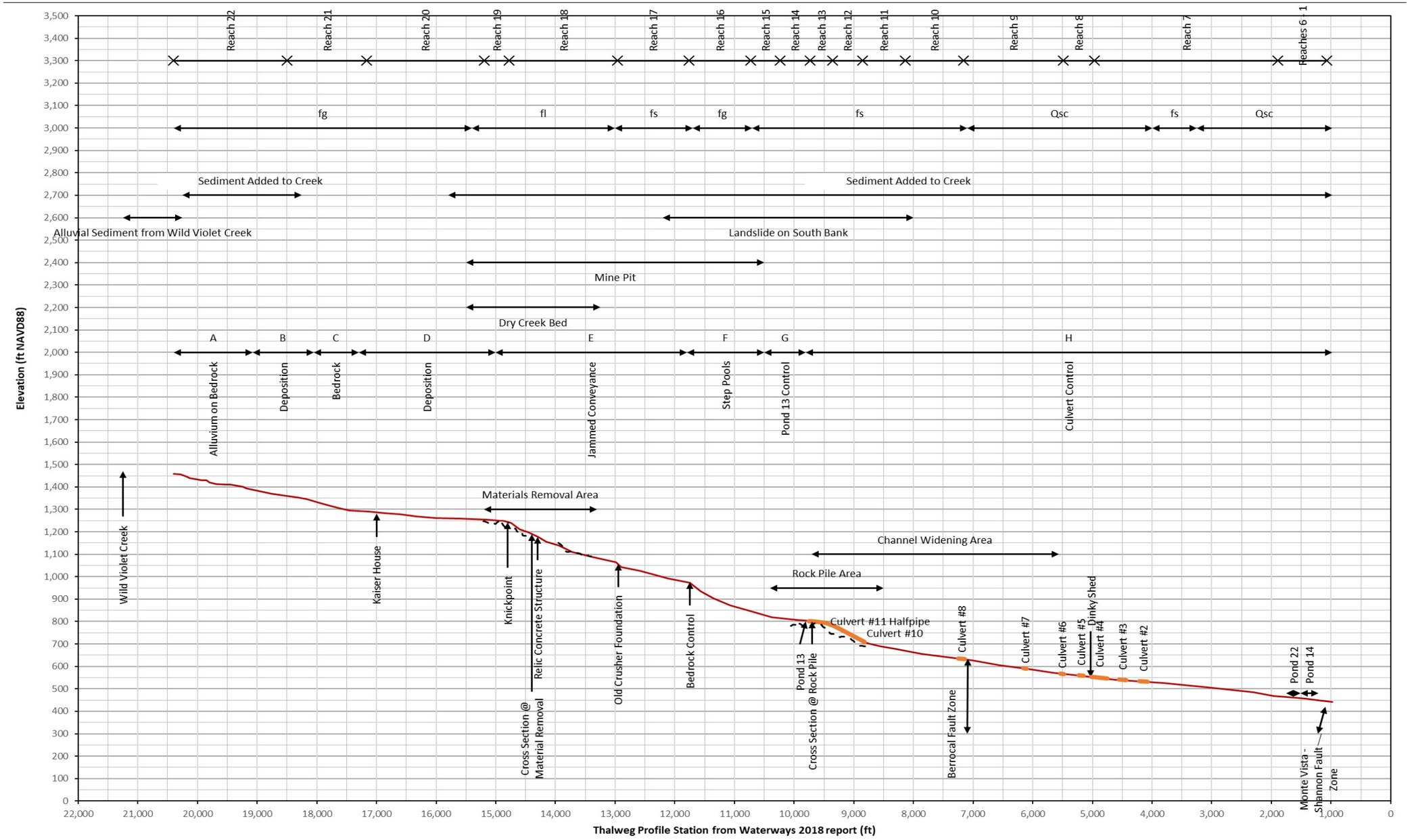


Figure 2: Permanente Creek Profile with geomorphic and geologic delineations. Stationing from Waterways (2019).

5.1.1 Reach A: Alluvium on Bedrock

The upstream most portion of the survey channel is characterized by alluvium in the form of travertine reinforced step pool morphology that partially covers a bedrock channel. The sediment supplied here is likely to come from natural processes and is likely partially supplied from an alluvial fan originating from Wild Violet Creek. Carbonate-rich water percolates from the south bank of the channel in this reach, indicating that the source of the carbonate-rich spring is likely within the Wild Violet drainage. Geologic maps (Dibblee and Minch 2007a and b) indicate that the limestone unit of the Franciscan complex outcrops within the Wild Violet drainage. The debris from this alluvial fan is being transported downstream and has deposited small terraces along both valley walls. These terraces are possibly abandoned by the modern hydraulic regime of the river and may be coupled to the debris flows originating from Wild Violet Creek.

5.1.2 Reach B: Deposition

This depositional reach is characterized by a relatively wide, low gradient, flat valley floor that extends for approximately 1,000 feet along the valley axis. In combination with downstream gradient controlled from the Bedrock reach, the sediment load is too great and too coarse for the local hydraulics to transport, resulting in deposition on the valley floor.

5.1.3 Reach C: Bedrock Control

The Bedrock controlled reach is relatively short (750 feet) and has a relatively low gradient (<2%), but the narrow bedrock channel maintains hydraulic and sediment continuity through this reach, resulting in a thin alluvial cover on a bedrock channel bed. It appears that this reach only receives sediment from the channel upstream and conveys almost all of this load through to the downstream reach.

5.1.4 Reach D: Deposition

This Deposition reach is characterized by the aggradation of sediment on the valley floor and relatively wide flat valley bottom that receives sediment from the upstream reach and the tributaries that confluence with Permanente Creek from the south. The downstream end of this reach is marked by the occurrence of a sharp change in channel gradient associated with a bedrock knickpoint. This portion of the landscape is within the Materials Removal Area. Further discussion of the implications of these features to the restoration plan are discussed in Section 6.

5.1.5 Reach E: Jammed Conveyance

The Jammed Conveyance is very steep (>9%), but due to the large quantity of material it receives, and the armoring effect of both the coarse sediment and the relict mining infrastructure within the channel, a large portion of this material remains within the reach. The geomorphic term ‘jammed’ describes steep channels that are clogged with debris (Zimmerman et al. 2010). Natural channels of this gradient are typically not depositional but rather erosional. The debris residing on the bed in this reach is immobile, and the modern channel alignment is constricted between the debris from the north and the south valley wall for much of this reach. The Material Removal Area is contained within the upstream portion of this reach.

5.1.6 Reach F: Step Pools

Downstream of the Jammed Conveyance, a large, mapped natural landslide borders the south bank of the river for the entirety of this reach. The large boulders from both mining and natural sources, as well as woody debris, form large, steep step-pools within this reach. Some of these step-pools appear to have been reinforced with travertine deposits, as evidenced by the relict abutment deposits on the channel margins.

5.1.7 Reach G: Pond 13 Control

The reach downstream of the Step Pools reach, appears to act as a gradient control. Although this gradient control may be driven by the back-water effect of the small reservoir at Pond 13, data from the Seismic survey indicates that this feature may be reinforced by naturally occurring bedrock ridges within the channel. A local bedrock ridge is present just downstream of Pond 13 (Figure 2).

5.1.8 Reach H: Culvert Control

Downstream from Pond 13 the channel is confined within culverts and canals that do not exhibit a morphologic connection to the adjacent landscape.

5.2 Geomorphic Observations

5.2.1 Knickpoints

In response to the dynamic changes driven by tectonic base level change, upstream propagating waves of erosion have migrated up Permanente Creek. The upstream most location of a given wave is marked by a distinct change in channel gradient, termed a knickpoint. Knickpoints characteristically migrate more rapidly through more easily erodible material, and more slowly through more erosion-resistant material (Whipple 2004). The upstream most knickpoint with the assessed channel is located at Station 148+00 within the Material Removal Area (Figure 2). This reach is characterized by a relatively low gradient reach upstream of this point and a steep reach downstream. The steep reach downstream is simultaneously receiving and conveying a large quantity of material, typically composed of the finer fraction of the total sediment load, and aggrading the coarser fraction, composed of large boulders.

Figure 3 - Travertine Deposits

5.2.2 Travertine

Travertine is a form of limestone precipitate that forms when calcium carbonate-rich water undergoes changes that cause the mineral to transition from solution to a solid state. This transition is largely controlled by physical processes, such as changes in pressure, temperature, or pH, but it can be influenced by biological processes and hydraulic variability as well (Fuller et al. 2010). Golder observed two types of travertine formation in Permanente Creek. One in which stalactites grew out of the southern stream bank downstream of the confluence with Wild Violet Creek, and the other along large portions of the channel where naturally forming step-pools were reinforced by travertine deposition to form travertine dams (Figure 3). These dams display a history of repeated formation and breaching, as evidenced by the clasts of travertine conglomerate from older dams being incorporated into modern dams, as well as the relict abutments of older travertine dams remaining on the channel margins. This natural process has been taking place throughout geologic time along Permanente Creek.

5.2.3 Basin Capture

A process termed basin capture can occur whereby drainage networks and flow paths are rearranged through landscape modifying influences of tectonics and surface processes. This process can result in characteristic landscape features like wind gaps, where valley geometry and upstream drainage are mismatched, and fishhooks, where headwater streams exhibit a significant curved alignment where the drainage meets the basin edge. The fishhook morphology is observable in the Permanente Creek basin, and adjacent basins (Figure 4). Evidence of basin capture is significant to the current investigation as the changes in basin area related to basin capture can be associated with a dis-equilibrium between the channel morphology and the sediment regime of the river. More straightforwardly, this implies that the basin used to be bigger, and the current hydrologic regime may not be sufficient to transport the former natural sediment load.

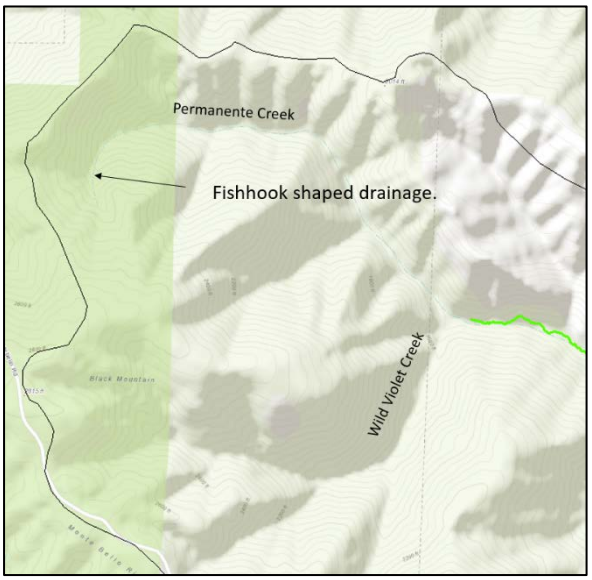


Figure 4 – Fishhook shaped headwaters

6.0 REVIEW OF RESTORATION DESIGN

This section provides an overview of the Waterways 90% design report (2019) with respect to the design basis and an evaluation of potential geotechnical issues for the Rock Pile and Material Removal Areas.

6.1 Geomorphic Design Basis

Waterways has based their geomorphic design on maintaining sediment transport continuity through the constructed reaches and proportionately distributing shear stresses across the channel bed and floodplain areas during floods to maintain a dynamic morphology without destabilizing the landscape. They optimized the design geometry by matching the hydraulics during flooding to the sediment size and transport rate of the channel. Additionally, design geometry incorporated the bankfull width and depth, and pool dimension and spacing relationships, of nearby reference watersheds and analog reaches (URS 2009). Waterways (2019) conducted hydrologic and hydraulic simulations of the restoration design and compared those results to fish passage capability, channel stability, flood conveyance, and sediment transport.

Waterways (2019) design specifications include the following primary elements:

- Engineered Streambed Material (ESM)
- Floodplain Armoring
- Vegetated Rock Slope Protection
- Vegetation Design
- Best Management Practices
- Engineered Woody Debris

- Slope Angle Guidance (Golder 2014)

6.2 Material Removal Area Design

Location: From Station 150+25 to 130+25

General Description (Waterways):

"This area has been modified by the placement of material within and adjacent to the channel… A seismic refraction analysis has been performed to estimate the depth to bedrock, in an effort to gain a clearer understanding of the pre-disturbance site geometry and allow a more informed evaluation of opportunities and constraints to enhancement.

Proposed cuts extend to depths of over thirty feet below existing ground, resulting in profile grades of 7.1% to 22.7%. These grades follow the peaks of the estimated subsurface bedrock profile. Final grades would be determined in the field to best fit bedrock exposures encountered during excavation."

Design Elements and Objectives:

- Removal of overburden/fill and a relic concrete structure, and moving the north toe of slope northward 25 feet along the majority of the project area, except near Pond 4A where it will move northward 16 feet;
- Construction of a new channel with floodplain bench areas with habitat elements that will help improve ecological complexity; and
- Installation of native vegetation.

6.2.1 Evaluation and Discussion of Materials Removal Area

A geologic and a geomorphic map of the Material Removal Area is presented in Figure 5. Longitudinal and thalweg profiles of this area are presented in Figures 6, 7 and 8. In general, both the cross section and long profile indicate that bedrock is close to the surface throughout the Material Removal Area with the exception of a few local areas where depths may be in the range of 15 to 20 ft bgs. The design approach used by Waterways notes that the estimated bedrock contacts as shown are approximate, and that the design will allow for the work to conform to and follow the bedrock surface as it uncovered during excavation.[1] Golder concurs with this general approach and doesn't believe any additional exploration would provide value to the design above and beyond the data provided by the seismic refraction surveys.

[1] It should be noted that where shown on included figures that the bedrock surface as interpreted from seismic refraction data is approximately located and will be field verified during construction.

LEGEND

- Areas of Interest
- Permanente Creek
- Design Thalweg
- Cross Section @ Material Removal Area
- BedrockPoints

Geomorphic Units

- Active Mine
- Bedrock
- Channel
- Floodplain
- Lake
- Mostly Landslides
- Open Culvert
- Pond 4 Fill
- Rock Pile
- Sidecast Overburden
- Terrace

0 200 400
FEET
1 IN = 206 FT

NOTE(S)
1. LINE NOTES
2. LINE NOTES
3. LINE NOTES

REFERENCE(S)
1. WATERWAYS CONSULTING, INC. 2018. PERMANENTE CREEK RESTORATION PLAN INTERNAL DRAFT 90% LEVEL SUBMITTAL DESIGN BASIS TECHNICAL MEMORANDUM. PREPARED FOR LEHIGH SOUTHWEST CEMENT COMPANY AND HANSON PERMANENTE CEMENT, INC. NOVEMBER 5, 2018.
2. COORDINATE SYSTEM: NAD 1983 STATE PLANE CALIFORNIA III (FT)

CLIENT
LEHIGH SOUTHWEST CEMENT COMPANY AND HANSON PERMANENTE CEMENT, INC.

PROJECT
GEOLOGIC AND GEOMORPHIC ASSESSMENT OF PERMANENTE CREEK: MATERIAL REMOVAL AREA

TITLE
GEOMORPHIC MAP OF THE MATERIAL REMOVAL AREA

CONSULTANT
GOLDER

YYYY-MM-DD	2019-10-02
DESIGNED	RPH/BVJ
PREPARED	RPH/BVJ
REVIEWED	BF/CJ/RPH
APPROVED	BF

PROJECT NO.	PHASE	REV.	FIGURE
179018601	100	0	5

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

1 in
0

PATH: G:\Lehigh\Hanson\PermanenteCreek\99_PROJECTS\179018601_GeomorphMap\10\02_PRODUCTION\MXD\FIGURES\Rev0\179018601_100_001_Fx_Rev0_MailRemov_Geomorph.mxd PRINTED ON: 2019-10-02 AT: 10:28:22 AM

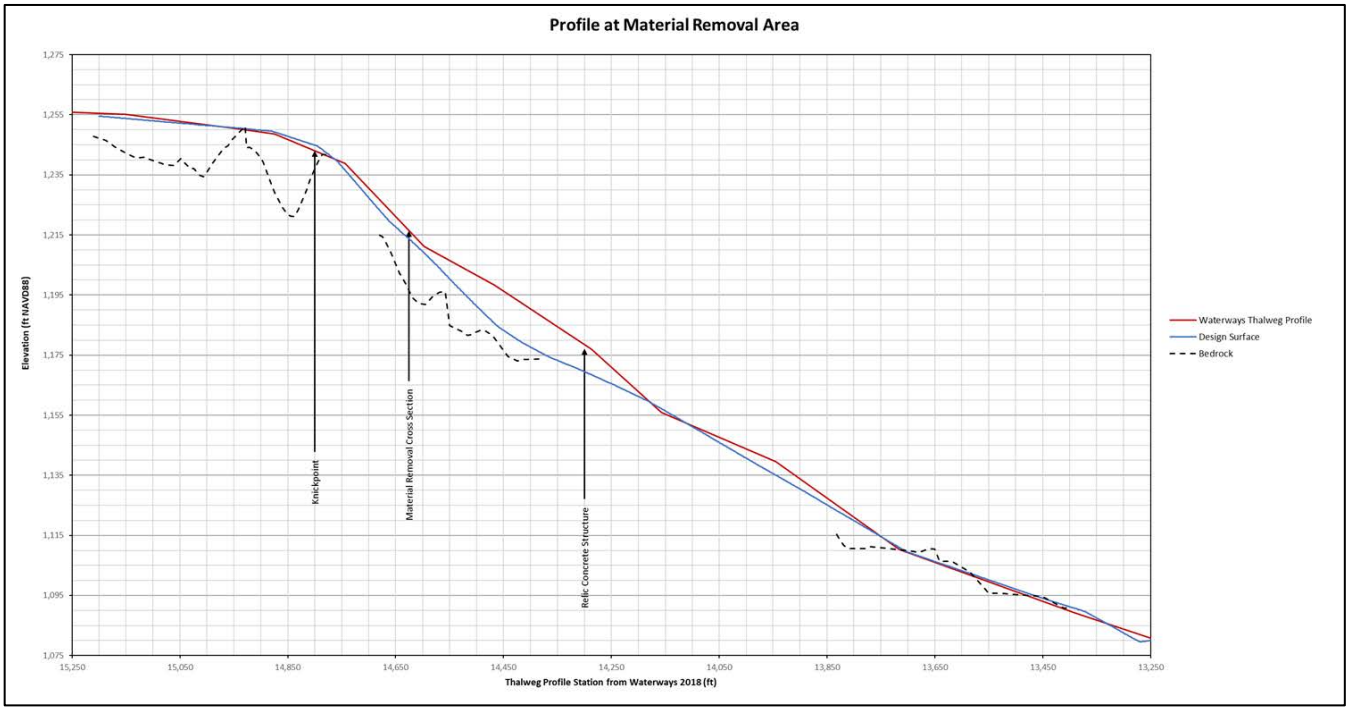


Figure 6: Profile of Material Removal Area from Station 152+50 to 132+50.

The following bullet points provide Golder's observations of the design as compared to conditions observed in the site reconnaissance and as informed by the seismic refraction survey data.

- At Station 148+00, bedrock close to the surface is likely the controlling feature of an upstream migrating knickpoint. The design shows the channel invert conforming to knickpoint and then potentially being established on exposed bedrock downstream of the knickpoint. We concur with this design approach. Additional design elements proposed including ESM and other profile control elements such as boulder weirs and sills should help to ensure stability of the knickpoint.
- Between Stations 146+50 and 142+50, the restoration design identifies a large quantity of material for removal from the channel. The relic mining infrastructure may play a role in defining the channel alignment and facilitating an armored surface on some of the debris. The result of the restoration efforts will increase the local gradient within this reach and extend the length of the high-gradient portion of the channel. Sheet C34 of the 2019 plan set provides additional details for Step-pool and cascade channel design segments in this reach to mitigate the local gradient. We concur with this approach and note that field engineering design modifications and follow on monitoring may be necessary to ensure that the post material removal channel geometry is stable.
- Between Stations 138+50 and 134+50, the seismic profiles indicate that bedrock may be encountered below design grade, but as the seismic profile lines were collected adjacent to the channel and not in the thalweg, Golder believes that bedrock may be exposed at relatively shallow depths along the thalweg. We understand that the intent of the design is to construct the channel on exposed bedrock

occurring within the proposed grading envelope and based on our reconnaissance we think this is generally achievable.

- There is a large relic concrete structure located in the left bank of the stream channel five to ten feet above the channel invert (143+00). There is a smaller relic concrete structure located in the channel further downstream. Golder understands that the removal of old mining infrastructure from the channel will increase the connectivity of the channel to the adjacent landscape and also that the relict structures may currently be contributing to the stability of this reach. We understand that weirs and steps will be constructed using material with a minimum size meeting the D50 of the specified material and a boulder sill w/ a minimum size meeting the D84. This design approach is intended to replace any potential stability relic structures are providing.
- The most challenging geologic and geotechnical issue in the Material Removal Area is the presence of the Upper Water Treatment System infrastructure, including the 1250 Pond and associated facilities located along the top of the creek bank and the access road to Permanente Creek. The lifetime of these facilities is uncertain at this time as they are required for on-going operations of the Facility. However, once reclamation is completed, they may no longer be necessary. If the facilities need to be protected during the creek restoration project, a retaining structure (e.g., Mechanically Stabilized Earth wall) will be necessary to maintain the road and the 1250 pond (as shown in Figure 4.0 of Waterways Updated Response Letter to the County dated 3-5-18 shown below). The retaining structure would be required as the design calls for pushing the north bank of the creek approximately 25 further north than current conditions.

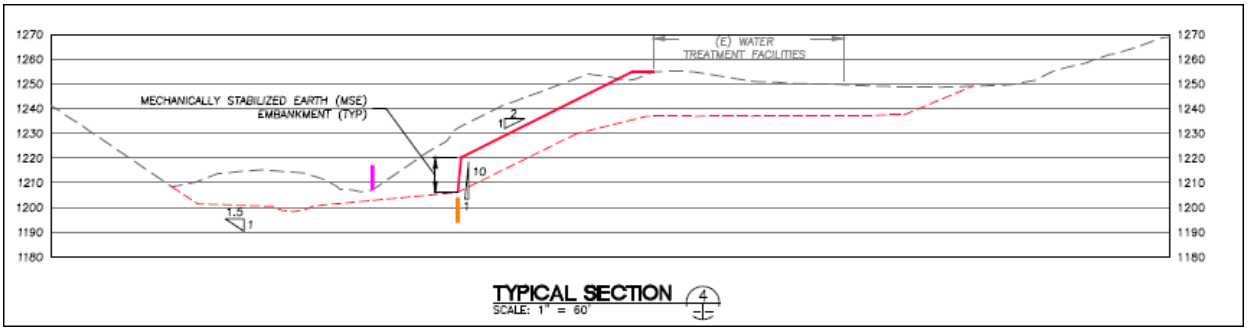


Figure 7: Typical Section of Potential MSE Wall to protect Water Treatment Facilities

- If a retaining structure is required, Golder recommends that a geotechnical investigation be performed along the alignment of the wall to verify depth to bedrock and to obtain appropriate design parameters for the design of the wall. However, depending on the timing of the restoration project, a retaining structure may not be necessary and therefore we recommend delaying any further investigation until such time it is needed. Figure 8 illustrates the design surface and bedrock conditions if the slope can be graded back at 2H:1V. This slope configuration meets Golder's general recommendations for cutslopes developed in surficial materials and is considered acceptable.

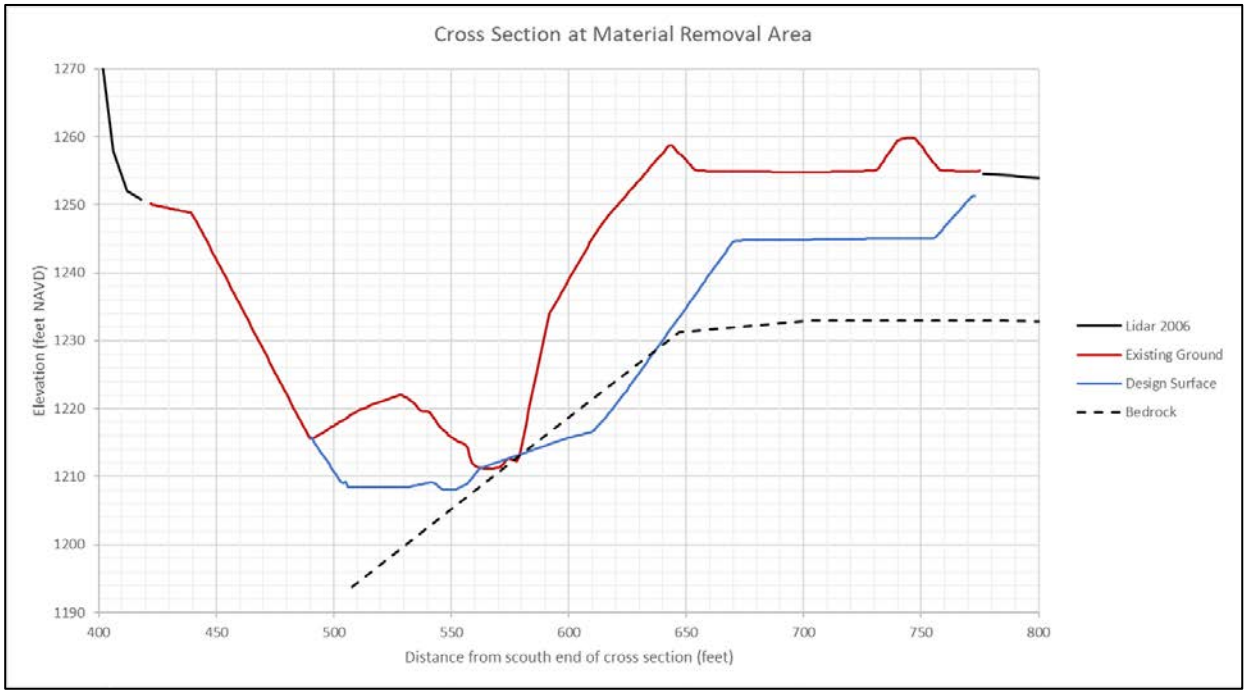


Figure 8: Cross section at Material Removal Area. Located at Thalweg Profile Station 146+00. Note depth to bedrock is approximate and estimated based on seismic refraction data.

6.3 Rock Pile Area Design

Location: From Station 104+50 to 85+50 within the Channel Widening Reach.

General Description (Waterways 2019):

"Extensive channel realignment and reconstruction is proposed throughout this area, including removal of Culverts #10 & #11 and the dam at Pond 13…. Cuts approximating thirty to forty feet of depth are required to accomplish this. The grading plan reflects the Lower Limit of Potential Design Channel Invert. The Upper Limit of Potential Design Channel Invert shown in profile has been established as a best fit to bedrock elevations that were estimated using a seismic refraction analysis and geotechnical borings. Final geometry will likely vary somewhat from that shown on the drawings, as necessary to conform to existing bedrock.

The rock pile and associated infrastructure will be removed to accommodate the lowered and widened channel…The slope exposed below the Rock Pile will be inspected by the Geotechnical Engineer or Project Engineering Geologist to evaluate the nature and stability of the exposed material and provide recommendations, as necessary, to ensure geotechnical stability of the slope and access road."

Design Elements and Objectives:

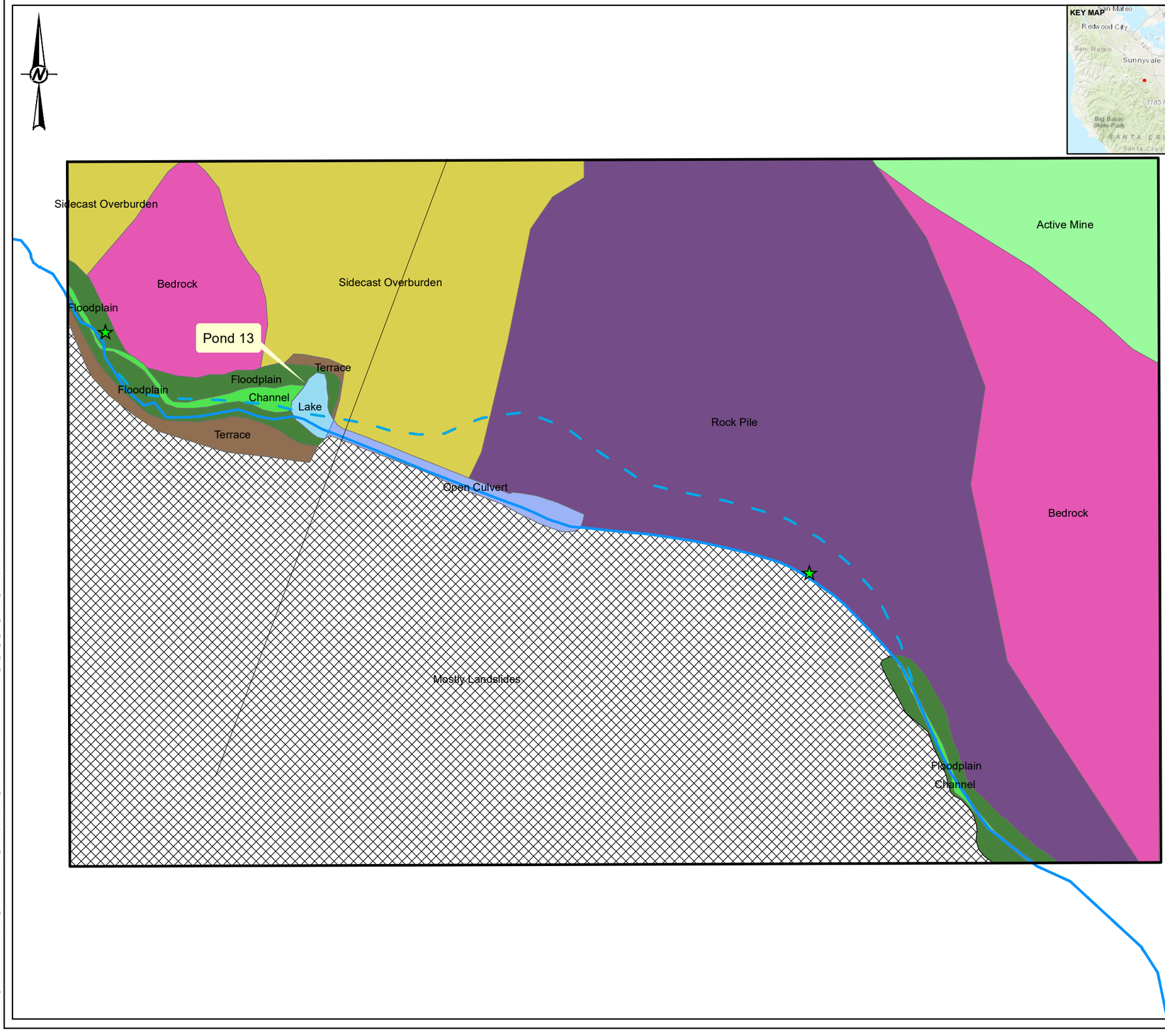
- Removal of concrete road segments and road-related fill material;
- Removal of 930 linear feet of culverts and daylighting of the creek that will help improve ecological complexity;
- Construction of a new channel with floodplain bench areas with habitat elements that will help improve ecological complexity;

- Removal of Rock Pile, retired Rock Plant conveyor system and associated infrastructure;
- Removal of Pond 13 dam/metal infrastructure; and
- Installation of native vegetation.

6.3.1 Evaluation and Discussion of Rock Pile Area

A geologic and a geomorphic map of the Rock Pile Area is presented in Figure 9. Cross sections and thalweg profiles of this area are presented in Figures 10 and 11. Appendix B includes Figure 1 from Waterways Updated Response Letter to the County dated March 5, 2018 showing the locations of exploratory borings drilled previously by Golder in the area of the Rockpile restoration work and boring logs. The following discussion provides additional observations of specific design elements as compared to conditions observed in the site reconnaissance and as informed by the seismic refraction survey data.

- In the Rock Pile Area, Golder's comparison of the restoration design with seismic survey results indicates that bedrock ranges from about 5 feet to approximately 25 feet below ground surface with significant relief along the longitudinal profile (Figure 10). As with the Material Removal Area, the design intent will allow for the work to conform to and follow the bedrock surface as it is uncovered during excavation.
- The interpreted depth to top of native alluvium or bedrock for borings along the proposed thalweg (Borings 1101 and 1103) is approximately 25 feet although native surficial materials were likely encountered approximately 5 to 10 feet shallower. Boring 1107, also along the thalweg but near the downstream limit of the area, encountered a concrete structure at approximately 7 feet bgs interpreted as being near original ground surface along the channel thalweg. The remaining borings were drilled upslope of the thalweg to evaluate depths of fill along the toe of the proposed slope. In general, these borings indicate depths of overburden along the toe of the slope in the range of 60 to 70 ft bgs.
- The bedrock surface depicted on Figure 10 is close to the "Upper Limit of Potential Design Channel Invert" as defined by Waterways (based on seismic lines and verification borings), whereas the grading plan included on the design drawings represents the "Lower Limit of Potential Design Channel Invert" to show the maximum extent of potential grading. It is our opinion based on the review of available data that the constructed profile will be close to the "Upper Limit" upstream of Rock Pile Design. In summary, it is our opinion that the design is reasonable, and additional exploration will not provide value to the design above and beyond the data provided by the seismic refraction surveys and previous completed borings.
- The seismic data also identifies a potential former bedrock channel, which extends through the Rock Pile Area that in some locations is north of the proposed thalweg (Figure 11). Golder understands that Waterways has, to the extent possible, re-occupied the historic thalweg; however, extensive grading would be required in some areas to realign the channel and move it further to the north to occupy the historic channel thalweg. We understand that pushing the toe of the slope further north is not considered feasible given that this would require significant flattening of the slope which would impact the extensive infrastructure located at the top of slope including the main access road and the crusher facility. Golder recommends that field engineering design modifications be applied to utilize existing



LEGEND

- Areas of Interest
- Permanente Creek
- Design Thalweg
- Cross Section @ Rock Pile Area
- BedrockPoints

Geomorphic Units

- Active Mine
- Bedrock
- Channel
- Floodplain
- Lake
- Mostly Landslides
- Open Culvert
- Pond 4 Fill
- Rock Pile
- Sidecast Overburden
- Terrace

0 200 400 FEET

1 IN = 145 FT

NOTE(S)

1. LINE NOTES
2. LINE NOTES
3. LINE NOTES

REFERENCE(S)

1. WATERWAYS CONSULTING, INC. 2018. PERMANENTE CREEK RESTORATION PLAN INTERNAL DRAFT 90% LEVEL SUBMITTAL DESIGN BASIS TECHNICAL MEMORANDUM. PREPARED FOR LEHIGH SOUTHWEST CEMENT COMPANY AND HANSON PERMANENTE CEMENT, INC. NOVEMBER 5, 2018.
2. COORDINATE SYSTEM: NAD 1983 STATE PLANE CALIFORNIA III (FT)

CLIENT
LEHIGH SOUTHWEST CEMENT COMPANY AND HANSON PERMANENTE CEMENT, INC.

PROJECT
GEOLOGIC AND GEOMORPHIC ASSESSMENT OF PERMANENTE CREEK: ROCK PILE AREA

TITLE
GEOMORPHIC MAP OF THE ROCK PILE AREA

CONSULTANT
GOLDER

YYYY-MM-DD	2019-10-02
DESIGNED	RPH/BVJ
PREPARED	RPH/BVJ
REVIEWED	BF/CJ/RPH
APPROVED	BF

PROJECT NO.	PHASE	REV.	FIGURE
179018601	100	0	9

PATH: G:\Lehigh\Hanson\PermanenteCreek\99_PROJECTS\179018601_Geomorph\Map\100\02_PRODUCTION\MXD\FIGURES\Rev0\179018601-100_001_Fx_Rev0_RockPile_Geomorph.mxd PRINTED ON: 2019-10-02 AT: 10:32:45 AM
IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

bedrock topography and historic thalweg to the extent possible to meet the desired restoration outcomes.

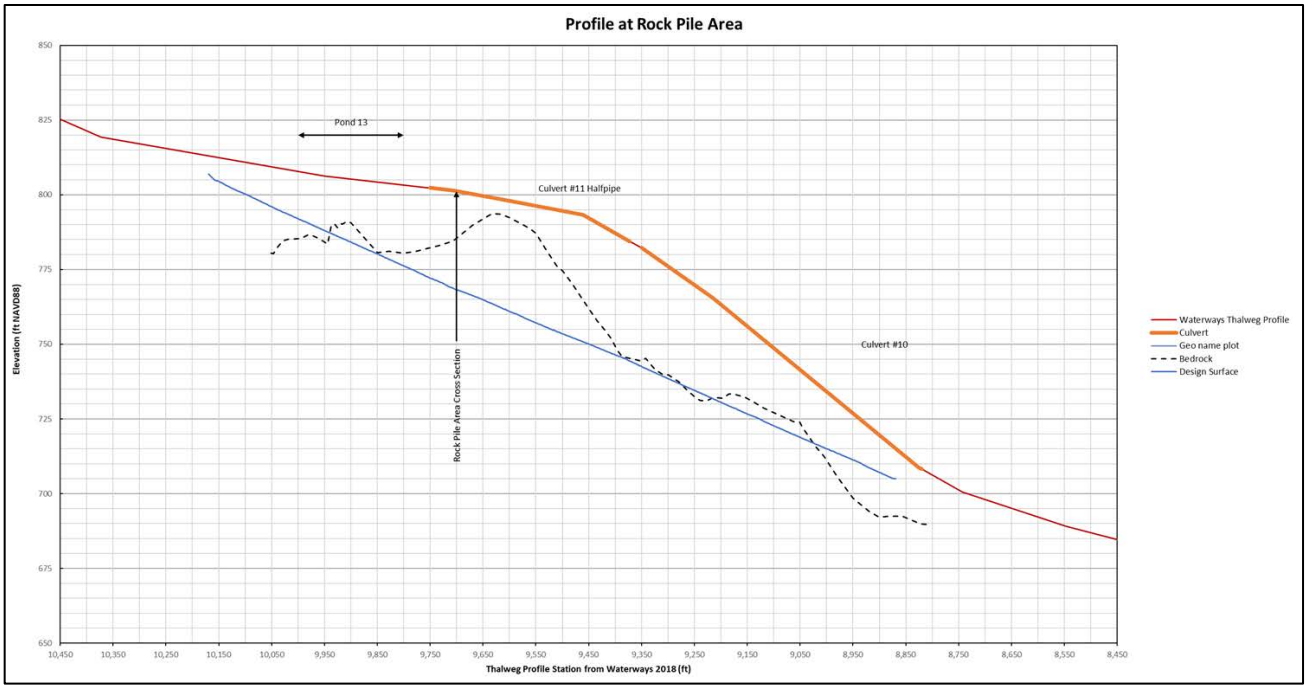


Figure 10: Profile of Rock Pile Area from Station 104+50 to 84+50.

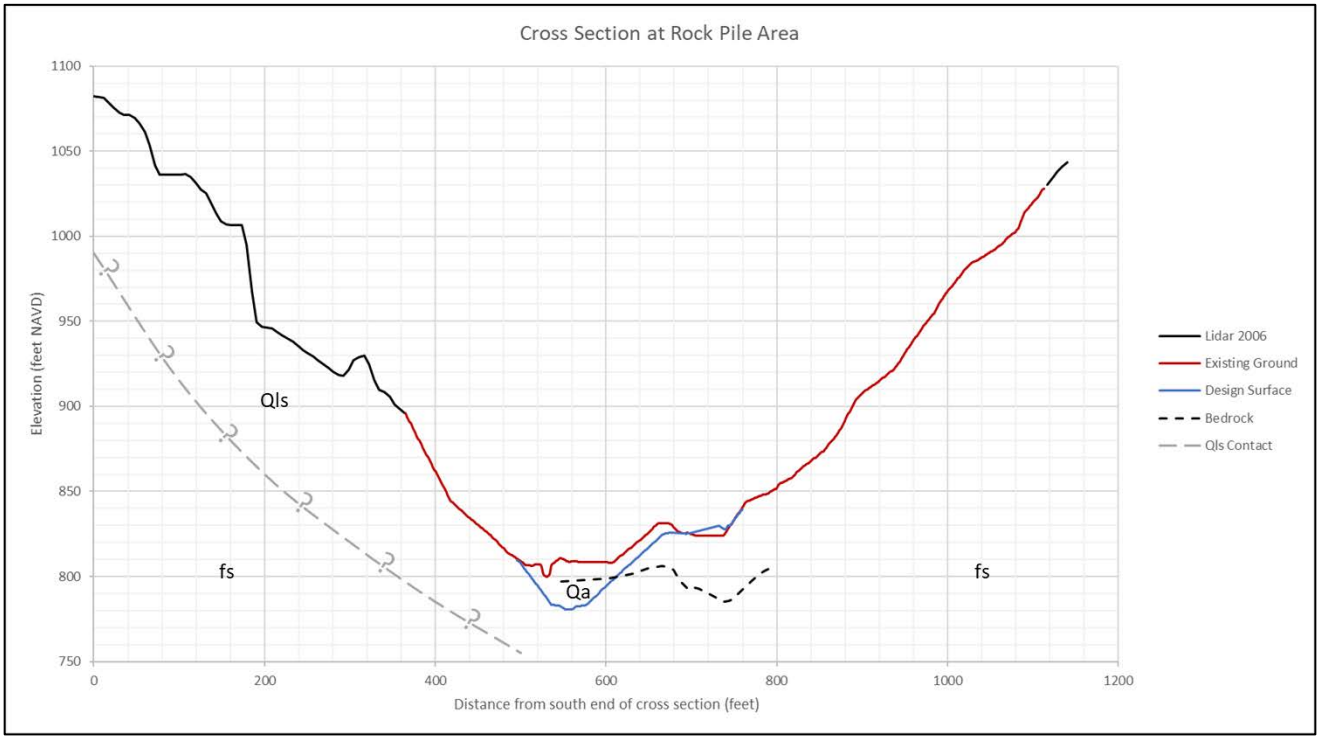


Figure 11: Cross section at the Rock Pile Area. Located at Thalweg Profile Station 97+00.

- The removal of the two culverts and creation of a floodplain with an inset channel in this reach will re-establish the lateral connectivity of the channel to the adjacent hillslopes. Reconnecting the channel to the adjacent landscape will have positive benefits as designed by Waterways, but it will also increase the potential for a laterally migrating channel to affect adjacent hillslopes. The north valley wall will consist of the excavated Rock Pile and the south valley wall is defined as a large, ancient landslide based on regional geologic mapping.
- The seismic data indicate that there is a bedrock ridge, oriented perpendicular to the valley axis, located just downstream of Pond 13. It appears that Pond 13, and/or the underlying more resistant bedrock, may be acting as a grade control structure on the reach upstream of Pond 13 (Figure 10).The channel morphology upstream of Pond 13 appears to have adjusted to this local gradient control and has resulted in the aggradation of sediment upstream of Pond 13. We understand that, the channel upstream of Pond 13 will be excavated into the stored sediment and depending on the depth to bedrock, a large proportion of these sediments will be removed as part of the restoration effort. In addition, we understand that grade control will be installed at the upstream limits of work under either Profile scenario.

7.0 CONCLUSIONS AND RECOMMENDATIONS

In this section, Golder summarizes the finding of our investigations and provides recommendations to facilitate the implementation of the Restoration Plan (Waterways 2018).

7.1 Adaptive Management and Monitoring

In our opinion, the most effective way to ensure a successful project is thorough engineering observation and field fitting of final profiles during excavation activities. This is the best way to achieve the goal of restoring natural profiles while minimizing excavation of native soils or bedrock materials. Note that this is a well-established concept first described and promoted by Karl Terzaghi as the “Observational Method” and was later described in detail by Ralph Peck (1969). The intent of the method is to balance the cost of investigation and design while still achieving a successful project through adaptive management in the field. The method entails designing to the most probable conditions rather than the most unfavorable conditions. Data gaps are filled by detailed observations during construction and designs are modified as needed.

It is important that stakeholders recognize that this is a restoration project, not an engineered stream channel, and this will by necessity entail restoration of new slopes to match previously existing slopes. This will require slope angles which, in some cases, may evidence stability just like the existing natural slopes. In our opinion, additional subsurface exploration will not alter this fundamental concept or improve the project outcome. Rather, it is understood by the Project team that shallow slides and/or erosion may occur on restored natural slopes.

7.2 Evolution of Design

The plan set is in general conformance with the applicable geotechnical recommendations as outlined in our “Preliminary Geotechnical Recommendations for Conceptual Level Permanente Creek Restoration Plans” dated April 28, 2014 (Golder 2014). We note that several structural construction elements that were part of the original project design in 2014 have been eliminated from the 2019 plan set. With the exception of a possible MSE wall in the Material Removal Area, structural elements such as gabions or retaining walls, which would warrant more detailed subsurface investigation and testing, are no longer part of the project.

7.3 Field Observations and Adaptive Management

As stated in the Field Engineering Notes section of the project plan notes (Sheet C28) stability of hillsides may necessitate:

- Field engineering and a field directed construction approach, i.e., field observations and adaptive design as discussed above
- Final geometries to be directed in the field by the Project Engineer to account for unanticipated subsurface conditions
- Flexibility with respect to final gradients and defined “grading envelopes” for channel gradients
- A narrowing of floodplain widths in areas where the final design profile approaches the lower limit of the grading envelope
- Slope benching to reduce slope angles and lengths in areas of disturbed terrain, and to control surface runoff and erosion while vegetation is established

We concur with the above recommendations, and the Field Engineering Notes in general, with respect to addressing and minimizing potential slope instabilities. We further recommend that the Project Geotechnical Engineer or Project Engineering Geologist inspect all interim and final cutslopes as the project progresses such that any potential areas of concern can be identified early in the process and remedial measures developed, if required.

7.4 Material Removal Area

The Material Removal Area may require a retaining structure, depending on timing of the creek restoration project with respect to site operations, to preserve infrastructure and access associated with the Upper Water Treatment System (UTS). Our understanding is that Waterways is recommending that work at the Material Removal Area is sequenced to occur after other portions of the project are constructed if the treatment facilities and Pond 1250 need to remain in place at the start of project implementation. Work would start with the Channel Widening Area and generally proceed upstream. The second phase of work would include the Rock Pile Area. The final stage of work would include the Material Removal Area.

If the MSE wall is required, then Golder recommends a geotechnical investigation be completed to prepare final design and construction plans. Based on the above construction sequence, there will adequate time to plan, permit and implement this investigation even after the project has started.

7.5 Rock Pile Area

The main geotechnical challenge for the proposed project is likely related to the Rock Pile Area which entails a reach of the creek where culverts will be removed, and a large stockpile of aggregate materials placed along the margin of the creek and up onto the hillside to a height in excess of 200 vertical feet. The estimated thickness of the rock pile ranges up to 100 feet. Estimated natural slopes angles underneath and above the rock pile are shown as steep as 1H:1V. We recommend inspection of these slopes by the Project Engineering Geologist or Geotechnical Engineer following the removals to evaluate the geologic conditions and stability of the exposed materials. If the removals expose bedrock, stability of the slopes should be adequate. However, if the cut leaves significant thicknesses of overburden in place, potential localized slope instability may be encountered. Golder

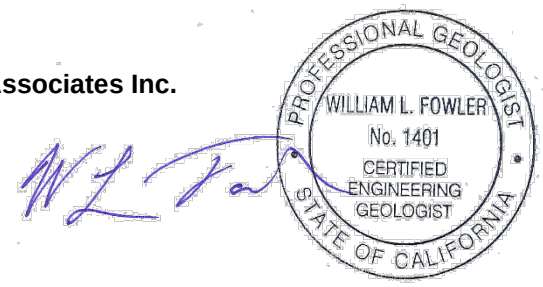
recommends that Lehigh and Waterways have contingency plans in place to design and implement remedial measures such as:

- Additional localized removals of loose or unstable materials
- Slope laybacks and benching
- Engineered drainage controls
- Buttresses or slope sections comprised of compacted rockfill

7.6 Travertine Deposits

The deposition of travertine between clasts in step-pools and dam-like structures, as well as deposited sediment that is accessed by the channel flow is likely to have increased the apparent strength of localized areas of alluvial materials along the channel. This cementation may make the removal of this material more difficult than anticipated and may play a role in long term channel stability. Golder recommends that this cemented material be left in place wherever possible to augment the restoration design.

Golder Associates Inc.



William L. Fowler, PG, CEG *Dated: 10/31/19*
Senior Program Leader/Principal

https://golderassociates-my.sharepoint.com/personal/bfowler_golder_com/documents/permanente/creek restoration/perm creek recon_final_wlf_10-31-19 r4.docx

References

Bakun, William H. 1999. "Seismic activity of the San Francisco Bay region." *Bulletin of the Seismological Society of America* 89, no. 3: 764-784.

Bedrossian, T.L. 1980. Shannon, Monte Vista and related faults: California Division of Mines and Geology Fault Evaluation Report FER-95, microfiche copy in California Division of Mines and Geology Open-File Report 90-11, scale 1:24,000.

Brabb, Earl E. 1970. Preliminary geologic map of the central Santa Cruz Mountains, California. No. 70-36. US Geological Survey.

Bryant, W.A., compiler. 2000. Fault number 57, Berrocal fault zone, in Quaternary fault and fold database of the United States: U.S. Geological Survey website, https://earthquakes.usgs.gov/hazards/qfaults, accessed 09/12/2019 09:33 AM.

Bryant, W.A., compiler. 2000. Fault number 56, Monte Vista-Shannon fault zone, in Quaternary fault and fold database of the United States: U.S. Geological Survey website, https://earthquakes.usgs.gov/hazards/qfaults, accessed 09/16/2019 02:40 PM.

Bryant, W.A., and Lundberg, M., compilers. 2002. Fault number 1c, San Andreas fault zone, Peninsula section, in Quaternary fault and fold database of the United States: U.S. Geological Survey website, https://earthquakes.usgs.gov/hazards/qfaults, accessed 09/16/2019 02:38 PM.

Caterpillar, I. N. C. "Handbook of Ripping." (2000).

Dibblee, T. W., and J. A. Minch. 2007a. "Geologic Map of the Cupertino and San Jose West quadrangles, Santa Clara and Santa Cruz Counties, California" Dibblee Geological Foundation Map DF-351, scale 1, no. 24,000.

Dibblee, T. W., and J. A. Minch. 2007b. "Geologic map of the Mindego Hill quadrangle, San Mateo, Santa Clara, and Santa Cruz Counties, California" Dibblee Geological Foundation Map DF-349, scale 1:24,000.

Ellis, W.L., Harp, E.L., Arnal, C.H., and Godt, J.W. 1999. Map showing locations of damaging landslides in Santa Clara County, California, resulting from 1997-98 El Nino rainstorms: U.S. Geological Survey, Miscellaneous Field Studies Map MF-2325-J, scale 1:125,000.

Fuller, Brian M., Leonard S. Sklar, Zacchaeus G. Compson, Kenneth J. Adams, Jane C. Marks, and Andrew C. Wilcox. 2010. "Ecogeomorphic feedbacks in regrowth of travertine step-pool morphology after dam decommissioning, Fossil Creek, Arizona." Geomorphology 126, no. 3-4: 314-332.

Foruria, J. 2004. Geology of the Permanente Limestone and Aggregate Quarry, Santa Clara County, California: Report prepared for Hanson Permanente Cement dated September 24, 2004.

Golder Associates Inc., 2014. “Preliminary Geotechnical Recommendations for Conceptual Level Permanente Creek Restoration Plans”. April 28, 2014

Haugerud, R. A., S. D. Ellen, D. P. Schwartz, and D. J. Ponti. 1990. "Coseismic ground deformation along the northeast margin of the Santa Cruz Mountains." *Field guide to neotectonics of the San Andreas fault system, Santa Cruz Mountains, in light of the 1989 Loma Prieta earthquake: US Geological Survey Open-File Report*: 90-274.

Hitchcock, C.S., and Kelson, K.I. 1999. Growth of late Quaternary folds in southwest Santa Clara Valley, San Francisco Bay area, California: Implications of triggered slip for seismic hazard and earthquake recurrence: Geology, v. 27, no. 5, p. 391–394.

Hitchcock, Christopher S., Keith I. Kelson, and Stephen C. Thompson. 1994. *Geomorphic investigations of deformation along the northeastern margin of the Santa Cruz Mountains*. No. 94-187. US Geological Survey.

Jennings, C.W. 1994. Fault activity map of California and adjacent areas, with locations of recent volcanic eruptions: California Division of Mines and Geology Geologic Data Map 6, 92 p., 2 pls., scale 1:750,000

Lawson, Andrew Cowper, and Harry Fielding Reid. 1908. *The California Earthquake of April 18, 1906: Report of the State Earthquake Investigation Commission...*. No. 87. Carnegie institution of Washington.

Langenheim, V. E., K. M. Schmidt, and R. C. Jachens. 1997. "Coseismic deformation during the 1989 Loma Prieta earthquake and range-front thrusting along the southwestern margin of the Santa Clara Valley, California." *Geology* 25, no. 12: 1091-1094.

McLaughlin, R. J., W. V. Sliter, D. H. Sorg, P. C. Russell, and A. M. Sarna-Wojcicki. 1996. "Large-scale right-slip displacement on the East San Francisco Bay Region fault system, California: Implications for location of late Miocene to Pliocene Pacific plate boundary." *Tectonics* 15, no. 1: 1-18.

McLaughlin, R.J., Clark, J.C., Brabb, E.E., and Helley, E.J. 1991. Geologic map and structure sections of the Los Gatos 7.5-minute quadrangle, Santa Clara and Santa Cruz Counties, California: U.S. Geological Survey Open-File Map 91-593, scale 1:24,000.

Nolan, K.M., and Hill, B.R. 1989. Effects of limestone quarrying and cement-plant operations on runoff and sediment yields in the upper Permanente Creek basin, Santa Clara County, California: U.S. Geological Survey, Water-Resources Investigations Report 89-4130, scale 1:40,900.

NORCAL Geophysical Consultants, Inc. 2014. Seismic Refraction Survey, Sites 4 and 11, Permanente Quarry, Cupertino, California. #14-245.15B May 22, 2014.

Peck, R.B. 1969. Advantages and limitations of the observational method in applied soil mechanics, Geotechnique, 19, No. 2, pp. 171–187.

Pulver, B.S. 1979a. Geology and landslides of the Mindego Hill 7.5' Quadrangle, California, California Department of Forestry, Title II Data Compilation Project, scale 1:24,000.

Pulver, B.S. 1979b. Geology and landslides of the Cupertino 7.5' Quadrangle, California, California Department of Forestry, Title II Data Compilation Project, scale 1:24,000.

Rogers, T.H. and Armstrong, C.F. 1973. Environmental Geologic Analysis of the Monte Bello Ridge Mountain Study Area, Santa Clara County, California, California Division of Mines and Geology Preliminary Report 17.

Sieh, Kerry E. 1978. "Prehistoric large earthquakes produced by slip on the San Andreas fault at Pallett Creek, California." *Journal of Geophysical Research: Solid Earth* 83, no. B8: 3907-3939.

Smith, T.C. 1981. Evidence of Holocene movement on the San Andreas fault zone, northern San Mateo County, California: California Division of Mines and Geology Open-File Report 81-6SF, scale 1:24,000.

Sorg, D.H., and McLaughlin, R.J. 1975. Geologic Map of the Sargent-Berrocal Fault Zone Between Los Gatos and Los Altos Hills, Santa Clara County, California: U.S. Geological Survey Miscellaneous Field Studies Map MF-643, scale 1:24,000.

Toppozada, T. R., C. R. Real, and D. L. Parke. 1981. Preparation of isoseismal maps and summaries of reported effects for pre-1900 California earthquakes, Calif. Div. Mines Geol. Open-File Rept. 81-11 SAC, 182 pp.

Toppozada, T. R. and D. L. Parke. 1982. Areas damaged by California earthquakes, 1900-1949, Calif. Div. Mines Geol. Open-File Rept. 82-17, 65 pp.

Toppozada, Tousson R., and Glenn Borchardt. 1998. "Re-evaluation of the 1836 “Hayward fault” and the 1838 San Andreas fault earthquakes." *Bulletin of the Seismological Society of America* 88, no. 1: 140-159.

Tuttle, Martitia P., and Lynn R. Sykes. 1992. "Re-evaluation of several large historic earthquakes in the vicinity of the Loma Prieta and Peninsular segments of the San Andreas fault, California." *Bulletin of the Seismological Society of America* 82, no. 4: 1802-1820.

URS. 2009. Permanente Creek Long-Term Restoration Plan. July 31, 2009.

USGS: San Francisco Bay Landslide Mapping Team. 1997. Introduction to the San Francisco Bay region, California, landslide folio: U.S. Geological Survey, Open-File Report OF-97-745-A, scale 1:125,000.

Waterways Consulting, Inc. 2018. Permanente Creek Restoration Plan Internal Draft 90% Level Submittal Design Basis Technical Memorandum. Prepared for Lehigh Southwest Cement Company and Hanson Permanente Cement, Inc. November 5, 2018.

Wesling, J.R., and Helley, E.J. 1989. Quaternary geologic map of the San Jose West quadrangle, Santa Clara County, California: U.S. Geological Survey Open-File Map 89-672, scale 1:24,000.

Working Group on Northern California Earthquake Potential (WGNCEP). 1996. Database of potential sources for earthquakes larger than magnitude 6 in northern California: U.S. Geological Survey Open-File Report 96-705, 40 p.

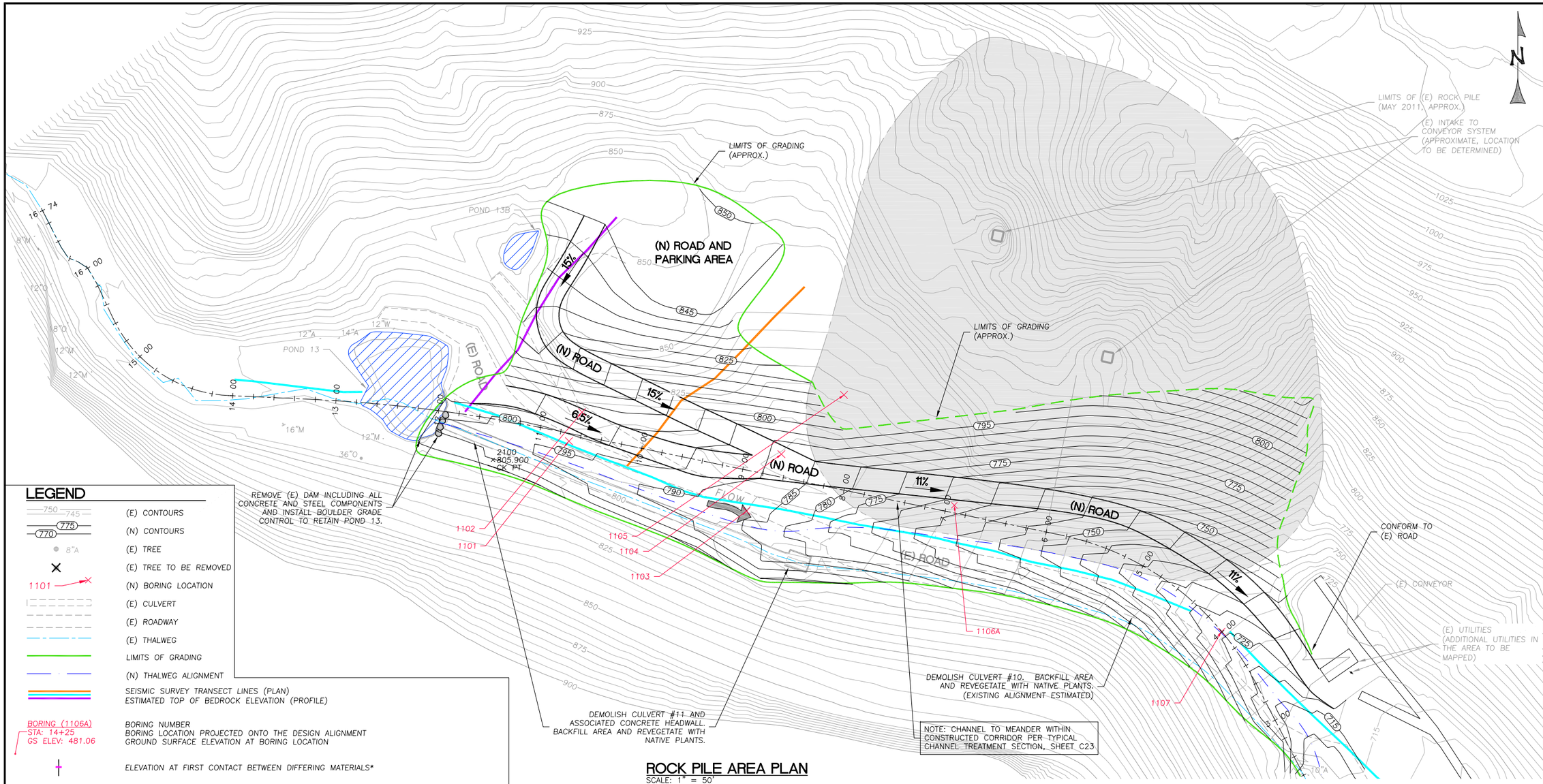
Whipple, Kelin X. 2004. "Bedrock rivers and the geomorphology of active orogens." Annual Rev. Earth Planet. Sci. 32: 151-185.

Zimmermann, André, Michael Church, and Marwan A. Hassan. "Step-pool stability: Testing the jammed state hypothesis." *Journal of Geophysical Research: Earth Surface* 115, no. F2 (2010).

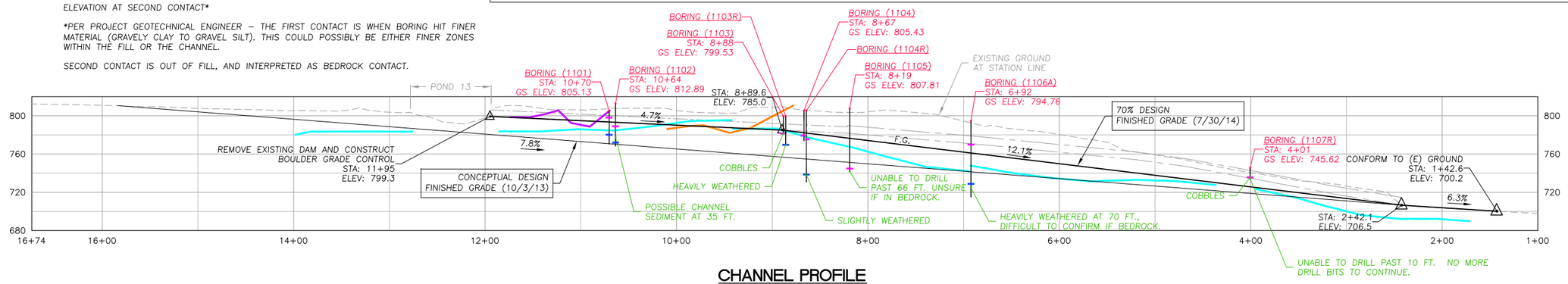
Appendix A

Intentionally left blank

Appendix B



ROCK PILE AREA PLAN
SCALE: 1" = 50'



CHANNEL PROFILE
SCALE: 1" = 60'

WATERWAYS CONSULTING INC.
509A SWIFT ST.
SANTA CRUZ, CA 95060
PH:(831)421-9291 // FAX:(888)819-6847
WWW.WATWAYS.COM

PRELIMINARY

NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:

LEHIGH HANSON
HEIDELBERG CEMENT GROUP

ROCK PILE AREA SEISMIC STUDY AND BORING RESULTS

PERMANENTE CREEK RESTORATION PLAN

SUBSURFACE BORING LOCATIONS

DESIGNED BY:	B.Z.
DRAWN BY:	B.M.S
CHECKED BY:	M.W.W.
DATE:	03/10/15
JOB NO.:	13-016

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS

0 1"

FIG. 1

Golder Associates, Inc.

Telephone:

BORING NUMBER 1101

PROJECT NUMBER 1302968-01 **DATE STARTED** 2/12/15

PROJECT NAME Lehigh Rockpile Drill **DATE COMPLETED** 2/12/15

LOCATION Cupertino, CA **CASING TYPE/DIAMETER** ----

DRILLING METHOD HSA **SCREEN TYPE/SLOT** ----

GROUND ELEVATION **GRAVEL PACK TYPE** ----

TOP OF CASING ---- **GROUT TYPE/QUANTITY** ----

LOGGED BY LF **DRILLING COMPANY** Gregg Drilling

REMARKS Borehole 1101 is located on road (furthest east location). Estimated depth of bedrock with seismic line is about 25 feet.

REMARKS CONTINUED Possible pond sediment at ~7 feet and weathered bedrock at ~25 feet.

SAMPLING METHOD	Recovery (ft)	USCS	DEPTH (ft. BGL)	GRAPHIC LOG	LITHOLOGIC DESCRIPTION
		ML	0		(FILL; ML) gravelly SANDY SILT, subangular to subrounded sand and gravel, low plastic fines; brown; moist.
			5		
		CH	10		(NATIVE possible pond sediment; CH) gravelly CLAY, medium to high plastic fines, fine subangular gravel, some coarse sand; dark brownish-gray; mosit.
			15		gravel decreases with depth
			20		
			25		at 25 feet: driller notice material is a little harder
SS	18/18	CL	30		(NATIVE; CL) gravelly CLAY, angular to subangular gravel, some FeOx staining, weathered Franciscan clasts; dark gray; moist.
		GM			(NATIVE; GM) SILTY GRAVEL, angular to subangular, low to medium plastic fines, weathered Franciscan bedrock; dark gray; moist to wet.
	12/18		35		Bottom of borehole at 35.0 feet.

LEHIGH ROCKPILE TEMPLATE GINT STD US LAB_LEHIGHROCKPILEDRILL.GPJ LOG A EWNN01.GDT 3/20/15

Golder Associates, Inc.

Telephone:

BORING NUMBER 1102

PROJECT NUMBER 1302968-01 **DATE STARTED** 2/12/15

PROJECT NAME Lehigh Rockpile Drill **DATE COMPLETED** 2/12/15

LOCATION Cupertino, CA **CASING TYPE/DIAMETER** ----

DRILLING METHOD HSA **SCREEN TYPE/SLOT** ----

GROUND ELEVATION **GRAVEL PACK TYPE** ----

TOP OF CASING ---- **GROUT TYPE/QUANTITY** ----

LOGGED BY LF **DRILLING COMPANY** Gregg Drilling

REMARKS Borehole 1102 is located on road above 1101. Drilled through fill and hit clay at ~19 feet and possibly weathered Franciscan at ~41 feet.

REMARKS CONTINUED

SAMPLING METHOD	Recovery (ft)	USCS	DEPTH (ft. BGL)	GRAPHIC LOG	LITHOLOGIC DESCRIPTION
			0		(FILL; SM) gravelly SILTY SAND, fine sand, subangular to subrounded gravel; brown; dry to moist.
			5		
			10		at 10-15 feet: increase in gravel, fine to coarse angular to subangular gravel; whitish-brown.
		SM	15		
	0/18		20		at 19 feet: driller noticed softer material; attempted a drive sample (no recovery)
		CL	25		(FILL; CL) gravelly SILTY CLAY, fine subangular to subrounded gravel, some coarse sand; grayish-brown; moist.
		GM	30		(FILL; GM) SILTY GRAVEL, angular to subangular gravel, some sand; wet.
		CH	35		(NATIVE; CH) CLAY, possible channel sediment, medium to high plastic fines.
	18/18	GM	40		(NATIVE; GM) sandy SILTY GRAVEL, possible channel sediment.
		ML			(NATIVE; ML) sandy gravelly SILT, low to medium plastic fines, weathered Franciscan bedrock; brownish-gray.

Bottom of borehole at 45.0 feet.

LEHIGH ROCKPILE TEMPLATE GINT STD US LAB_LEHIGHROCKPILEDRILL.GPJ LOG A EWNN01.GDT 3/20/15

Golder Associates, Inc.

Telephone:

BORING NUMBER 1103

PROJECT NUMBER 1302968-01 **DATE STARTED** 2/12/15

PROJECT NAME Lehigh Rockpile Drill **DATE COMPLETED** 2/12/15

LOCATION Cupertino, CA **CASING TYPE/DIAMETER** ----

DRILLING METHOD HSA **SCREEN TYPE/SLOT** ----

GROUND ELEVATION **GRAVEL PACK TYPE** ----

TOP OF CASING ---- **GROUT TYPE/QUANTITY** ----

LOGGED BY LF **DRILLING COMPANY** Gregg Drilling

REMARKS Borehole 1103 is located on road. Hit cobbles at 18 feet and unable to drill past.

REMARKS CONTINUED

SAMPLING METHOD	Recovery (ft)	USCS	DEPTH (ft. BGL)	GRAPHIC LOG	LITHOLOGIC DESCRIPTION
		ML	0		(FILL; ML) gravelly SILT, low plastic fines, subangular to subrounded gravel, some fine sand; dark grayish-brown; moist.
		SM	5		(FILL; SM) gravelly SILTY SAND, fine sand, low plastic fines, subangular to subrounded gravel; brown; moist.
		ML	10		(FILL; ML) gravelly sandy SILT, low to medium plastic fines; dark brown; moist.
		GM	15		(FILL; GM) SILTY GRAVEL and COBBLES, angular to subangular; whitish-brown. unable to drill past 18 feet; possibly stuck on a boulder
					Bottom of borehole at 18.0 feet.

Golder Associates, Inc.

Telephone:

BORING NUMBER 1103R

PROJECT NUMBER 1302968-01 **DATE STARTED** 2/12/15

PROJECT NAME Lehigh Rockpile Drill **DATE COMPLETED** 2/12/15

LOCATION Cupertino, CA **CASING TYPE/DIAMETER** ----

DRILLING METHOD HSA **SCREEN TYPE/SLOT** ----

GROUND ELEVATION **GRAVEL PACK TYPE** ----

TOP OF CASING ---- **GROUT TYPE/QUANTITY** ----

LOGGED BY LF **DRILLING COMPANY** Gregg Drilling

REMARKS Borehole 1103R is 3 feet east of 1103. Hit weathered Franciscan bedrock at ~25-30 feet.

REMARKS CONTINUED

SAMPLING METHOD	Recovery (ft)	USCS	DEPTH (ft. BGL)	GRAPHIC LOG	LITHOLOGIC DESCRIPTION
		ML	0		(FILL; ML) gravelly SILT, low plastic fines, subangular to subrounded gravel, some fine sand; light brown to brown; moist.
		SM	5		(FILL; SM) gravelly SILTY SAND, fine sand, low to medium plastic fines, subangular to subrounded gravel; brown to dark brown; moist.
		ML	10		(FILL, ML) gravelly sandy SILT, angular to subangular gravel, weathered Franciscan clasts; brown.
		CL-ML	15		(NATIVE; CL-ML) gravelly SILT to gravelly CLAY, angular to subangular gravel, weathered Franciscan bedrock; reddish-orangish-brownish-gray; moist to wet.
			20		
			25		
			30		Bottom of borehole at 30.0 feet.

LEHIGH ROCKPILE TEMPLATE GINT STD US LAB_LEHIGHROCKPILEDRILL.GPJ LOG A EWNN01.GDT 3/20/15

Golder Associates, Inc.

Telephone:

BORING NUMBER 1104

PROJECT NUMBER 1302968-01 **DATE STARTED** 2/12/15

PROJECT NAME Lehigh Rockpile Drill **DATE COMPLETED** 2/12/15

LOCATION Cupertino, CA **CASING TYPE/DIAMETER** ----

DRILLING METHOD HSA **SCREEN TYPE/SLOT** ----

GROUND ELEVATION **GRAVEL PACK TYPE** ----

TOP OF CASING ---- **GROUT TYPE/QUANTITY** ----

LOGGED BY LF **DRILLING COMPANY** Gregg Drilling

REMARKS Borehole 1104 is located on rockpile. Hit cobbles at 32 feet and unable to drill past.

REMARKS CONTINUED

SAMPLING METHOD	Recovery (ft)	USCS	DEPTH (ft. BGL)	GRAPHIC LOG	LITHOLOGIC DESCRIPTION
			0		(FILL; ML) gravelly sandy SILT, low to medium plastic fines, subangular to subrounded gravel; gray; moist.
		ML	5		color change to light grayish-brown
			10		color change to light brown
		CL-ML	15		(FILL; ML-CL) gravelly SILT to gravelly CLAY, medium plastic fines, subangular to subrounded gravel, trace coarse sand; brown; moist.
		GM	20		(FILL; GM-ML) SILTY GRAVEL to gravelly SILT, low plastic fines, angular gravel, some coarse angular sand; tannish-whitish-brown; moist.
			25		at 26 feet: driller noticed material became more stiff
	18/18	CL-ML	30		(FILL; ML-CL) gravelly CLAY to gravelly SILT, medium plastic fines, fine subangular to subrounded gravel, some fine sand, weathered; dark brownish-gray; moist.
	3/12				at 32 feet: hard material; unable to drill any further.
					Bottom of borehole at 33.0 feet.

LEHIGH ROCKPILE TEMPLATE GINT STD US LAB_LEHIGHROCKPILEDRILL.GPJ LOG A EWNN01.GDT 3/20/15

Golder Associates, Inc.

Telephone:

BORING NUMBER 1104R

PROJECT NUMBER 1302968-01 **DATE STARTED** 2/12/15

PROJECT NAME Lehigh Rockpile Drill **DATE COMPLETED** 2/12/15

LOCATION Cupertino, CA **CASING TYPE/DIAMETER** ----

DRILLING METHOD HSA **SCREEN TYPE/SLOT** ----

GROUND ELEVATION **GRAVEL PACK TYPE** ----

TOP OF CASING ---- **GROUT TYPE/QUANTITY** ----

LOGGED BY LF **DRILLING COMPANY** Gregg Drilling

REMARKS Borehole 1104R is 3 feet east of 1104. Possibly hit weathered Franciscan bedrock at about 67 feet.

REMARKS CONTINUED

SAMPLING METHOD	Recovery (ft)	USCS	DEPTH (ft. BGL)	GRAPHIC LOG	LITHOLOGIC DESCRIPTION
			0		(FILL; ML) gravelly sandy SILT, low plastic fines, angular to subangular gravel; grayish-brown; moist.
		ML	5		
			10		at 9 ' color changes to light brown
			15		
		CL-ML			(FILL; ML-CL) gravelly SILT to gravelly CLAY, low to medium plastic fines; brown; moist.
			20		
		GM	25		(FILL; GM-ML) SILTY GRAVEL to gravelly SILT, low plastic fines, angular gravel; tanish-brown; moist.
			30		
		CL-ML	35		(FILL: ML-CL) gravelly SILT to gravelly CLAY, subangular to subrounded gravel; brown to reddish-brown; moist.
					at 35' color changes to reddish-brown

LEHIGH ROCKPILE TEMPLATE GINT STD US LAB_LEHIGHROCKPILEDRILL.GPJ LOG A EWNN01.GDT 3/20/15

Golder Associates, Inc.

Telephone:

BORING NUMBER 1104R

PROJECT NUMBER 1302968-01 **DATE STARTED** 2/12/15

PROJECT NAME Lehigh Rockpile Drill **DATE COMPLETED** 2/12/15

SAMPLING METHOD	Recovery (ft)	USCS	DEPTH (ft. BGL)	GRAPHIC LOG	LITHOLOGIC DESCRIPTION
		CL-ML	45		(FILL: ML-CL) gravelly SILT to gravelly CLAY, subangular to subrounded gravel; brown to reddish-brown; moist. *(continued)*
		ML	50		(FILL; ML) gravelly SILT, low plastic fines, coarse subangular to angular gravel; brown; moist.
		CL-ML	55		(FILL; ML-CL) gravelly SILT to gravelly CLAY, low to medium plastic fines, angular to subangular gravel; brown; moist.
		GM	60		(FILL; GM) SILTY GRAVEL, low plastic fines, fine subangular gravel; light tanish-brown; moist.
			65		at 67 feet: driller notices a change in drilling
		GM	70		(NATIVE; GM-SM) sandy GRAVEL to gravely SAND, low plastic fines, weathered Franciscan clasts; brownish-gray to greenish-gray; moist to wet.
		CL	75		(NATIVE; CL) CLAY, slightly weathered Franciscan; dark gray; moist to wet.
					Bottom of borehole at 75.0 feet.

Golder Associates, Inc.

Telephone:

BORING NUMBER 1105

PROJECT NUMBER 1302968-01
PROJECT NAME Lehigh Rockpile Drill
LOCATION Cupertino, CA
DRILLING METHOD HSA
GROUND ELEVATION
TOP OF CASING ----
LOGGED BY LF

DATE STARTED 2/13/15
DATE COMPLETED 2/13/15
CASING TYPE/DIAMETER ----
SCREEN TYPE/SLOT ----
GRAVEL PACK TYPE ----
GROUT TYPE/QUANTITY ----
DRILLING COMPANY Gregg Drilling

REMARKS Borehole 1105 is located on rockpile (most North on Figure). Hit clay at ~63 feet, unable to drill past 66 feet.

REMARKS CONTINUED

SAMPLING METHOD	Recovery (ft)	USCS	DEPTH (ft. BGL)	GRAPHIC LOG	LITHOLOGIC DESCRIPTION
		GM	0		(FILL, GM) SILTY GRAVEL, angular to subangular; light to dark gray.
		CL-ML	5		(FILL; CL-ML) gravelly sandy CLAY to sandy SILT, medium plastic fines, medium to coarse sand, subangular gravel; dark gray; moist.
		ML	10		(FILL; ML) gravelly SILT, low plastic fines, fine to coarse subangular gravel, some coarse sand; brown; moist.
		GM	20		(FILL, GM) SILTY GRAVEL, fine to coarse angular to subangular gravel, low plastic fines; whitish-brown; moist.
		ML	30		(FILL; ML) gravelly SILT, low to medium plastic fines, subangular gravel; brown; moist.
		ML	35		(FILL; ML) gravelly SILT, low plastic fines, angular to subangular gravel, some coarse angular to subangular sand, slightly weathered Franciscan clasts; reddish-orangish-brown; moist. at 35 feet: driller noticed material became more stiff; drill bit became hot and started smoking.

LEHIGH ROCKPILE TEMPLATE GINT STD US LAB_LEHIGHROCKPILEDRILL.GPJ LOG A EWNN01.GDT 3/20/15

PROJECT NUMBER 1302968-01 **DATE STARTED** 2/13/15

PROJECT NAME Lehigh Rockpile Drill **DATE COMPLETED** 2/13/15

SAMPLING METHOD	Recovery (ft)	USCS	DEPTH (ft. BGL)	GRAPHIC LOG	LITHOLOGIC DESCRIPTION
		ML			(FILL; ML) gravelly SILT, low plastic fines, angular to subangular gravel, some coarse angular to subangular sand, slightly weathered Franciscan clasts; reddish-orangish-brown; moist. *(continued)*
			45		(FILL; ML) gravelly SILT, low plastic fines, anuglar to subangular gravel; brown; moist.
		ML	50		
			55		
			60		(FILL; ML-SM) gravelly sandy SILT, low plastic fines, fine to coarse sand, subangular to subrounded gravel; brown; moist.
		SM-ML			
		CH			(NATIVE; CH) gravelly CLAY, possible pond sediment, medium to high plastic fines, subangular to subrounded gravel, some coarse subangular sand; brown to dark brownish-gray to black; moist.
SS	3/6 5/6		65		
		CL-ML			(NATIVE; ML-CL) CLAYEY SILT to SILTY CLAY, possible pond sediment, low plastic fines, some fine sand, trace coarse subangular sand; light brownish-gray mottled dark gray.
					Bottom of borehole at 66.0 feet.

LEHIGH ROCKPILE TEMPLATE GINT STD US LAB_LEHIGHROCKPILEDRILL.GPJ LOG A EWNN01.GDT 3/20/15

Golder Associates, Inc.

Telephone:

BORING NUMBER 1106A

PROJECT NUMBER 1302968-01 **DATE STARTED** 2/13/15

PROJECT NAME Lehigh Rockpile Drill **DATE COMPLETED** 2/13/15

LOCATION Cupertino, CA **CASING TYPE/DIAMETER** ----

DRILLING METHOD HSA **SCREEN TYPE/SLOT** ----

GROUND ELEVATION **GRAVEL PACK TYPE** ----

TOP OF CASING ---- **GROUT TYPE/QUANTITY** ----

LOGGED BY LF **DRILLING COMPANY** Gregg Drilling

REMARKS Borehole 1106A location is downslope on rockpile (east of previous boreholes). Driller notes gravel at ~18 feet.

REMARKS CONTINUED Possible pond sediment at ~25 feet. Possibly hit weathered Franciscan bedrock at ~66 feet.

SAMPLING METHOD	Recovery (ft)	USCS	DEPTH (ft. BGL)	GRAPHIC LOG	LITHOLOGIC DESCRIPTION
		GM	0		(FILL; GM) sandy SILTY GRAVEL, angular to subangular gravel, low plastic fines, fine to coarse sand; brown; moist.
		GP	10		(FILL; GP) poorly graded GRAVEL, coarse subangular gravel, some silt; brown; moist.
		GM	15		(FILL; GM-GC) SILTY GRAVEL to CLAYEY GRAVEL, low plastic fines, subangular gravel; brown; moist.
		SM	20		(FILL; SM) SILTY SAND, fine sand, low plastic fines, some medium to coarse subangular sand, some fine to coarse subangular gravel; brown; moist.
		CL-ML	25		(FILL/COLLUVIUM (?); ML-CL) gravelly SILT to gravelly CLAY, low to medium plastic fines, fine to coarse subangular gravel; brown; moist.
			30		
			35		

LEHIGH ROCKPILE TEMPLATE GINT STD US LAB_LEHIGHROCKPILEDRILL.GPJ LOG A EWNN01.GDT 3/20/15

Golder Associates, Inc.

Telephone:

BORING NUMBER 1106A

PROJECT NUMBER 1302968-01 **DATE STARTED** 2/13/15

PROJECT NAME Lehigh Rockpile Drill **DATE COMPLETED** 2/13/15

SAMPLING METHOD	Recovery (ft)	USCS	DEPTH (ft. BGL)	GRAPHIC LOG	LITHOLOGIC DESCRIPTION
		ML			(FILL/COLLUVIUM (?); ML) gravelly SILT, low plastic fines, fine subangular gravel; brown; moist.
		ML	45		(FILL/COLLUVIUM (?); ML) gravelly SILT, low palstic fines, fine subangular gravel, some fine to coarse subangular sand; brown; moist.
		GM	50		(FILL/COLLUVIUM (?); GM) SILTY GRAVEL, fine angular to subangular gravel, low plastic fines, some coarse subangular gravel; brown; moist.
		ML	55		
			60		(FILL/COLLUVIUM (?); ML) gravelly SILT, low plastic fines, fine to coarse subangular gravel, some coarse subangular sand; brown; moist
SS	12/18		65		
		SM			(NATIVE; SM/GP) SILTY SAND and GRAVEL, heavily weathered; wet.
SS	6/18	CL-ML	70		(NATIVE; ML-CL) gravelly SILT to gravelly CLAY, heavily weathered, possibly Franciscan bedrock; wet.
		GM			(NATIVE; GM) sandy SILTY GRAVEL, fine to coarse angular to subangular gravel, possibly Franciscan bedrock; brown and dark green; wet.
SS	12/18		75		
		SM			(NATIVE; SM) gravelly SILTY SAND, fine to coarse sand, low plastic fines, angular to subangular gravel, weathered, possibly Franciscan bedrock; reddish-brown mottled brown; wet.
SS	3/80		80		Bottom of borehole at 80.0 feet.

LEHIGH ROCKPILE TEMPLATE GINT STD US LAB_LEHIGHROCKPILEDRILL.GPJ LOG A EWNN01.GDT 3/20/15

Golder Associates, Inc.

Telephone:

BORING NUMBER 1107

PROJECT NUMBER 1302968-01 **DATE STARTED** 2/13/15

PROJECT NAME Lehigh Rockpile Drill **DATE COMPLETED** 2/13/15

LOCATION Cupertino, CA **CASING TYPE/DIAMETER** ----

DRILLING METHOD HSA **SCREEN TYPE/SLOT** ----

GROUND ELEVATION **GRAVEL PACK TYPE** ----

TOP OF CASING ---- **GROUT TYPE/QUANTITY** ----

LOGGED BY LF **DRILLING COMPANY** Gregg Drilling

REMARKS Borehole 1107 is located on rockpile (most East on Figure). Hit a burried retaining wall at 7 feet and can't drill further.

REMARKS CONTINUED

SAMPLING METHOD	Recovery (ft)	USCS	DEPTH (ft. BGL)	GRAPHIC LOG	LITHOLOGIC DESCRIPTION
		GM	5		(FILL; ML-GM) gravelly SILT to SILTY GRAVEL, low plastic fines, fine to coarse angular to subangular gravel, some coarse angular to subangular sand; dark gray; moist. at 7 feet: hit retaining well; can't drill futher. Bottom of borehole at 7.0 feet.

LEHIGH ROCKPILE TEMPLATE GINT STD US LAB_LEHIGHROCKPILEDRILL.GPJ LOG A EWNN01.GDT 3/20/15

Golder Associates, Inc.

Telephone:

BORING NUMBER 1107R

PROJECT NUMBER 1302968-01 **DATE STARTED** 2/13/15

PROJECT NAME Lehigh Rockpile Drill **DATE COMPLETED** 2/13/15

LOCATION Cupertino, CA **CASING TYPE/DIAMETER** ----

DRILLING METHOD HSA **SCREEN TYPE/SLOT** ----

GROUND ELEVATION **GRAVEL PACK TYPE** ----

TOP OF CASING ---- **GROUT TYPE/QUANTITY** ----

LOGGED BY LF **DRILLING COMPANY** Gregg Drilling

REMARKS Borehole 1107R is 3 feet east of 1107. Hit cobbles 10 feet and unable to drill past.

REMARKS CONTINUED

SAMPLING METHOD	Recovery (ft)	USCS	DEPTH (ft. BGL)	GRAPHIC LOG	LITHOLOGIC DESCRIPTION
		GM	5		(FILL; GM) SILTY GRAVEL, coarse subangular gravel; dark gray; moist.
			10		at 10 feet: stuck on cobble; can't drill further.
					Bottom of borehole at 10.0 feet.

LEHIGH ROCKPILE TEMPLATE GINT STD US LAB_LEHIGHROCKPILEDRILL.GPJ LOG A EWNN01.GDT 3/20/15

G2. Slope Stability Analyses (Golder Associates, July 22, 2021)

GOLDER
MEMBER OF WSP

TECHNICAL MEMORANDUM

DATE July 22, 2021 **Project No.** 179018610

TO Erika Guerra
Lehigh Hanson

FROM Robert Paul C. Erickson, PE; William L. Fowler, PG, CEG **EMAIL robertpaul_erickson@golder.com, bill_fowler@golder.com**

RE: SLOPE STABILITY ANALYSES, PERMANENTE CREEK RESTORATION PLAN, LEHIGH SOUTHWEST CEMENT COMPANY AND HANSON PERMANENTE CEMENT, INC. PERMANENTE QUARRY, CUPERTINO, CALIFORNIA

Ms. Guerra,

Golder Associates Inc. (Golder) is submitting this technical memorandum to Lehigh Southwest Cement Company and Hanson Permanente Cement, Inc. (Lehigh) to present the results of our slope stability analyses of the proposed Rock Pile and mining overburden removal to the design finished grade related to Permanente Creek Restoration Plan, herein referred to as the Restoration Plan (Waterways, 2018)[1], at the Permanente Quarry in Cupertino, California. This work was performed in support of our response to comments dated June 25, 2021 compiled by ESA and submitted to the County of Santa Clara regarding the Permanente Creek Restoration Plan (PCRP).

The following sections provide a brief description of the analyses that were performed, the results and conclusions, and relevant slope stability analyses model outputs are provided as Attachment 1.

1.0 MODEL DEVELOPMENT

Golder analyzed cross-section C-C', shown on Sheets 19 and 21 of the Restoration Plan, 90% design submittal (Waterways, 2019). This cross-section location is considered critical for slope stability because it consists of, nominally, the greatest height of the rockpile overburden material (250 feet measured from toe to crest) and captures the steepest inclinations of both the existing rockpile (approximately 1.1H to 1.2H:1V) and underlying native metabasalt (aka greenstone) (approximately 1H: 1V). The geometry of the existing site conditions is based on topographic data per a survey collected by Lehigh in May 2011. The Restoration Plan provides additional information regarding the interpretation of the depth to the underlying native bedrock. The topographic data provided to Golder was truncated at the existing haul road on the north side of the creek at approximately elevation 1070 feet (El. 1070), therefore, model geometry north of the haul road was estimated based on measurements from Google Earth.

In lieu of piezometer data along cross-section C-C', Golder assumed a phreatic surface based on our understanding of the general subsurface water conditions along the south rim of the quarry as informed by long

[1] Waterways Consulting, Inc. 2019. Permanente Creek Restoration Plan Grading Plan 90% Design. Santa Clara County Grading Permit Submittal, October 31, 2019.

Golder Associates Inc.
1000 Enterprise Way, Suite 190, Roseville, California, USA 95678 T: +1 916 786-2424 F: +1 916 786-2434

Golder and the G logo are trademarks of Golder Associates Corporation

term installation and data collection from vibrating wire piezometers installed between the quarry and Permanente Creek. The analyses performed here assumed the depth to water is approximately 75 feet below the existing haul road and declines through the native bedrock to a depth of approximately 20 feet below the existing culvert in the creek (near original creek thalweg elevation).

2.0 ANALYSES

Golder performed 2-dimensional, limit equilibrium slope stability analysis along cross-section C-C' using Slide2 Modeler, Version 9.012[2]. The analyses presented here used Spencer's method of analysis because it satisfies static horizontal and vertical equilibrium as well as moment equilibrium. These analyses evaluated circular failures only because the interpretation of the subsurface conditions indicate a block type failure is unlikely (i.e., no weak horizontal stratum). Critical slip surfaces and corresponding FOS were evaluated for local failures through upper and lower portions of the respective slopes as well as global failures that span from the ultimate crest to ultimate toe of the final slope configuration.

Golder analyzed the following four cases for slope stability:

1. The existing rockpile overburden given existing conditions.
2. The interpreted native bedrock following excavation and removal of the rockpile overburden and underlying thin surficial deposits.
3. The interpreted native bedrock surface in the creek bottom following excavation to the expected upper limit of the design finished subgrade of the creek per the Restoration Plan.
4. The interpreted native bedrock surface in the creek bottom following excavation to the expected lower limit of the design finished subgrade of the creek per the Restoration Plan.

As a limited sensitivity analysis, Golder evaluated each of the above four cases considering the assume phreatic surface described in Section 1 as well as under dry conditions to bracket the range of factors of safety (FOS).

3.0 GEOTECHNICAL PARAMETERS

The geotechnical parameters used in slope stability analyses are summarized in Table 1 and described below.

Table 1: Summary of Geotechnical Parameters

Material	Unit Weight (pcf)	Cohesion (psf)	Effective Friction Angle (degrees)
Rockpile Overburden	125	0	40
Metabasalt/Greenstone	165	6,480	30

Notes: pcf = pounds per cubic foot
psf = pounds per square foot

[2] Rocscience Inc. 2020. Slide 2 Modeler, 2D Limit Equilibrium Analysis for Slopes. Build Version 9.012. Build date December 11, 2020.

Golder assumed the rockpile overburden has a unit weight of 125 pounds per cubic foot (pcf) with 0 cohesion and an effective friction angle (Φ') of 40 degrees. Its assumed friction angle corresponds to the rockpile's angle of repose and these assumed shear strength parameters yield a minimum static FOS of 1.0 which is reasonable considering the rockpile has performed well and appears stable since its placement.

Numerous previous analyses were performed by Golder[3] to back calculate, test, and develop shear strength parameters for the native greenstone at the site. These investigations and analyses determined the characteristics of the greenstone vary across the site with poorer quality greenstone generally observed in the northern portion of the quarry and better-quality rock located along the southern and southeastern portions of the site. The best geologic analog for the Rock Pile area is the nearby southern quarry rim which is located about 1500 feet west-northwest of the Rock Pile. The two areas are on trend with respect to the structural fabric of the quarry, and it is our opinion that they likely are underlain by the same general package of Franciscan bedrock comprised of a mixture of metabasalt and graywacke with associated interlayered limestone blocks.

Golder performed a detailed investigation and analyses of the south quarry area for the purpose of final pitslope design in 2008. The results of this work are included as Chapter 9 of our geotechnical report published in support of the updated 2011 Reclamation Plan. Four coreholes were installed in the south quarry rim and approximately 1500 feet of core were recovered and analyzed. Rock mass properties used for the pitslope design were developed from geotechnical core logging, point load testing, and laboratory testing of the core. Mohr-Coulomb strengths for the rock units were estimated from Hoek-Brown strengths using the computer program RocData, by Rocscience. Based on this previous work, Golder assumed the metabasalt/greenstone unit has a unit weight of 165 pounds per cubic foot (pcf) with 45 psi cohesion and an effective friction angle (Φ') of 30 degrees.

4.0 RESULTS

The results of slope stability analyses are summarized in Table 2 and relevant model outputs are provided as Attachment 1.

[3] Golder Associates Inc. 2011. Geotechnical Evaluations and Design Recommendations (Revised), Permanente Quarry Reclamation Plan Update, Santa Clara County, California. December 2011.

Table 2: Summary of Slope Stability Analyses

Case	Failure Mode	FOS	
		Hypothetical Dry Conditions	Assumed Phreatic Surface
1 – Existing Conditions	Upper Slope	1.13	1.13
	Lower Slope	1.15	1.15
	Global	1.37	1.37
2 – Excavate Rockpile	Local (Upper Slope)	2.09	1.98
	Global	2.32	2.05
3 – Excavate to Upper Limit of Finished Grade	Local (Upper Slope)	2.09	1.97
	Lower Slope	5.58	5.13
	Global	2.14	1.87
4 – Excavation to Lower Limit of Finished Grade	Local (Upper Slope)	2.09	1.98
	Lower Slope	4.92	4.37
	Global	2.13	1.83

5.0 CONCLUSIONS AND CONSIDERATIONS

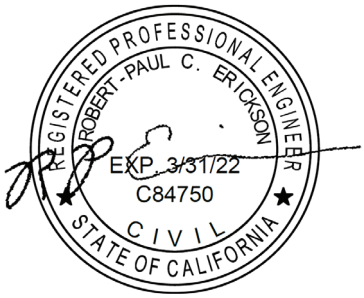
The results of the analyses presented here indicate the proposed excavation of the existing rockpile as well as excavation to both the upper and lower limits of the finished subgrade of the creek per the Restoration Plan will exceed a static FOS of 1.8. These conclusions are based on the interpreted extent of the native metabasalt/greenstone beneath the rockpile as described in the Restoration Plan, the condition (and corresponding geotechnical parameters) of the native metabasalt/greenstone Golder assumed for the analyses, and the phreatic surface Golder assumed for the analyses.

As outlined in our response to comments, and our previous documents published in support of the Permanente Creek Restoration Plan, a qualified professional engineer or geologist is required to inspect and map the native bedrock that is exposed beneath the rockpile overburden to confirm, or modify, the assumptions made to perform these analyses. If the observed conditions are different than those assumed here, additional analyses may be required.

6.0 CLOSING

Please contact the undersigned if you have questions or require clarifications regarding the information provided in this memorandum.

Golder Associates Inc.



Robert Paul C. Erickson, PE
Senior Consultant
RPCE/WLF/rpce

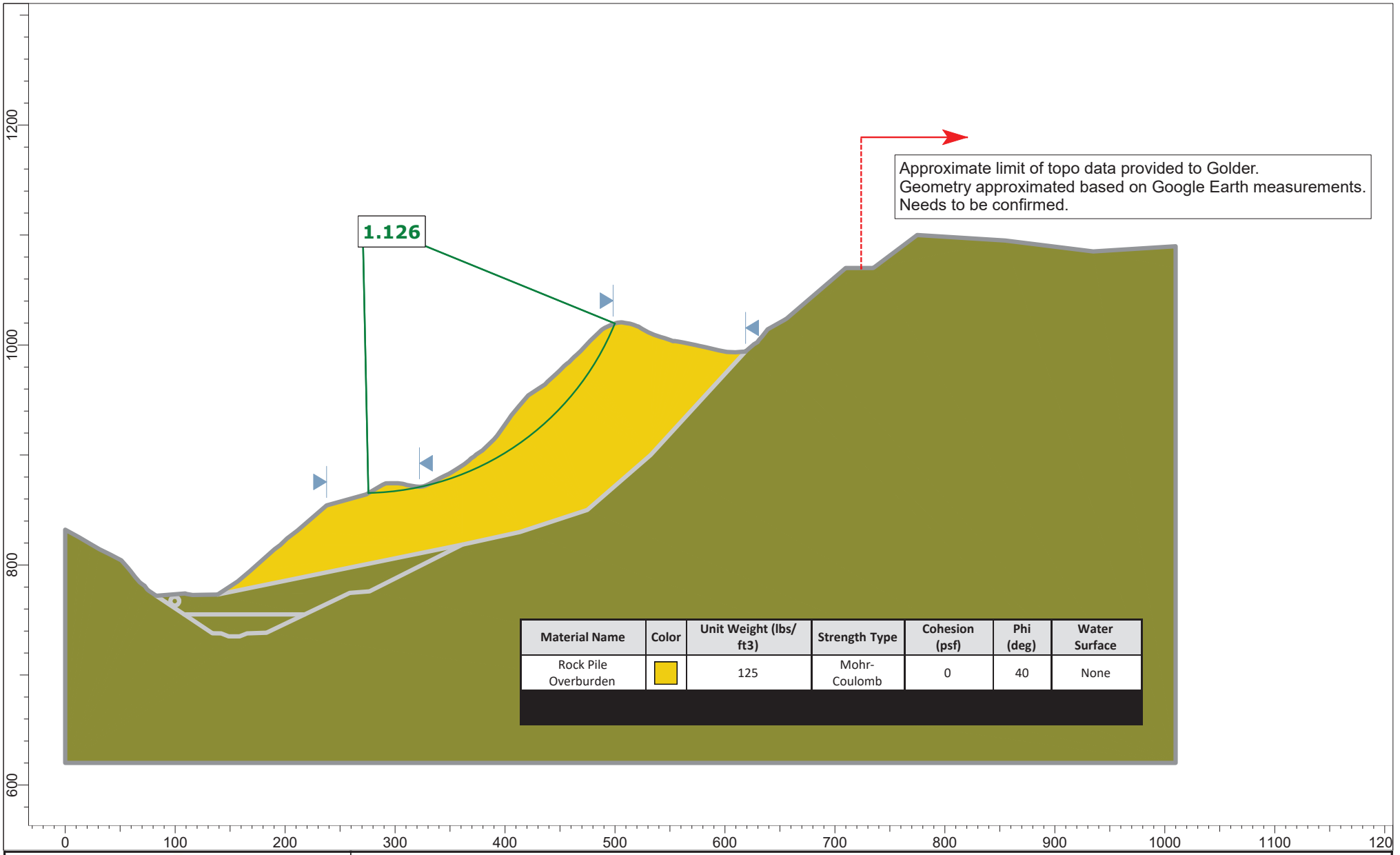
William L. Fowler, PG, CEG
Principal Engineering Geologist

Attachments: Attachment 1 – Slope Stability Analyses Model Outputs

https://golderassociates.sharepoint.com/sites/0637109940-lehighpermgwmonitoring-ca/shared documents/creek restoration/lehigh permanente creek restoration slope stability memo - 20210722.docx

ATTACHMENT 1

Slope Stability Analyses Model Outputs

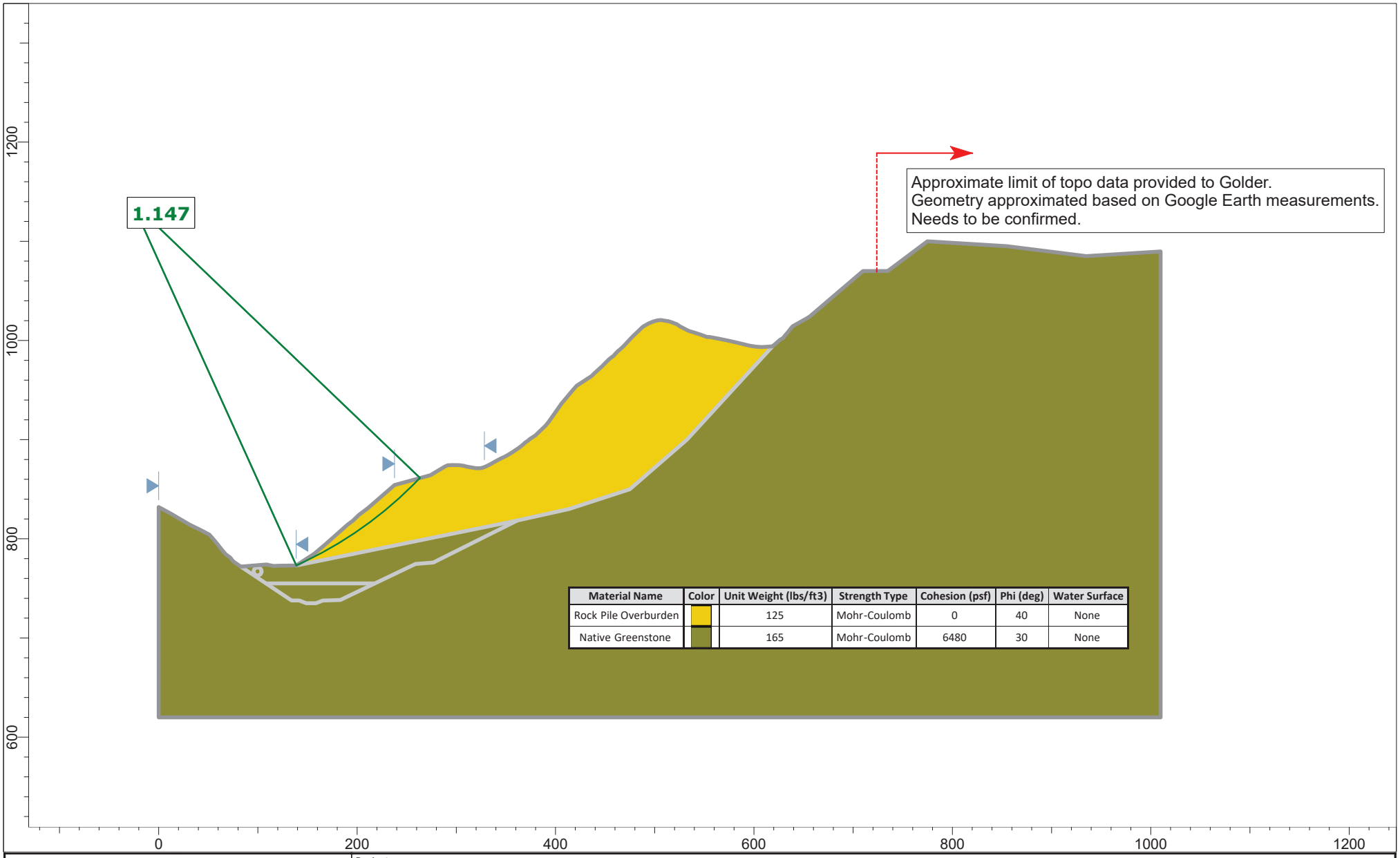


Material Name	Color	Unit Weight (lbs/ ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface
Rock Pile Overburden		125	Mohr-Coulomb	0	40	None

GOLDER

SLIDEINTERPRET 9.012

Project SLIDE - An Interactive Slope Stability Program		
Analysis Description		
Drawn By	*Scale* 1:1444	*Company*
Date 7/9/2021, 4:25:49 PM		*File Name* Section C-C'_20210715.slmd

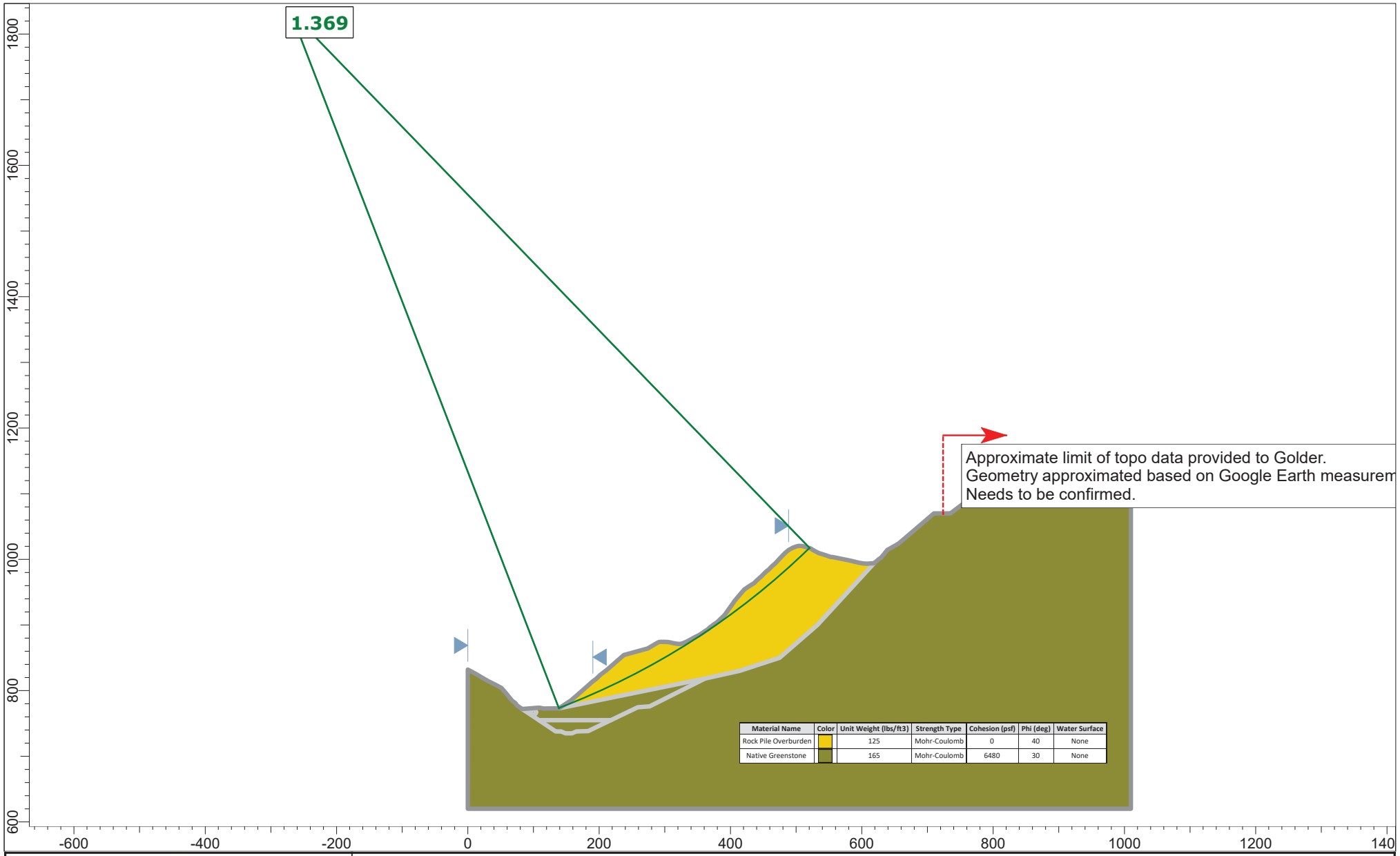


Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface
Rock Pile Overburden		125	Mohr-Coulomb	0	40	None
Native Greenstone		165	Mohr-Coulomb	6480	30	None

GOLDER

SLIDEINTERPRET 9.012

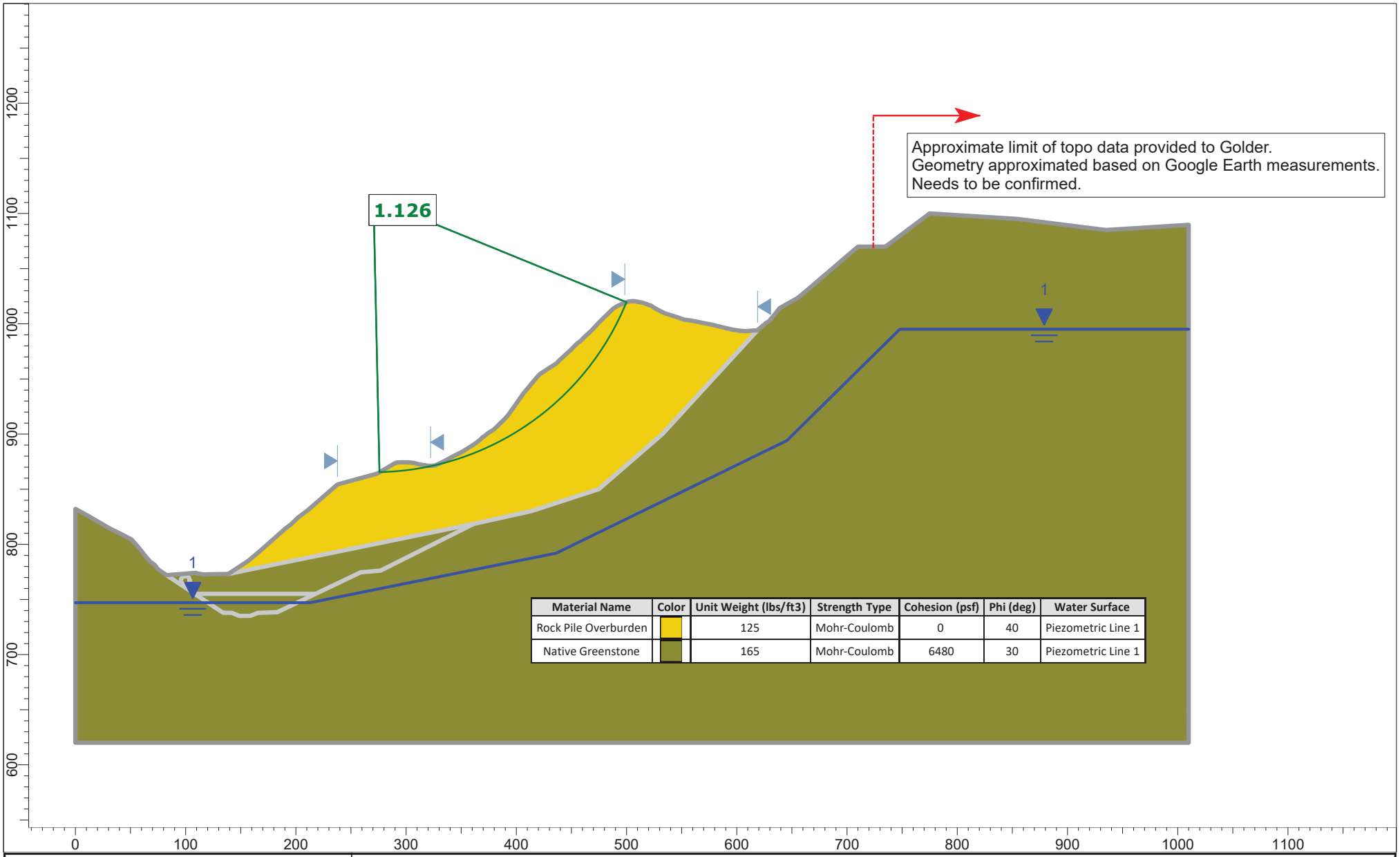
Project	SLIDE - An Interactive Slope Stability Program		
Analysis Description			
Drawn By		*Scale* 1:1605	*Company*
Date	7/9/2021, 4:25:49 PM		*File Name* Section C-C'_20210715.slmd



GOLDER

SLIDEINTERPRET 9.012

Project	SLIDE - An Interactive Slope Stability Program	
Analysis Description		
Drawn By	*Scale* 1:2423	*Company*
Date 7/9/2021, 4:25:49 PM		*File Name* Section C-C'_20210715.slmd

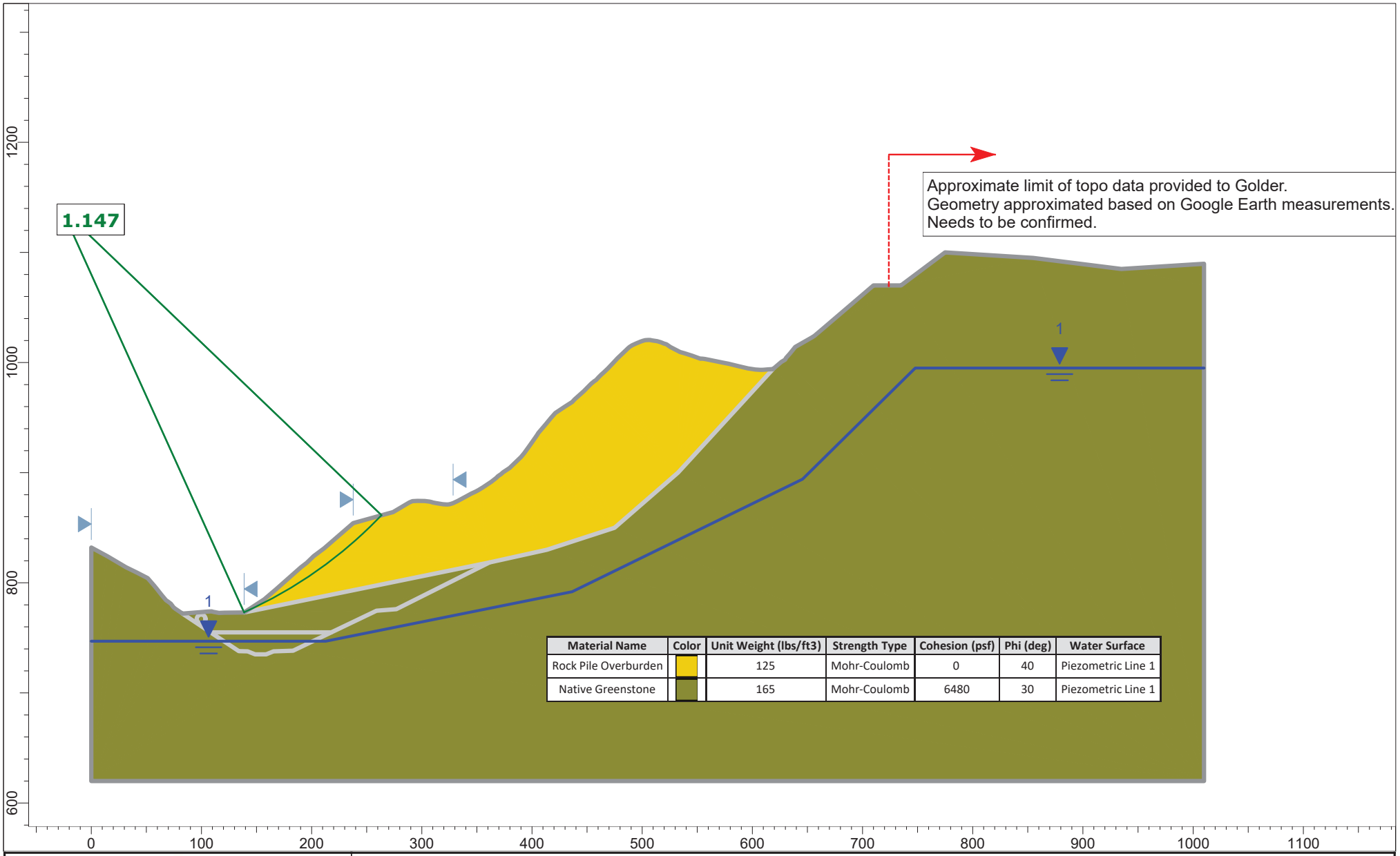


Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface
Rock Pile Overburden		125	Mohr-Coulomb	0	40	Piezometric Line 1
Native Greenstone		165	Mohr-Coulomb	6480	30	Piezometric Line 1

GOLDER

SLIDEINTERPRET 9.012

Project	SLIDE - An Interactive Slope Stability Program		
Analysis Description			
Drawn By		*Scale* 1:1444	*Company*
Date	7/9/2021, 4:25:49 PM		*File Name* Section C-C'_20210715.slmd

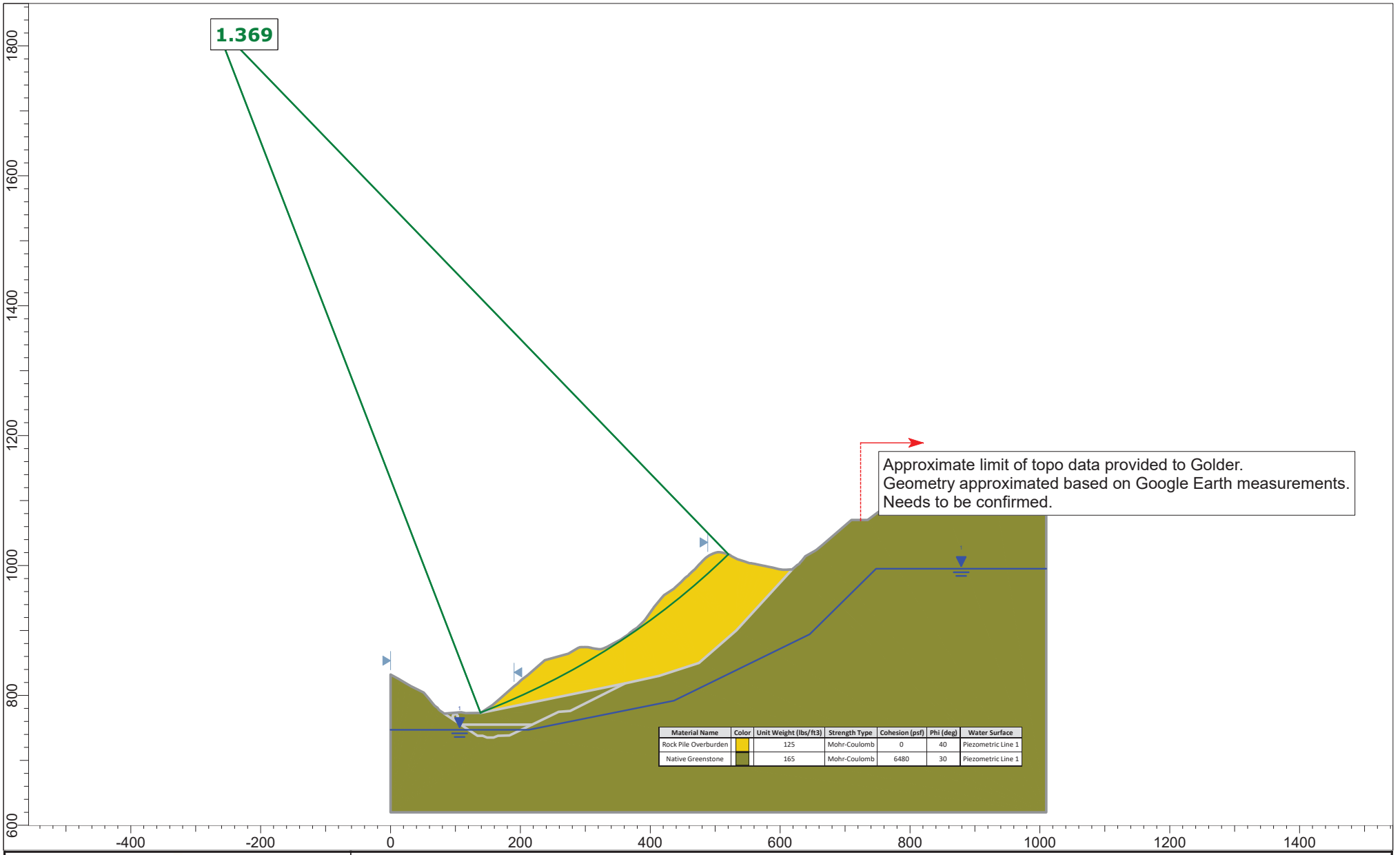


Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface
Rock Pile Overburden		125	Mohr-Coulomb	0	40	Piezometric Line 1
Native Greenstone		165	Mohr-Coulomb	6480	30	Piezometric Line 1

GOLDER

SLIDEINTERPRET 9.012

Project	SLIDE - An Interactive Slope Stability Program		
Analysis Description			
Drawn By		*Scale* 1:1444	*Company*
Date	7/9/2021, 4:25:49 PM		*File Name* Section C-C'_20210715.slmd

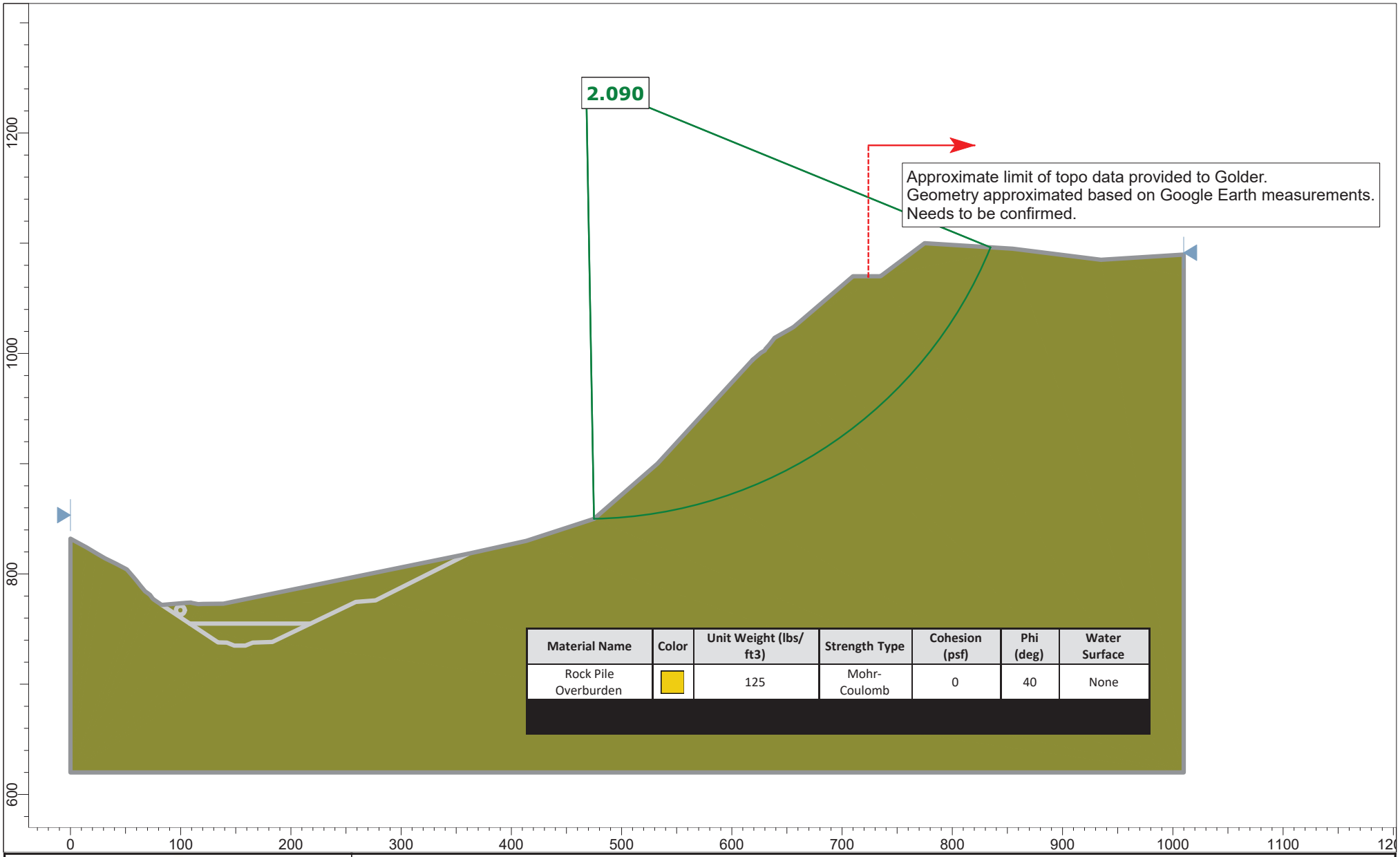


Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface
Rock Pile Overburden		125	Mohr-Coulomb	0	40	Piezometric Line 1
Native Greenstone		165	Mohr-Coulomb	6480	30	Piezometric Line 1

GOLDER

SLIDEINTERPRET 9.012

Project SLIDE - An Interactive Slope Stability Program		
Analysis Description		
Drawn By	*Scale* 1:2446	*Company*
Date 7/9/2021, 4:25:49 PM		*File Name* Section C-C'_20210715.slmd

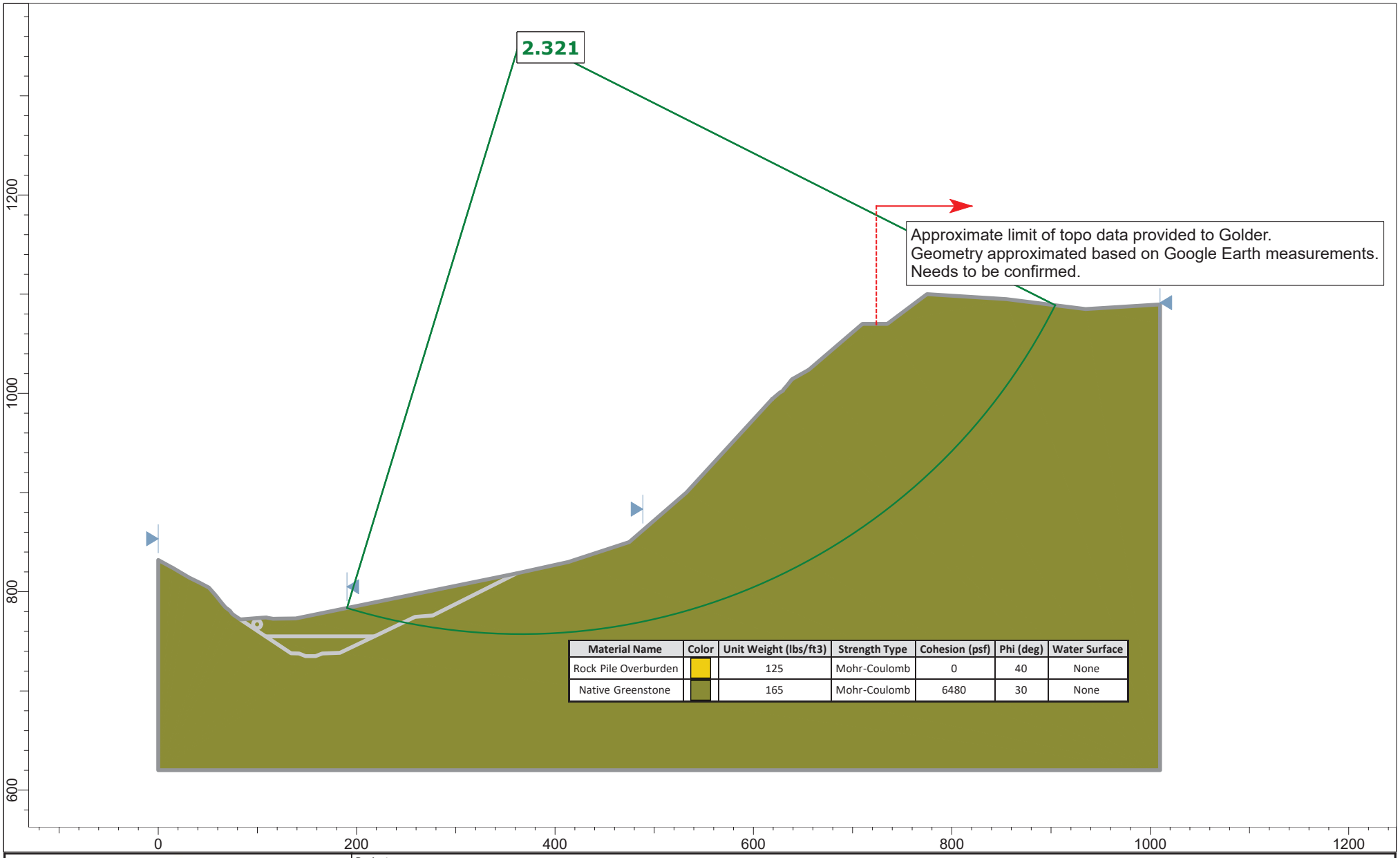


Material Name	Color	Unit Weight (lbs/ ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface
Rock Pile Overburden		125	Mohr-Coulomb	0	40	None

GOLDER

SLIDEINTERPRET 9.012

Project	SLIDE - An Interactive Slope Stability Program		
Analysis Description			
Drawn By		*Scale* 1:1444	*Company*
Date	7/9/2021, 4:25:49 PM		*File Name* Section C-C'_20210715.slmd

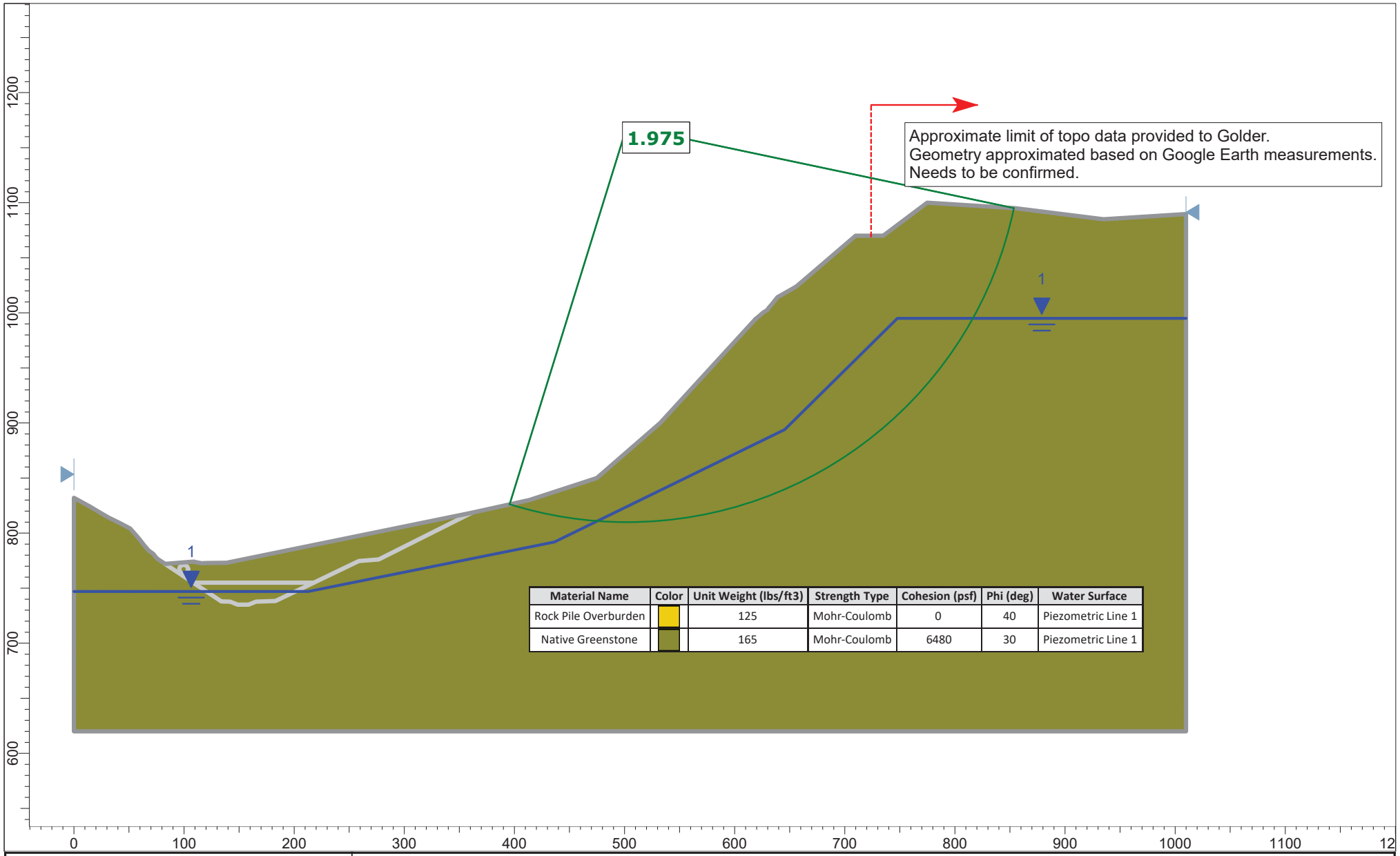


Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface
Rock Pile Overburden		125	Mohr-Coulomb	0	40	None
Native Greenstone		165	Mohr-Coulomb	6480	30	None

GOLDER

SLIDEINTERPRET 9.012

Project	SLIDE - An Interactive Slope Stability Program		
Analysis Description			
Drawn By		Scale 1:1605	Company
Date	7/9/2021, 4:25:49 PM		File Name Section C-C'_20210715.slmd

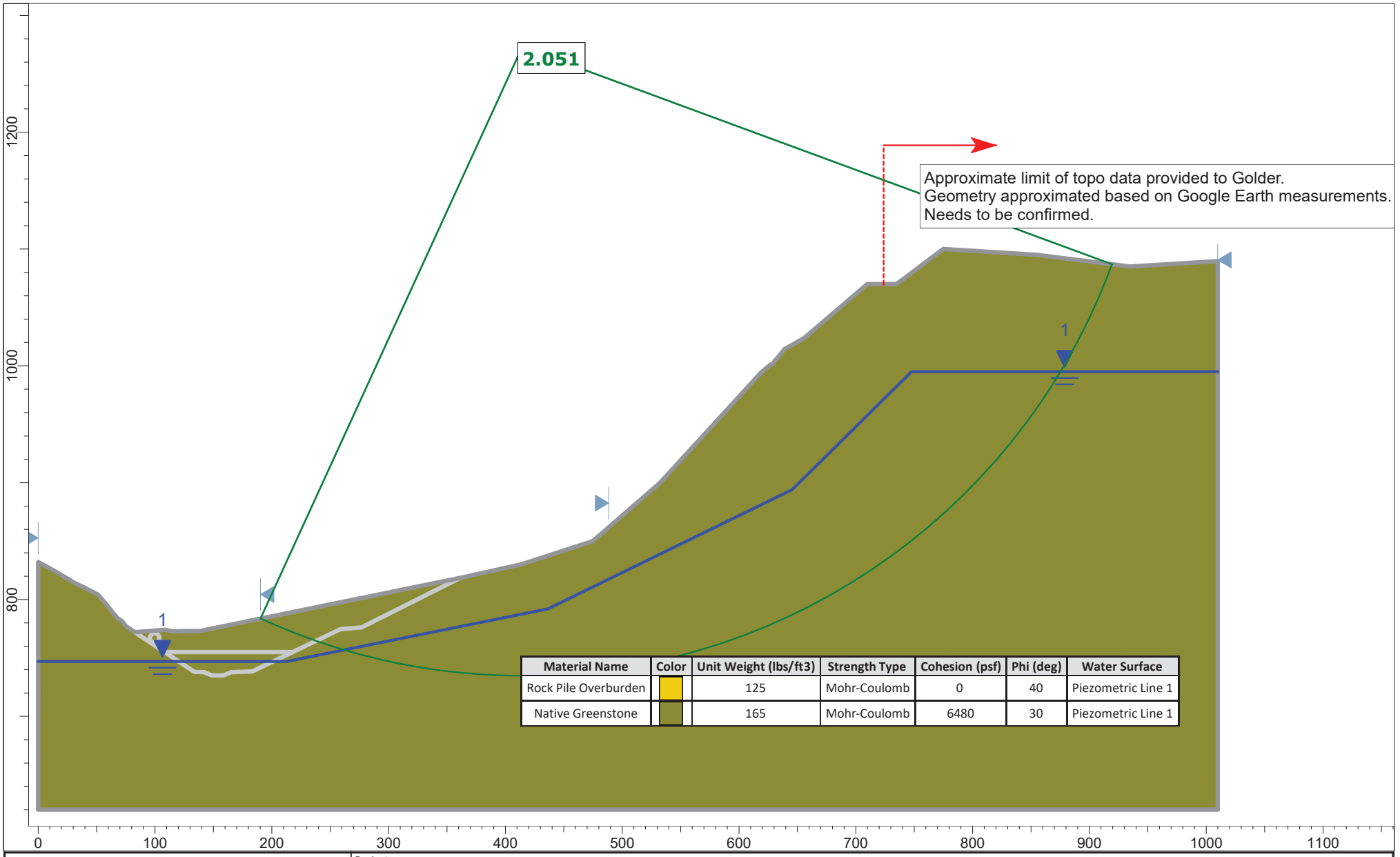


Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface
Rock Pile Overburden		125	Mohr-Coulomb	0	40	Piezometric Line 1
Native Greenstone		165	Mohr-Coulomb	6480	30	Piezometric Line 1

GOLDER

SLIDEINTERPRET 9.012

Project SLIDE - An Interactive Slope Stability Program		
Analysis Description		
Drawn By	*Scale* 1:1444	*Company*
Date 7/9/2021, 4:25:49 PM		*File Name* Section C-C'_20210715.slmd

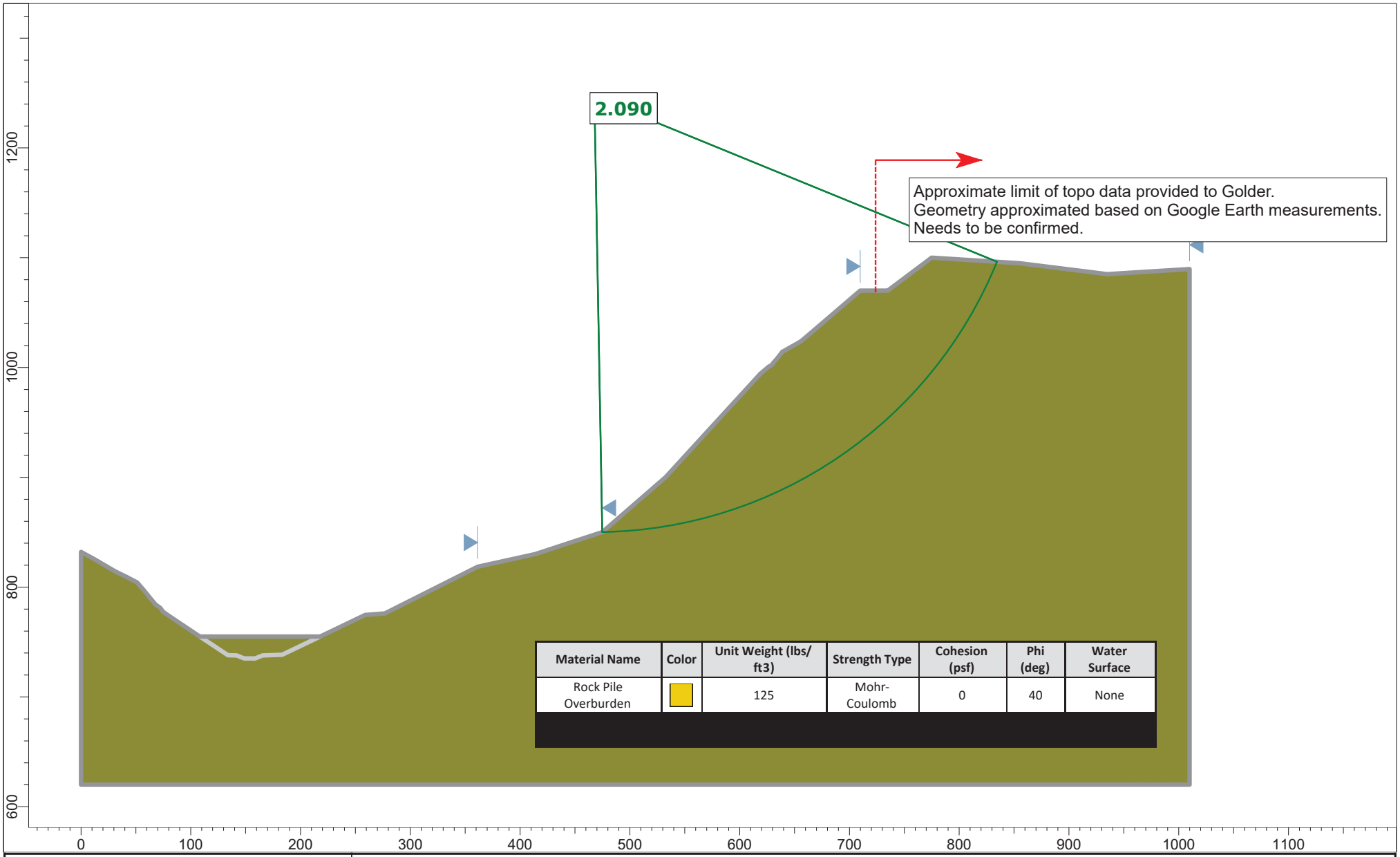


Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface
Rock Pile Overburden		125	Mohr-Coulomb	0	40	Piezometric Line 1
Native Greenstone		165	Mohr-Coulomb	6480	30	Piezometric Line 1

GOLDER

SLIDEINTERPRET 9.012

Project	SLIDE - An Interactive Slope Stability Program		
Analysis Description			
Drawn By		Scale 1:1361	Company
Date	7/9/2021, 4:25:49 PM		File Name Section C-C'_20210715.slmd

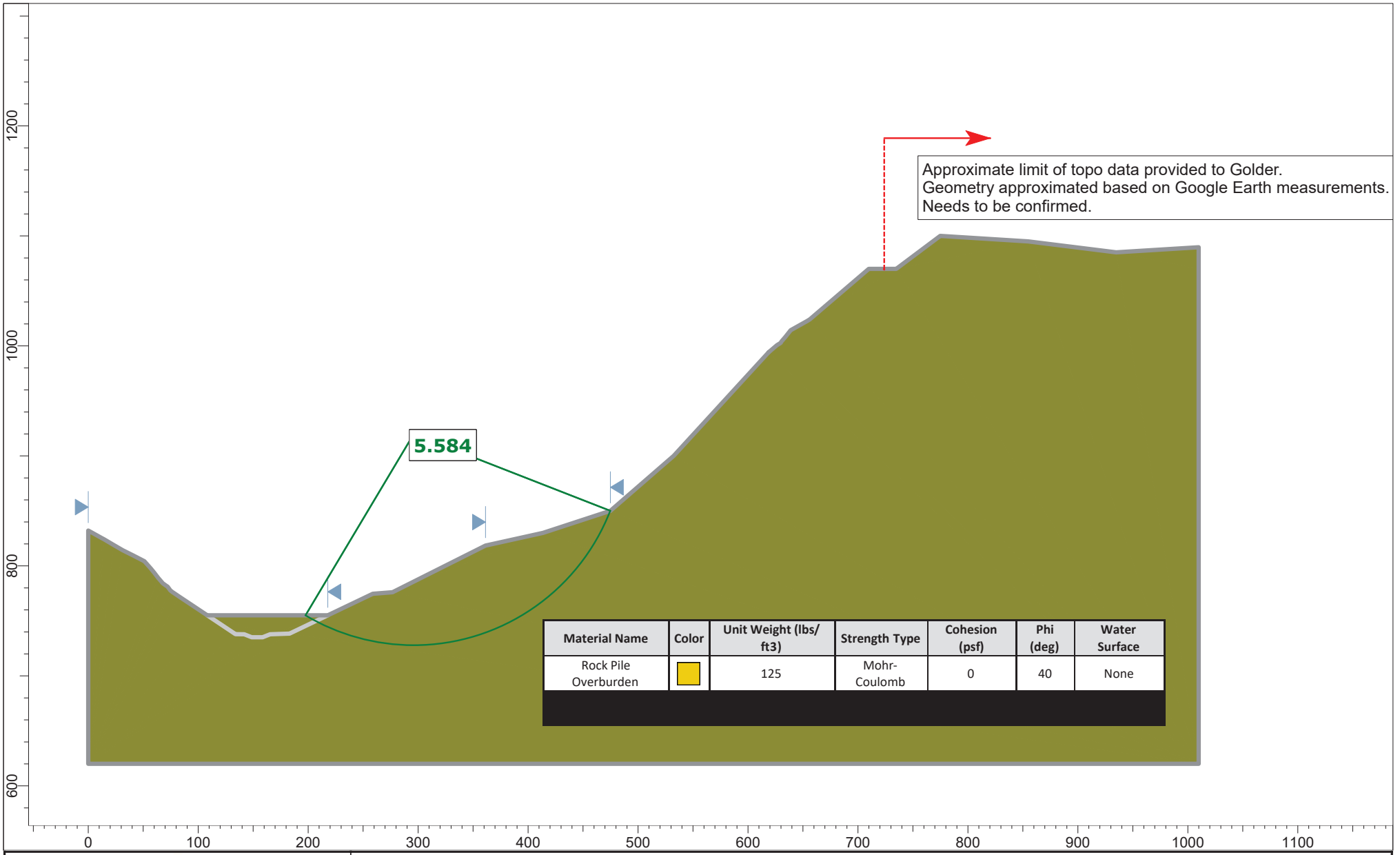


Material Name	Color	Unit Weight (lbs/ ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface
Rock Pile Overburden		125	Mohr-Coulomb	0	40	None

GOLDER

SLIDEINTERPRET 9.012

Project	SLIDE - An Interactive Slope Stability Program		
Analysis Description			
Drawn By		*Scale* 1:1450	*Company*
Date	7/9/2021, 4:25:49 PM		*File Name* Section C-C'_20210715.slmd

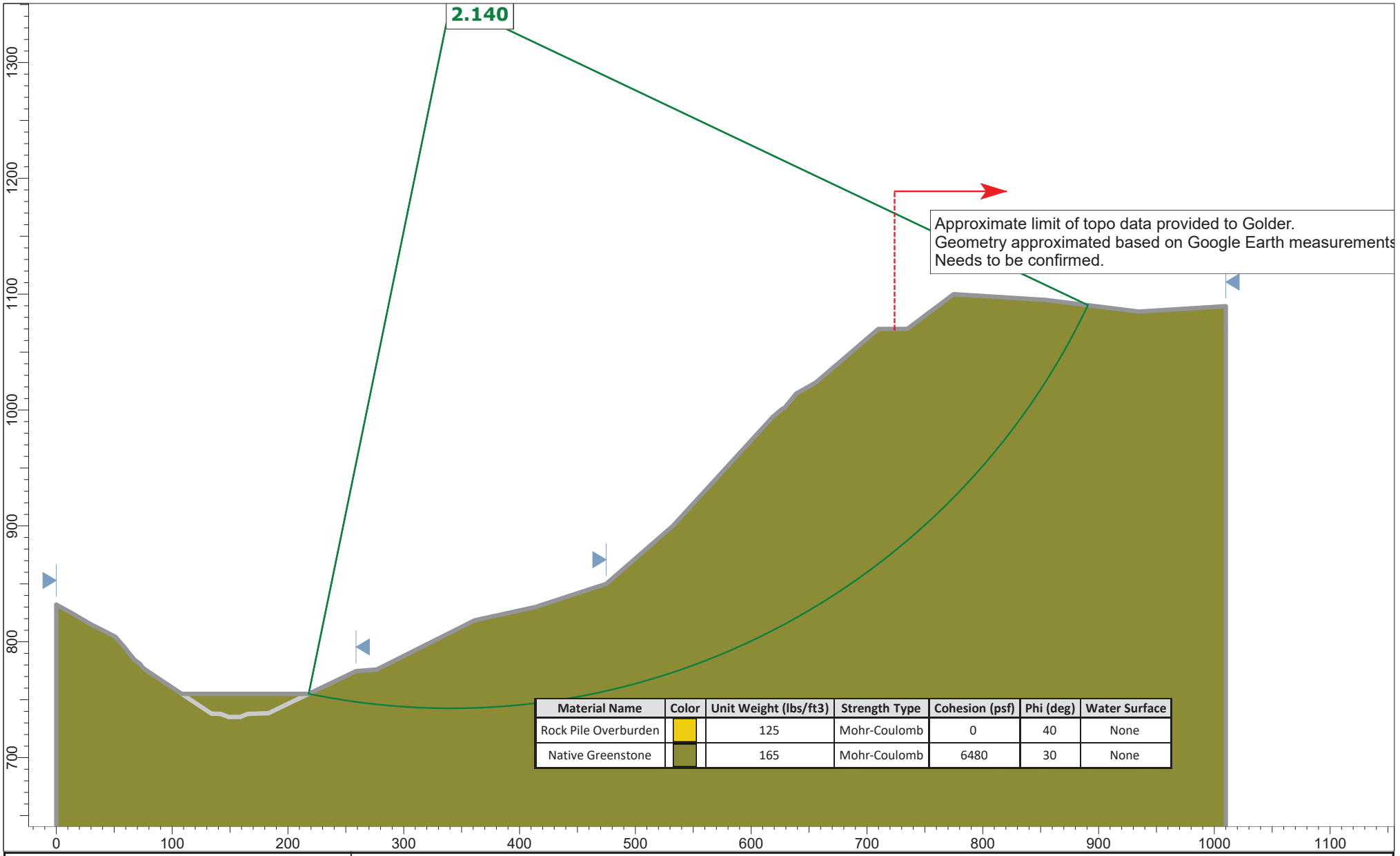


Material Name	Color	Unit Weight (lbs/ ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface
Rock Pile Overburden		125	Mohr-Coulomb	0	40	None

GOLDER

SLIDEINTERPRET 9.012

Project	SLIDE - An Interactive Slope Stability Program		
Analysis Description			
Drawn By		*Scale* 1:1444	*Company*
Date	7/9/2021, 4:25:49 PM		*File Name* Section C-C'_20210715.slmd

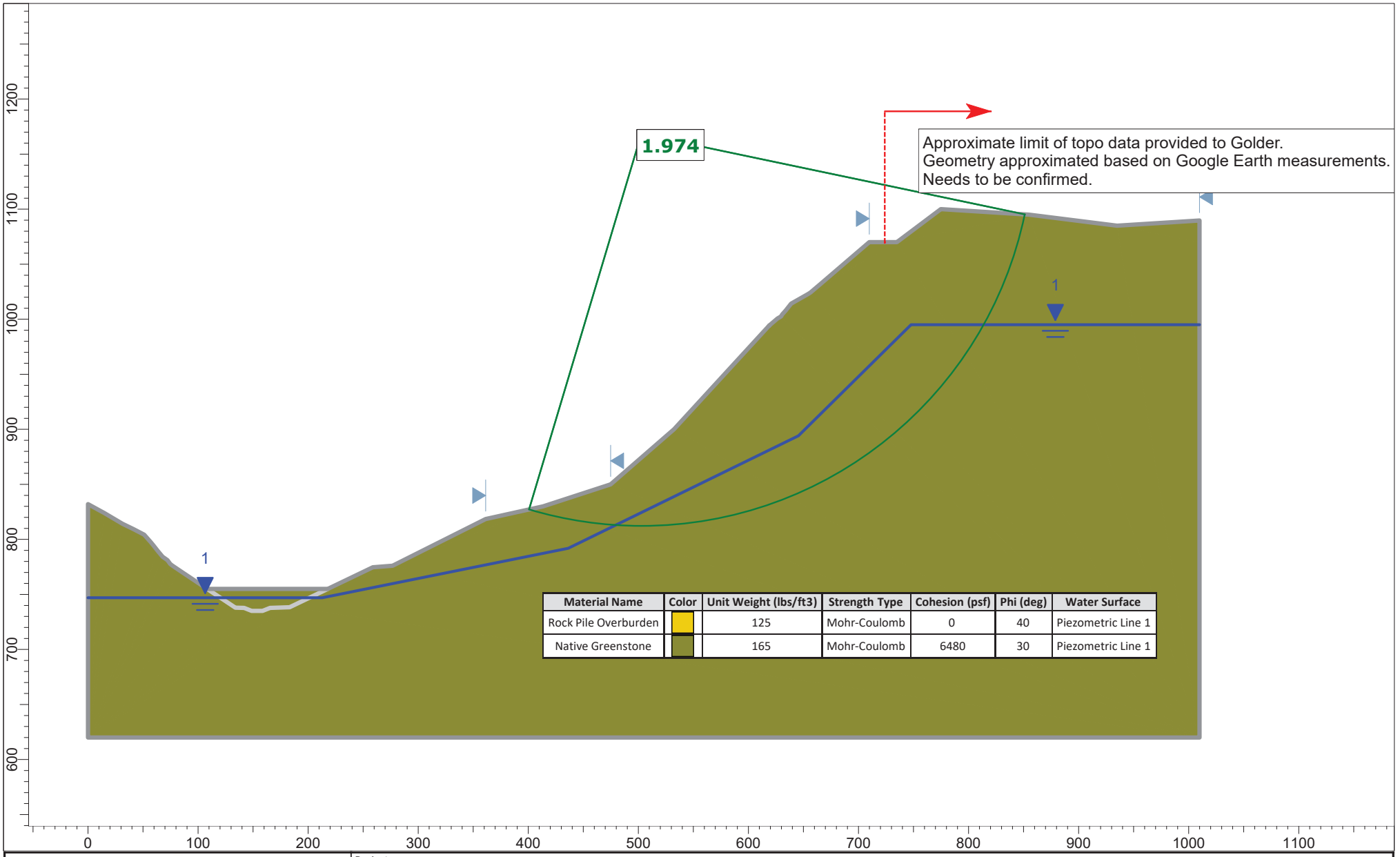


Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface
Rock Pile Overburden		125	Mohr-Coulomb	0	40	None
Native Greenstone		165	Mohr-Coulomb	6480	30	None

GOLDER

SLIDEINTERPRET 9.012

Project SLIDE - An Interactive Slope Stability Program		
Analysis Description		
Drawn By	*Scale* 1:1373	*Company*
Date 7/9/2021, 4:25:49 PM		*File Name* Section C-C'_20210715.slmd

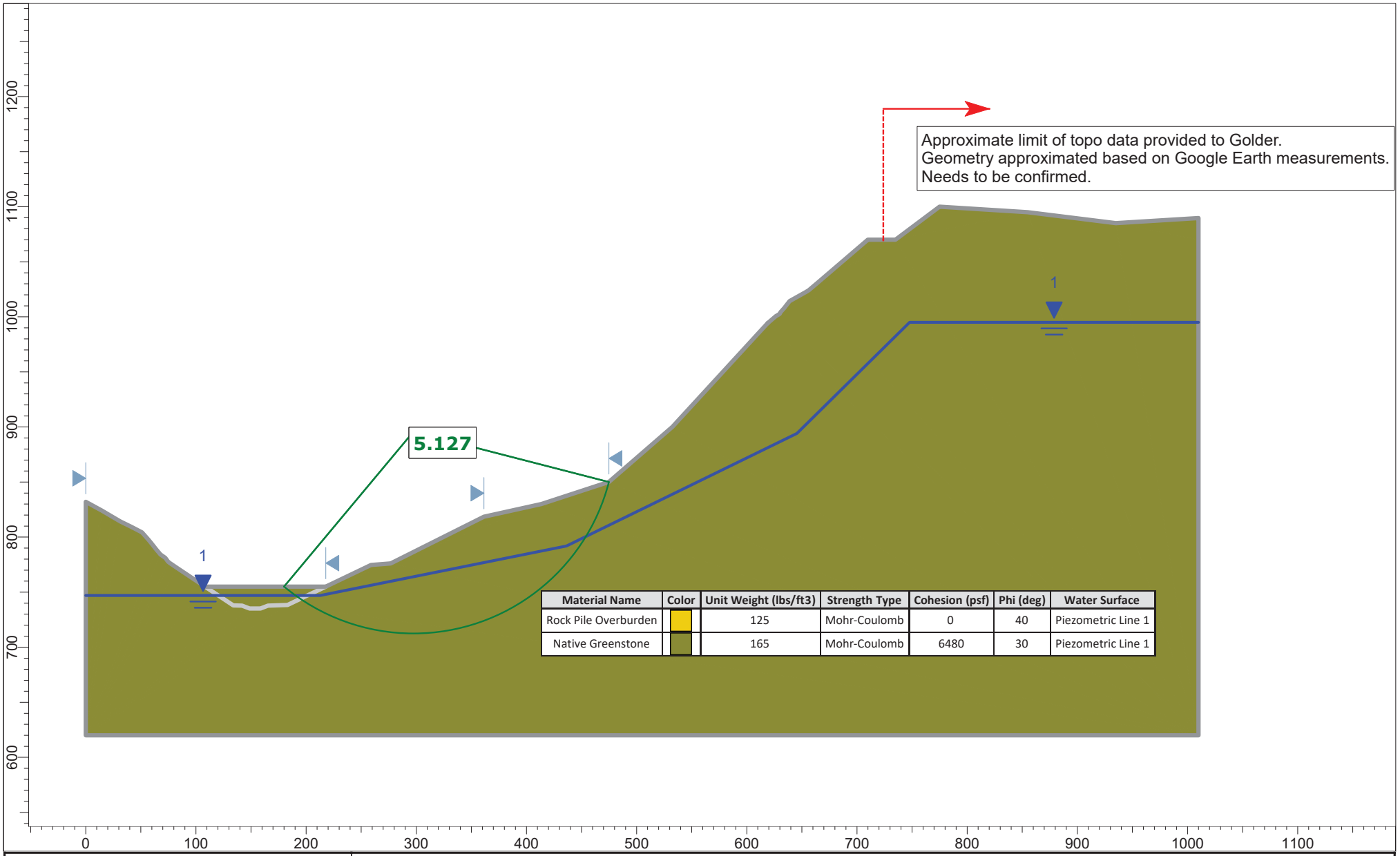


Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface
Rock Pile Overburden		125	Mohr-Coulomb	0	40	Piezometric Line 1
Native Greenstone		165	Mohr-Coulomb	6480	30	Piezometric Line 1

GOLDER

SLIDEINTERPRET 9.012

Project	SLIDE - An Interactive Slope Stability Program		
Analysis Description			
Drawn By		*Scale* 1:1444	*Company*
Date	7/9/2021, 4:25:49 PM		*File Name* Section C-C'_20210715.slmd

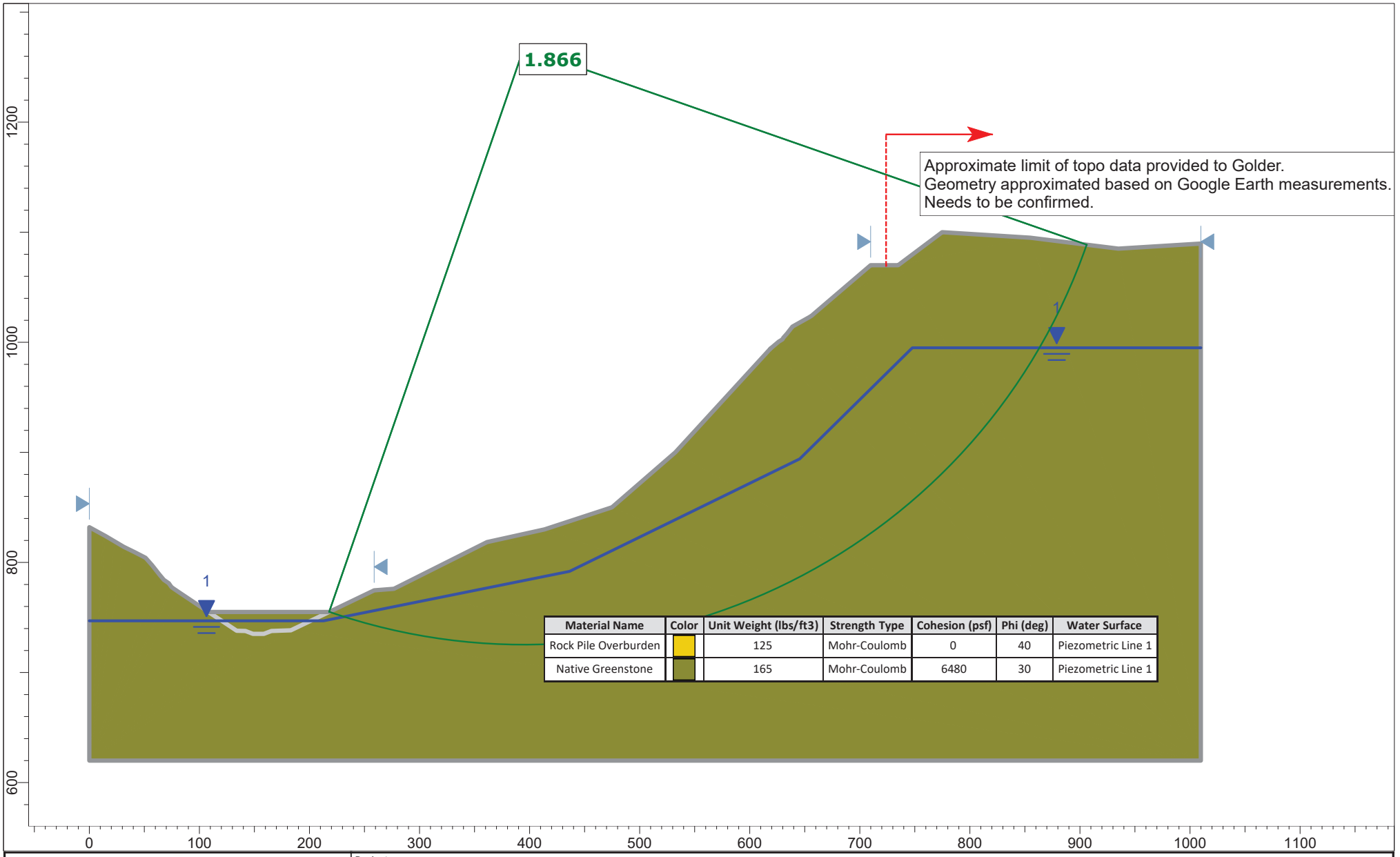


Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface
Rock Pile Overburden		125	Mohr-Coulomb	0	40	Piezometric Line 1
Native Greenstone		165	Mohr-Coulomb	6480	30	Piezometric Line 1

GOLDER

SLIDEINTERPRET 9.012

Project	SLIDE - An Interactive Slope Stability Program		
Analysis Description			
Drawn By		*Scale* 1:1444	*Company*
Date	7/9/2021, 4:25:49 PM	*File Name*	Section C-C'_20210715.slmd

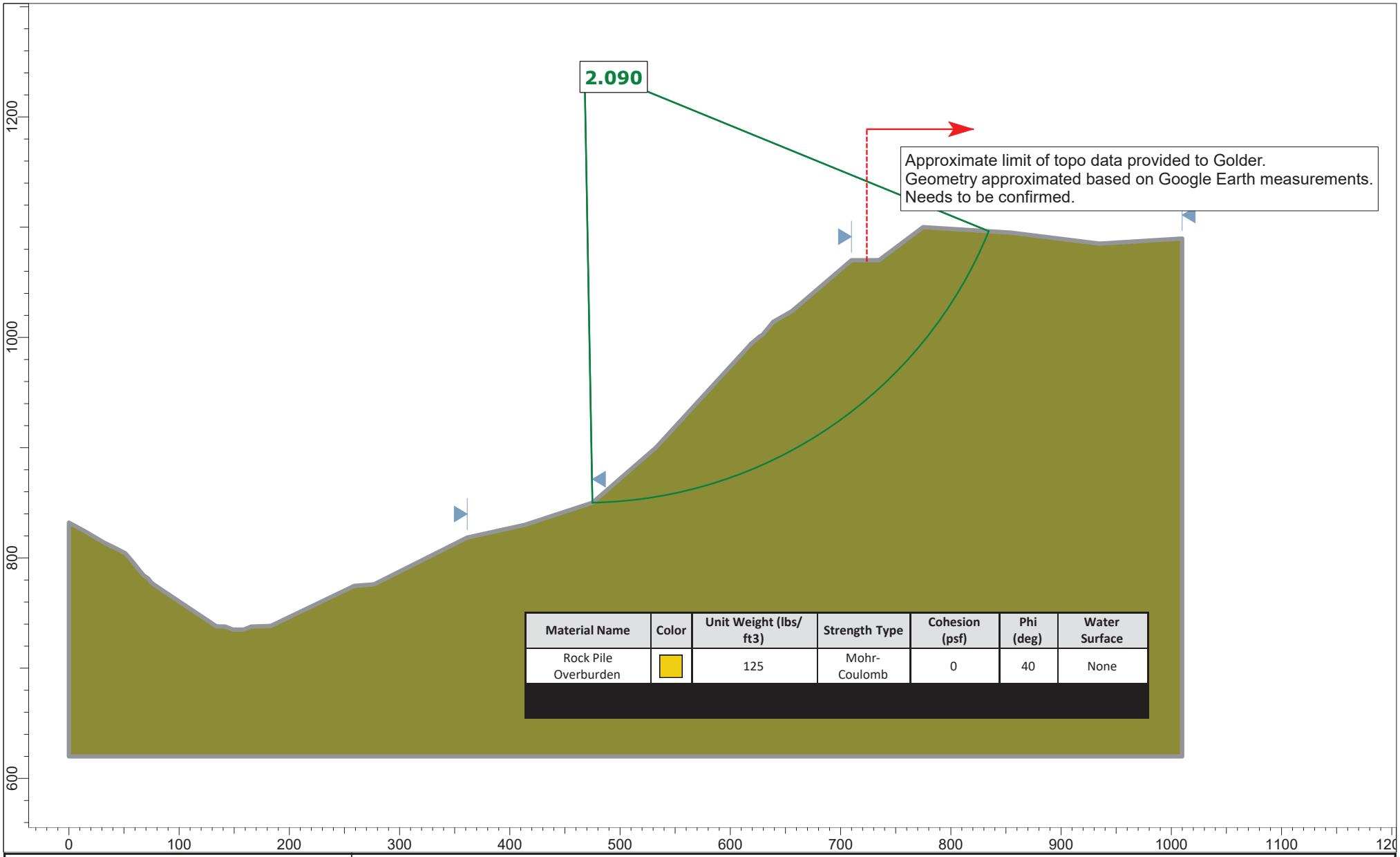


Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface
Rock Pile Overburden		125	Mohr-Coulomb	0	40	Piezometric Line 1
Native Greenstone		165	Mohr-Coulomb	6480	30	Piezometric Line 1

GOLDER

SLIDEINTERPRET 9.012

Project	SLIDE - An Interactive Slope Stability Program		
Analysis Description			
Drawn By		Scale 1:1444	Company
Date	7/9/2021, 4:25:49 PM		File Name Section C-C'_20210715.slmd

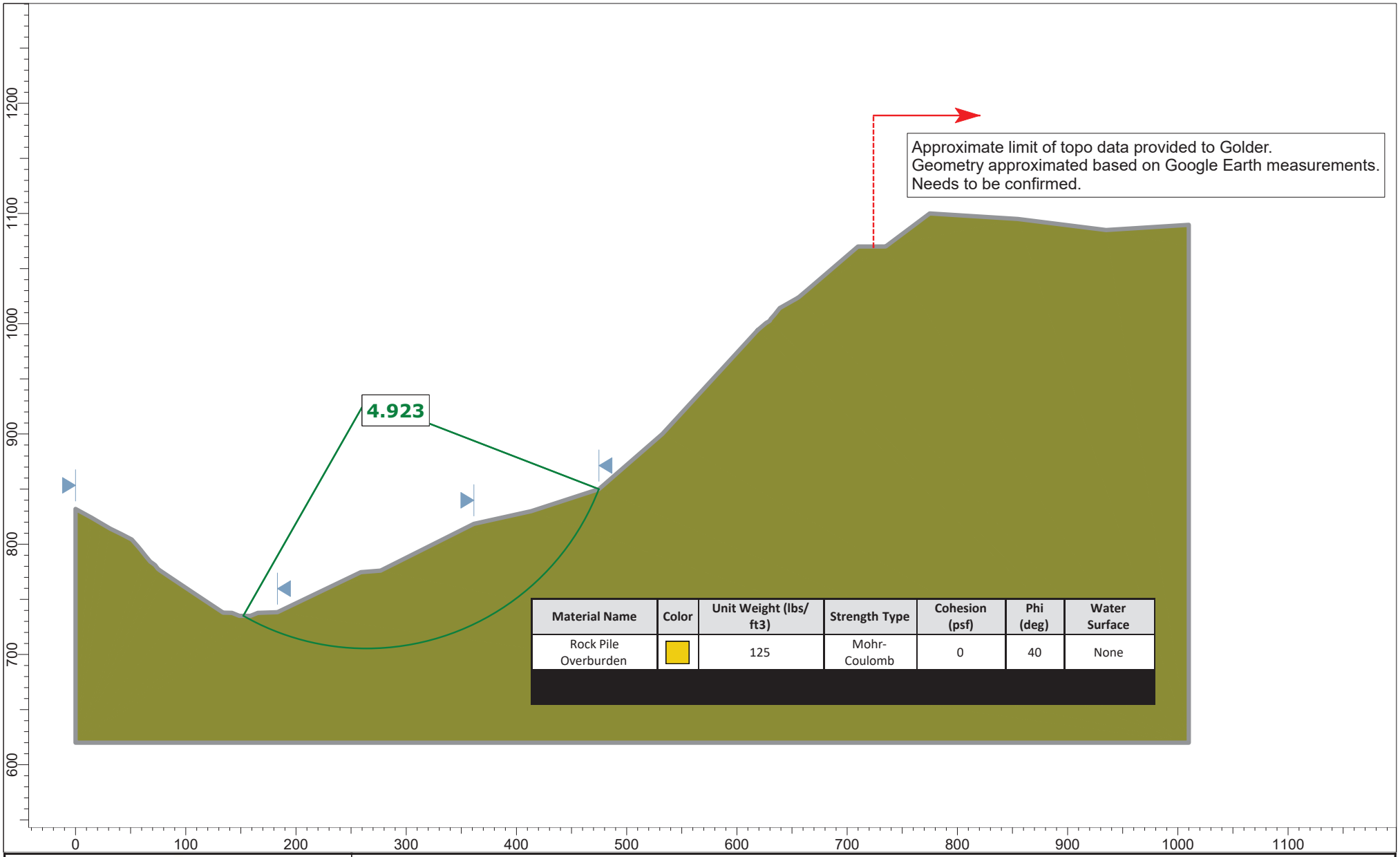


Material Name	Color	Unit Weight (lbs/ ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface
Rock Pile Overburden		125	Mohr-Coulomb	0	40	None

GOLDER

SLIDEINTERPRET 9.012

Project	SLIDE - An Interactive Slope Stability Program		
Analysis Description			
Drawn By		Scale 1:1444	Company
Date	7/9/2021, 4:25:49 PM		File Name Section C-C'_20210715.slmd

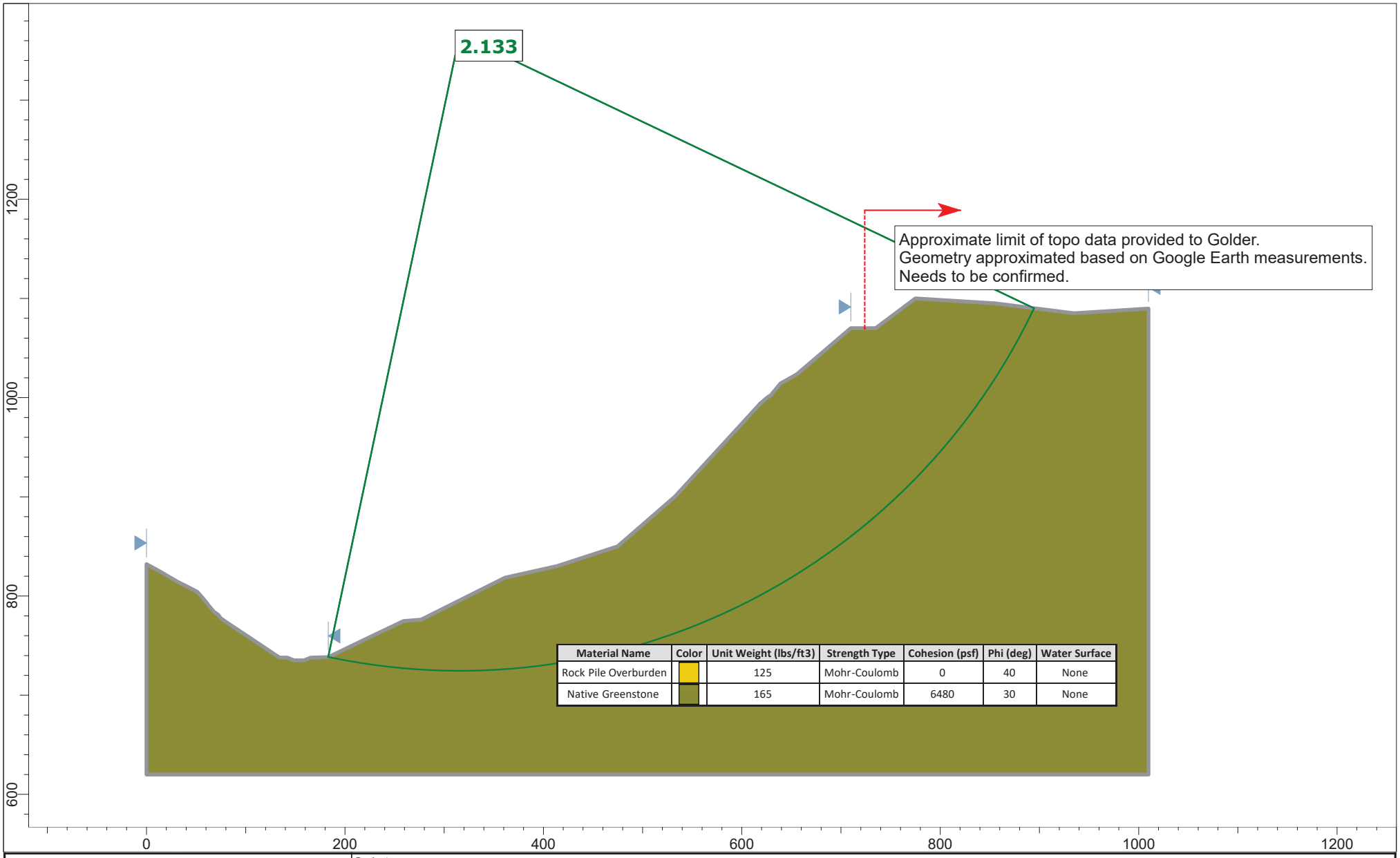


Material Name	Color	Unit Weight (lbs/ ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface
Rock Pile Overburden		125	Mohr-Coulomb	0	40	None

GOLDER

SLIDEINTERPRET 9.012

Project	SLIDE - An Interactive Slope Stability Program		
Analysis Description			
Drawn By		Scale 1:1444	Company
Date	7/9/2021, 4:25:49 PM		File Name Section C-C'_20210715.slmd

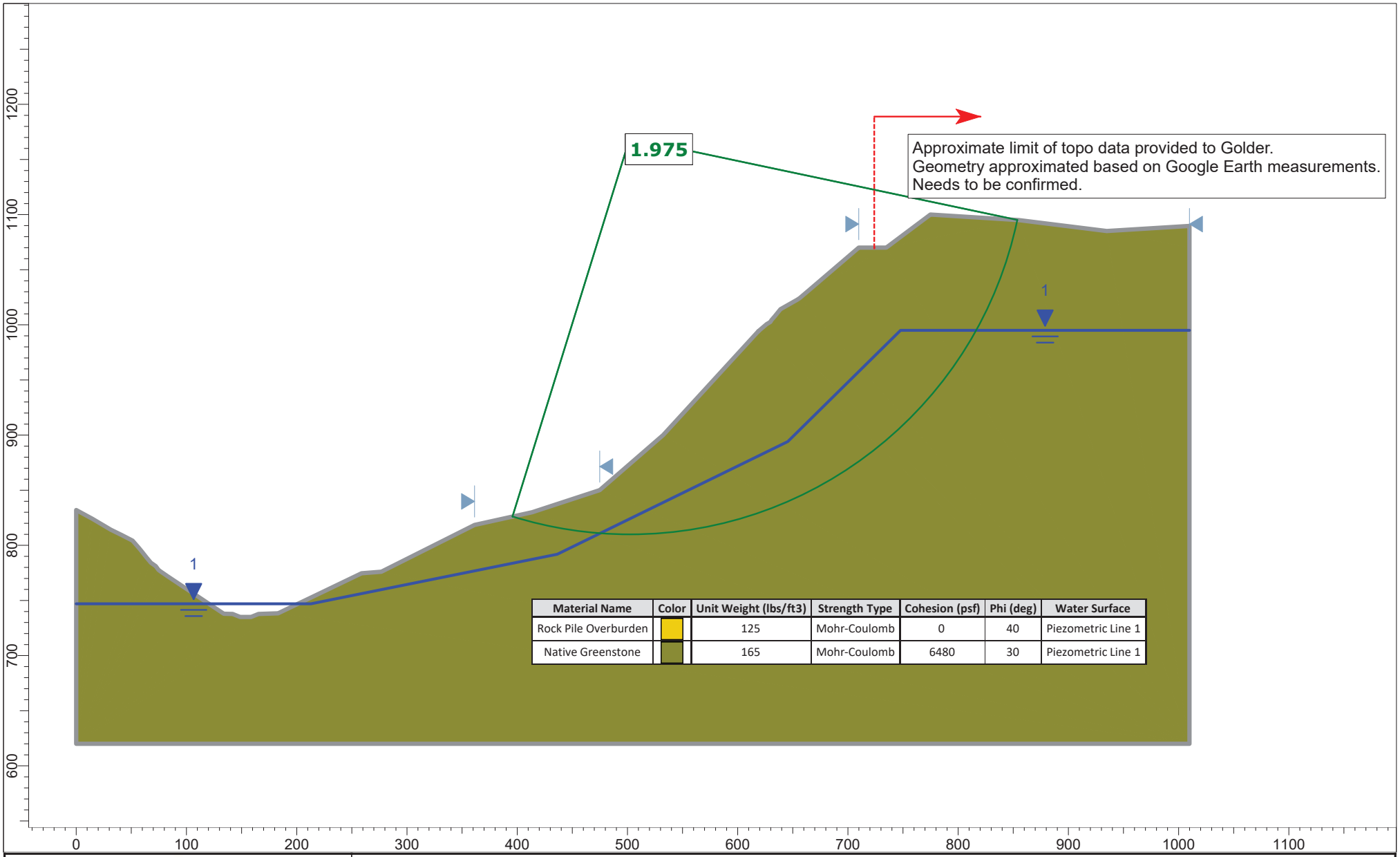


Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface
Rock Pile Overburden		125	Mohr-Coulomb	0	40	None
Native Greenstone		165	Mohr-Coulomb	6480	30	None

GOLDER

SLIDEINTERPRET 9.012

Project	SLIDE - An Interactive Slope Stability Program		
Analysis Description			
Drawn By		Scale 1:1605	Company
Date	7/9/2021, 4:25:49 PM		File Name Section C-C'_20210715.slmd

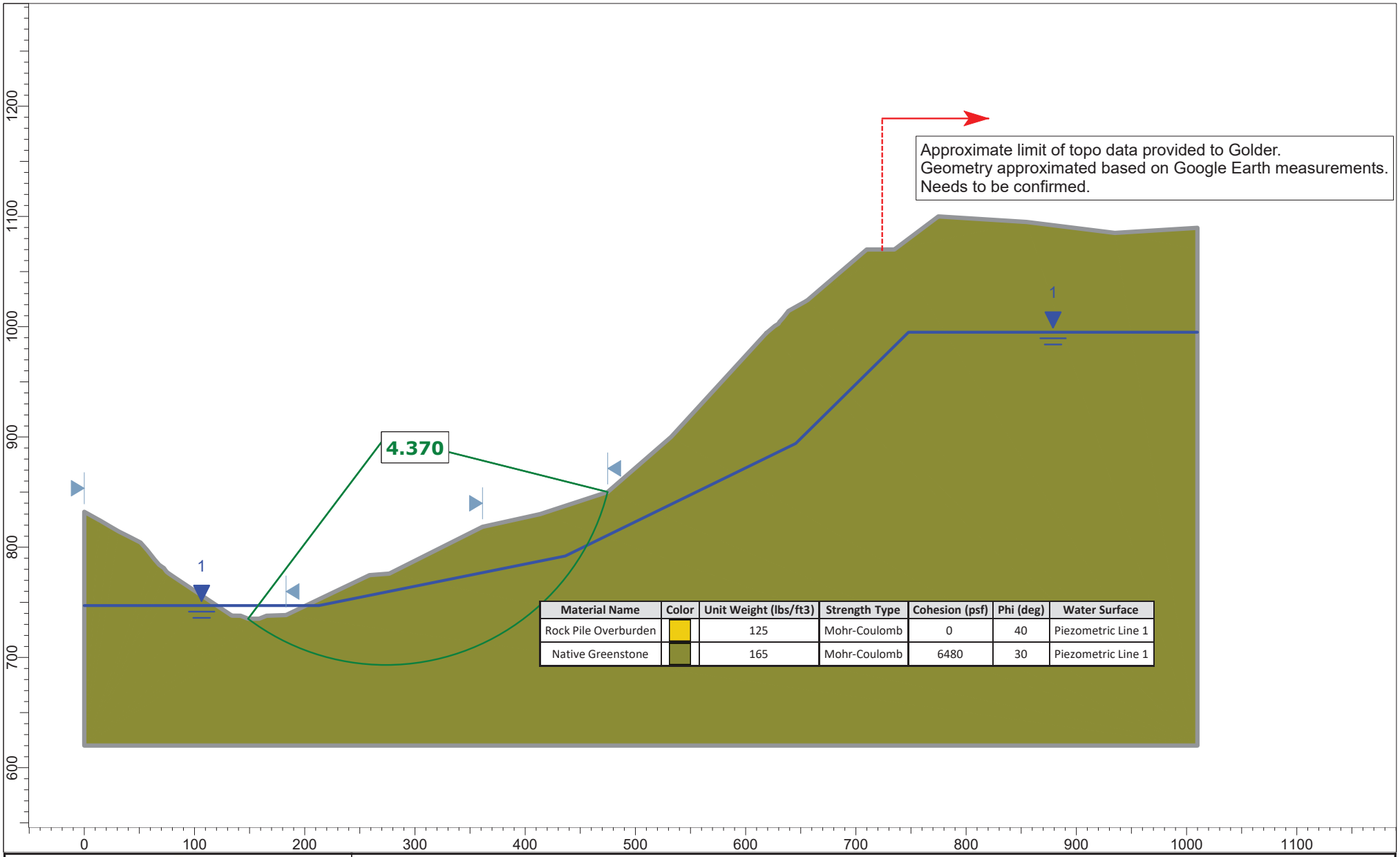


Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface
Rock Pile Overburden		125	Mohr-Coulomb	0	40	Piezometric Line 1
Native Greenstone		165	Mohr-Coulomb	6480	30	Piezometric Line 1

GOLDER

SLIDEINTERPRET 9.012

Project	SLIDE - An Interactive Slope Stability Program		
Analysis Description			
Drawn By		*Scale* 1:1444	*Company*
Date	7/9/2021, 4:25:49 PM		*File Name* Section C-C'_20210715.slmd

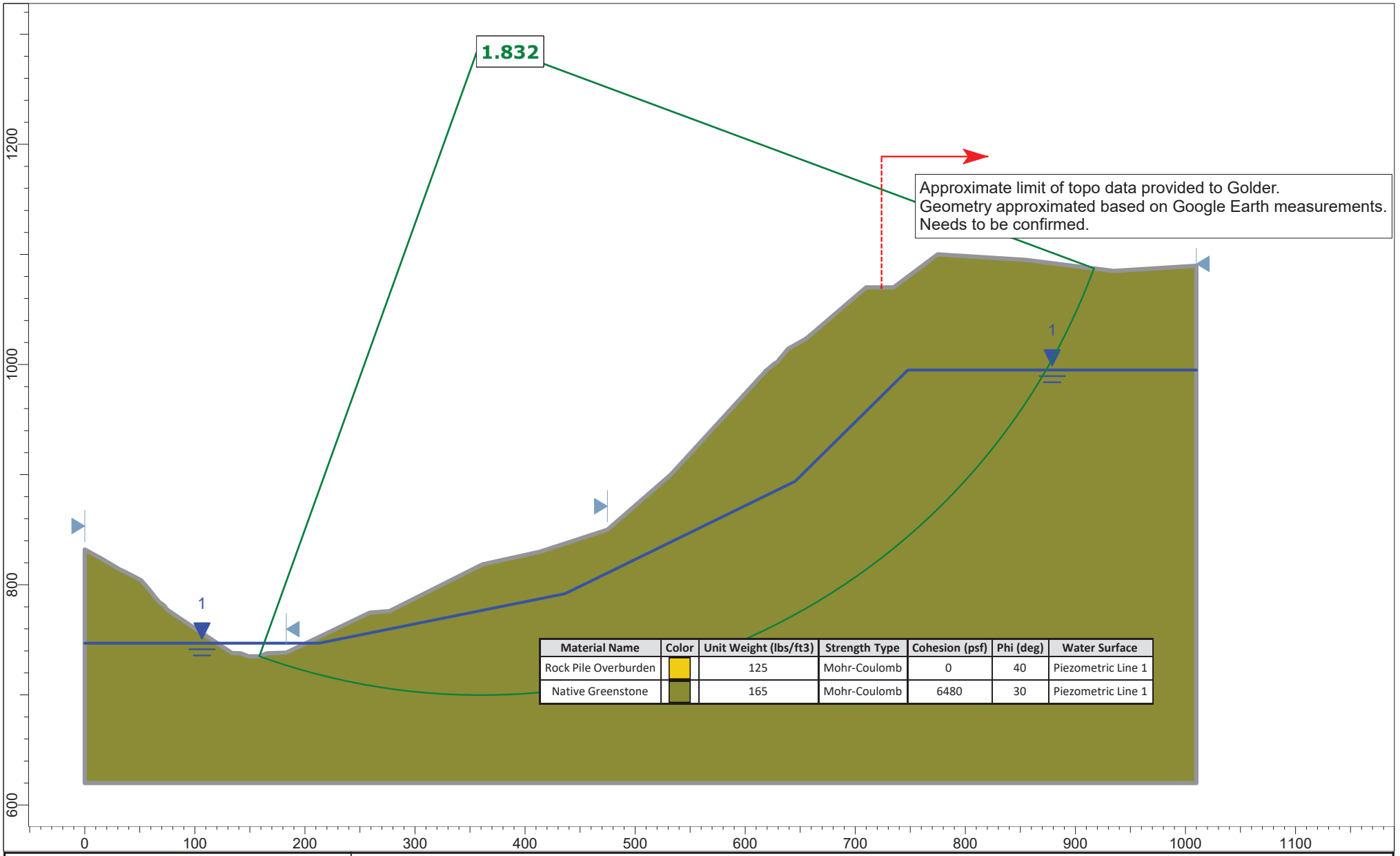


Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface
Rock Pile Overburden		125	Mohr-Coulomb	0	40	Piezometric Line 1
Native Greenstone		165	Mohr-Coulomb	6480	30	Piezometric Line 1

GOLDER

SLIDEINTERPRET 9.012

Project	SLIDE - An Interactive Slope Stability Program		
Analysis Description			
Drawn By		*Scale* 1:1444	*Company*
Date	7/9/2021, 4:25:49 PM		*File Name* Section C-C'_20210715.slmd



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface
Rock Pile Overburden		125	Mohr-Coulomb	0	40	Piezometric Line 1
Native Greenstone		165	Mohr-Coulomb	6480	30	Piezometric Line 1

GOLDER

SLIDEINTERPRET 9.012

Project	SLIDE - An Interactive Slope Stability Program		
Analysis Description			
Drawn By		*Scale* 1:1444	*Company*
Date	7/9/2021, 4:25:49 PM		*File Name* Section C-C'_20210715.slmd

Sampling, Analysis, and Management Plan for Soil and Sediment Material from Maintenance Projects

Description:
Soil and sediment material that is generated from maintenance projects conducted at the Lehigh Permanente Facility (Site) will be sampled, analyzed, and managed according to this standard operating procedure (SOP). This document is intended to provide instructions to adequately manage soil and sediment from maintenance operations by specifying screening guidelines, testing requirements, and placement to conform to applicable Federal, State and Local regulations.

Regulatory Framework:
The San Francisco Bay Regional Water Quality Control Board (Water Board) issued Waste Discharge Requirements, Order No. R2-2018-0028, (WDRs) to Lehigh for the Permanente Facility. The WDR regulates discharges to land and governs wastes and activities that generate waste at the site that have the potential to impact groundwater and hydrogeologically connected surface waters. Operations and maintenance of Waste Management Units (WMUs) at the Facility, including the Eastern Material Storage Area (EMSA) and Western Material Storage Area (WMSA), must be conducted in accordance to California Code of Regulations (CCR) 27 (Title 27), section 13263 of the California Water Code (CWC) and the approved plans required by Waste Discharge Requirement Order No. R2-2018-0028. The purpose of the procedures set forth herein is to ensure that material placement resulting from soil and sediment removal from maintenance operations is consistent with the requirements established by the WDRs.

- **Responsibility**— Environmental Department
- **Applicability**— Sampling and sediment of creek sediment originated from culvert cleanout activities
- **Affected Area**— Culverts in Permanente Creek
- **Frequency**— As needed
- **Attachments**— Attachment A – Environmental Screening Levels
- **Safety**—Basic Plant mandated PPE is required

Procedure:
Soil or sediment samples will be collected by Lehigh personnel and sent to laboratory for analysis. Samples will be analyzed for parameters listed on Table 1 and results compared against the most recent, applicable Water Board's Tier 1 Environmental Screening Levels (ESLs) for soils and groundwater as modified (Attachment A contains the 2019 ESLs for metals, the primary constituents of concern), as described below.

The documentation required includes:

1. Reports of removed material volume, date of removal, and location
2. Field data sheets and testing results
3. Temporary storage location, including survey coordinates, if needed
4. Final placement location, including survey coordinates

5. Report with December Self-Monitoring Report.

Sampling Guidelines:

Samples will be collected and analyzed in a manner sufficient to characterize the material. Sampling and laboratory analysis will be conducted in compliance with the following requirements:

1. All analysis will be performed in accordance with EPA and California approved methods
2. Analysis of samples will be completed and reported by an analytical laboratory accredited by the California State Environmental Laboratory Accreditation Program and the National Environmental Laboratory Accreditation Program;
3. The laboratory detection limits for Modified Waste Extraction Test (WET) results must be below the applicable Tier 1 ESLs for groundwater;
4. The laboratory reporting limits will be reported on a dry-weight basis; and
5. The results of the laboratory analysis will be reported in a standard laboratory data package, including a summary of the quality control and quality assurance sample results and chain of custody documentation.

Discrete soil samples will be collected unless regulatory approval is obtained for collection of composite samples for a specific project or if the project is greater than acres (Table 2). Samples will be collected with dedicated sampling equipment (e.g., plastic scoops) when possible. Any non-dedicated sampling equipment will be decontaminated between sampling locations. Field data sheets documenting sampling collection date, time, location, personnel, weather conditions, and sample identification will be completed. Each sample will be logged on a chain-of-custody record, which will accompany the samples through collection and delivery to the analytical laboratory. Table 1 includes the analytical parameters and sampling schedule.

Table 1: Laboratory Analytical Parameters

Analysis	EPA Analytical Method	Frequency
California Title 22 Metals (TTLC)	USEPA 6010B, 6020B, and/or 7471A	All
Modified WET California Title 22 Metals with DI Water	USEPA 6010B, 6020B, 1631E and/or 7471A	As necessary per TTLC results; minimum 1 out of 4 samples
VOCs	USEPA 82600/624	1 of 10 samples; minimum 1 sample per project

Sampling, Analysis, and Management Plan for Soil and Sediment Material from Maintenance Projects

Analysis	EPA Analytical Method	Frequency
SVOCs	USEPA 8270/625/SIM	1 of 10 samples; minimum 1 sample per project
PCBs and Pesticides (surface water only)	USEPA 8080/8081/608	1 of 10 samples; minimum 1 sample per project
TPH as diesel, motor oil, and gasoline	EPA 8015	1 of 10 samples; minimum 1 sample per project
Cyanide	EPA 335.4/10-204-00	1 of 10 samples; minimum 1 sample per project

All samples will be analyzed for total metals via TTLC and a subset for leachability per the modified WET procedure. The WET results will be used to determine if metal concentrations in the soil or sediment have the potential to leach to groundwater. The WET results will be compared to the modified Tier 1 ESLs for groundwater. An additional subset of samples will be analyzed for other potential constituents of concern. These parameters, as well as the TTLC metal results, will be compared to the Tier 1 ESLs for soil.

The sampling schedule varies depending on the volume of soil or sediment to be displaced as part of the maintenance project. The frequency is listed on Table 2 and is based on the California Environmental Protection Agency, Department of Toxic Substances Control (DTSC) Information Advisory Clean Imported Fill Material Fact Sheet (https://dtsc.ca.gov/information-advisory-clean-imported-fill-material-fact-sheet).

Table 2: Sampling Frequency for Evaluation of Material

Area of Individual Area	**Sampling Requirements per Area**
2 acres or less	Minimum of 4 samples
2 to 4 acres	Minimum of 1 sample every ½ acre
Greater than 10 acres	Minimum of 8 samples with 4 subsamples per location
Volume of Stockpiled Material	**Samples per Volume**
Up to 1,000 cubic yards	1 sample per 250 cubic yards
1,000 to 5,000 cubic yards	4 samples for first 1000 cubic yards +1 sample per each additional 500 cubic yards

Greater than 5,000 cubic yards	12 samples for first 5,000 cubic yards + 1 sample per each additional 1,000 cubic yards

Results Evaluation and Material Placement:

The sampling results will be tabulated and reviewed. Based on the findings, the following scenarios will be followed.

1. If the results are below applicable Tier 1 ESLs, the removed soil and sediment material may be considered for backfill or cover material on site with regulatory notification and approval.
2. If the metal concentrations do not meet the applicable Tier 1 ESLs, but are below TTLC and/or STLC thresholds, additional characterization may be completed to determine the appropriate placement based on the following:
    a. If the material is determined to be a Group B mining waste similar to the material already present in the WMUs, the material will be placed and managed within a WMU (e.g., WMSA) in accordance with the Operations, Maintenance, and Contingency (OM&C) Plan.
    b. If the material is characteristically distinct from the Group B waste present in the WMUs, contains concentrations above applicable Tier 1 ESLs, and concentrations below TTLC and/or STLC thresholds, Lehigh will consult with the Water Board regarding the management and potential on and offsite disposal of these materials.
3. While not anticipated, if the results are above TTLC and/or STLC thresholds, the WATER BOARD will be notified and additional characterization will be completed to confirm the results and aid in determining appropriate management and disposal options. Upon completion of the additional characterization, Lehigh will seek the Water Board's concurrence on the management and disposal of these materials.

Dewatering Analysis and Placement Requirements:

1. Dewatering – If dewatering is conducted, additional characterization of the material may be conducted after dewatering has been implemented and soil is no longer saturated.
2. The water from the dewatering operations will be collected and sent to the on-site water treatment system(s) via the reclaim water system.
3. The soil or sediment will be moved to a selected dewatering location if necessary. Once the material is dewatered and characterized, the material will be managed and disposed of as appropriate based on this SOP.

Sampling, Analysis, and Management Plan for Soil and Sediment Material from Maintenance Projects

Attachment A: Screening Values

Metal	CAS No.	Tier 1 ESL Soil (mg/kg)	TTLC (mg/kg)	Tier 1 ESL Groundwater (µg/L)*	STLC (µg/L)
		Total Metal		WET Results	
Antimony	7440-36-0	11	500	6.0	1500
Arsenic	7440-38-2	0.067****	50	10****	500
Barium	7440-39-3	390	10000	1000	100000
Beryllium	7440-41-7	5.0	75	2.7	75
Cadmium	7440-43-9	1.9	100	0.25	1000
Chromium	7440-47-3	160	2500	50.0	5000***
Cobalt	7440-48-4	23	8000	3.0	80000
Copper	7440-50-8	180	2500	3.1	25000
Lead	7439-92-1	32	1000	2.5	5000
Mercury	7439-97-6	13	20	0.025	200
Molybdenum	7439-98-7	6.9	3500	100	350000
Nickel	7440-02-0	86	2000	8.2	20000
Selenium	7782-49-2	2.4	100	5.0**	1000
Silver	7440-22-4	25	500	0.19	5000
Thallium	7440-28-0	0.78	700	2.0	7000
Vanadium	7440-62-2	18	2400	19	24000
Zinc	7440-66-6	340	5000	81	250000

Notes:

ESLs based on January 2019 (Rev. 1) Water Board ESL Workbook Tier 1 values for soil and groundwater unless otherwise noted.

* DI WET results to be compared to Tier 1 GW ESL.

** Freshwater Ecotox used instead of Saltwater Ecotox for the Aquatic Habitat Goal that comprises the GW Tier 1 ESL for selenium.

*** If the soluble chromium as determined by the TCLP is less than 5mg/L, and the soluble chromium as determined by the STLC test equals or exceeds 560mg/L, and the waste is not otherwise identified as a RCRA hazardous waste, then the waste is a non-RCRA hazardous waste.

**** Arsenic background levels are known to be above these screening levels.

G3. Water Quality Evaluation (Golder Associates, August 26, 2022)

TECHNICAL MEMORANDUM

DATE August 26, 2022 **Project No.** 31405507

TO Carolina Addison
Lehigh Hanson, Inc.

FROM George Wegmann, PG, CHg;
Bill Fowler, PG, CEG **EMAIL** **gwegmann@wsp.com**

WATER QUALITY EVALUATION, PERMANENTE CREEK RESTORATION PROJECT, LEHIGH SOUTHWEST CEMENT COMPANY AND HANSON PERMANENTE CEMENT, INC., PERMANENTE QUARRY, CUPERTINO, CALIFORNIA

1.0 INTRODUCTION

Golder Associates USA Inc. (Golder), a member of WSP, prepared this memorandum for Lehigh Southwest Cement Company and Hanson Permanente Cement, Inc. (Lehigh) to present the results of our assessment regarding the significance of potential water related impacts associated with specific elements of the proposed Permanente Creek Restoration Project (PCRP) adjacent to the Permanente Cement Plant and North Quarry (Permanente Site). The specific elements include:

- The type of onsite material(s) used for backfill or other restoration-related activities where those materials that may come in contact with the Permanente Creek watercourse, and recommendations related thereto;
- Expected geology of the restored creek channel that will come in contact with the Permanente Creek watercourse.

This evaluation is based on available geochemical characterization data and the conceptual site geochemical model prepared in accordance with applicable permits for the Permanente Site (*e.g.,* San Francisco Regional Water Quality Control Board (Water Board) Order No. R2-2018-002 (WDRs), and additional information or studies prepared in response to Water Code section 13267 Orders or as part of, site operations and reclamation-related activities. The scope of work for this evaluation included (1) a desktop data review of previous studies, (2) summarizing more recent rock unit characterization and creek sediment sampling, and (3) completing a site reconnaissance of the project area to evaluate the geologic conditions in conjunction with the proposed restoration design.

1.1 Background

The Permanente Site is located in Santa Clara County, California, west of the City of Cupertino. In response to a Cleanup and Abatement Order issued by the Water Board (Order No. 99-018) and as a result of a 2016 Amended Consent Decree entered into by Lehigh and the Sierra Club, Lehigh has committed to undertake the PCRP. Details regarding the scope of the PCRP are set forth in 2016 Amended Consent Decree and the 90% design documents prepared by Lehigh's consultant, Waterways, which were recently updated to incorporate regulatory agency and Santa Clara County comments to date, and submitted to the County on August 26, 2022 (90% Design drawings). The portion of Permanente Creek involved in the PCRP is located south/southeast of the Permanente Site, and the project involves, among other activities, removing material/sediment from Permanente Creek, laying back slopes, widening reaches, and ensuring stream bank stability and ecological/geomorphic function.

Golder Associates USA Inc.
425 Lakeside Drive, Sunnyvale, California, USA 94085 T: +1 408 220-9223 F: +1 408 220-9224

The headwaters of Permanente Creek are located approximately 2 miles west/southwest of the Permanente Site. Approximately 4.2 miles of Permanente Creek are adjacent or traverse through Lehigh's Permanente Site in a south/south-eastern/eastern "L" shaped direction, portions of which are included in the PCRP, including stretches of the Creek upstream of the Cement Plant that have been re-aligned into an open culverted channel or placed in underground culverts, or are subject to dam infrastructure (Pond 13). Flow in Permanente Creek continues in an eastern direction as it leaves the Permanente Site, flowing through the highly urbanized area Cities of Los Altos and Mountain View and into Mountain View Slough or Stevens Creek through the Stevens Creek Diversion Channel operated by the Santa Clara Valley Water District, which ultimately can reach the San Francisco Bay. The downstream hydrology of the Permanente Creek watershed has been substantially altered for flood protection purposes.

The Cement Plant and North Quarry at the Permanente Site have been operational since 1939 and has been a major source of cement for Santa Clara County. The facility contains two mining waste rock (also called "overburden") storage areas, the East Material Storage Area (EMSA) and West Material Storage Area (WMSA), largely comprised of soil and rocks excavated from the North Quarry, some of which may be accessed for onsite use as part of the PCRP as backfill. The North Quarry sits between the two storage areas, while the Cement Plant is located southwest of the EMSA (Attachment A, Figure 1).

1.2 Regional Geologic Setting

Most of the Site is underlain by complexly deformed and faulted rocks of the Franciscan Assemblage. The eastern portion of the Site, including portions of the Cement Plant and the EMSA, are underlain by Plio-Pleistocene rocks of the Santa Clara Formation, which in turn overlie the Franciscan bedrock. Overlying the bedrock are modern alluvial deposits associated with Permanente Creek, and relatively shallow surficial deposits comprised of soil and colluvium. The Miocene-age Monterey Formation lies just east of the Site in fault contact with the Franciscan basement rocks along the Monte Vista Fault System.

1.2.1 Bedrock Geologic Units

The bedrock materials exposed in the North Quarry are part of the Permanente Terrane of the Franciscan Assemblage. The Franciscan Assemblage is comprised of highly deformed and variably metamorphosed, marine sedimentary rocks with submarine basalt (greenstone) and limestone and, to a lesser extent, graywacke. The Franciscan is considered a tectonic mélange that was formed in the subduction zone between the Pacific tectonic plate and the North American plate. This plate boundary is now a transform, strike-slip plate boundary defined by the San Andreas Fault zone located about two miles southwest of the North Quarry. The Franciscan Complex contains complexly deformed marine sedimentary rocks and basalt, which were metamorphosed and altered during subduction and subsequent thrust faulting. The Santa Clara Formation, a late Tertiary-Pleistocene assemblage of conglomerate, sandstone, siltstone, and claystone sits unconformably on the Franciscan Complex in the eastern portion of the site. Surficial deposits of unconsolidated alluvial deposits, fill material, colluvium, landslide deposits, and surface soils overlie the bedrock units.

The geology of the Permanente Creek Basin is shown on Figure 2 (Attachment A) based on our site reconnaissance and two main geologic map sources: Cupertino and Mindego Hills quadrangles (Dibblee and Minch 2007a and b); and the San Francisco Bay Landslide Mapping Team (USGS 1997). Previous researchers have also mapped the basin (Brabb 1970, Pulver 1979a and b).

1.2.2 Surficial Geologic Units

Some of the south-facing slopes that flank Permanente Creek are mantled with varying thicknesses of overburden, which is a heterogeneous mixture of fines, sand, gravel and cobble-sized fragments (*i.e.,* greenstone, graywacke, and soil materials) but with small percentages of limestone. This same overburden

comprises most of the WMSA and EMSA. Regarding the south-facing slopes, they are generally described as side-cast fills that mantle existing canyon slopes and fill small drainages and swales that formerly reported to Permanente Creek. The overburden deposits are of highly variable thickness and exist adjacent to the Rock Pile Area[1] (see 90% Design drawings at Sheet C19) and Material Removal Area (see 90% Design drawings at Sheets C23 & C24); this material will be removed and relocated as part of the PCRP.

Modern unconsolidated alluvial deposits are present along the active stream channel of Permanente Creek. These deposits are comprised of a poorly sorted mixture of cobbles, gravels, sand, silt and clay. Deposits range from a few inches thick in the upper reaches of the watershed where erosion has cut the channel down into bedrock over thousands of years, to tens of feet thick where the channel widens and deepens as it approaches the flatter terrain of the Santa Clara Valley.

Colluvial and slope wash deposits are common throughout the steep terrain of the Santa Cruz Mountains. In general, the natural slopes in the region are overlain with approximately one to two feet of soil and colluvial materials, which thicken to several feet or more in the larger natural swales in the region. Colluvium is generally described as predominantly clayey sand with gravel to clayey gravel, with some gravelly clay. The alluvial and colluvial deposits contain a mixture of fines, sand, gravel and cobble-sized fragments (*i.e.*, greenstone, graywacke, and soil materials) but with small percentages of limestone.

1.2.3 Creek Bed Geology Summary

Most of the PCRP area is underlain by complexly deformed and faulted rocks of the Franciscan Assemblage as depicted on Figure 2 (Attachment A). The eastern portion of the project area, including portions by the Cement Plant and the EMSA, are underlain by Plio-Pleistocene rocks of the Santa Clara Formation. Overlying the bedrock are modern alluvial deposits associated with Permanente Creek (restricted to the eastern portion of the property), and relatively shallow surficial deposits comprised of soil and colluvium.

Figure 3 (Attachment A) depicts the profile of Permanente Creek, which can broadly be classified into depositional reaches and bedrock reaches (delineated as Reach A, Reach B, etc.). The processes that define these reaches are the rate that sediment is supplied to the channel and the rate at which the channel can convey the supplied sediment. The rate of sediment supply is controlled by hillslope processes and the rate that sediment is delivered to the channel. The rate of sediment transport is controlled by the channel geometry and the hydraulic characteristics of the reach.

The furthest upstream portion of Permanente Creek, upstream of the PCRP area, is characterized by alluvium in the form of travertine reinforced step pool morphology that partially covers a bedrock channel that is comprised of greenstone and limestone. The sediment supplied here is likely to come from natural processes and is partially supplied from an alluvial fan originating from Wild Violet Creek. Carbonate-rich water percolates from the south bank of the channel in this reach, indicating that the source of the carbonate-rich spring is likely within the Wild Violet drainage. Geologic maps (Dibblee and Minch) indicate that the limestone unit of the Franciscan complex outcrops within the Wild Violet drainage. The debris from this alluvial fan is being transported downstream and has deposited small terraces along both valley walls. These terraces are possibly abandoned by the modern hydraulic regime of the Creek and may be coupled to the debris flows originating from Wild Violet Creek.

Travertine is a form of limestone precipitate that forms when calcium carbonate-rich water undergoes changes that cause the mineral to transition from solution to a solid state. This transition is largely controlled by physical

[1] The Rock Pile area is comprised of stockpiled material for aggregate production, which is ongoing. The character of the Rock Pile is variable but generally consists of fine to coarse-grained gravel to angular cobble-sized rock fragments of limestone.

processes, such as changes in pressure, temperature, or pH, but it can be influenced by biological processes and hydraulic variability as well (Fuller, et al. 2010). Golder observed two types of travertine formation in Permanente Creek. One in which stalactites grew out of the southern stream bank downstream of the confluence with Wild Violet Creek, and the other along large portions of the channel where naturally formed step-pools were reinforced by travertine deposition to form travertine dams (Attachment A, Figure 3). These dams display a history of repeated formation and breaching, as evidenced by the clasts of travertine conglomerate from older dams being incorporated into modern dams, as well as the relict abutments of older travertine dams remaining on the channel margins. This natural process has been taking place throughout geologic time along Permanente Creek.

The primary geologic units within the PCRP area are mainly greenstone (including shear zones) and the Santa Clara Formation. Greenstone bedrock is present at Reaches 10-17 and 20-22 and Santa Clara Formation bedrock along reaches 1-9 (Attachment A, Figure 3). Limestone bedrock is present along Reaches 18 and 19, including south of the creek, and comprises less than 15% of the bedrock present along the PCRP area. Importantly, with regard to the material removal activities planned to occur in Reach 18, the bedrock surface within the creek channel has been unaltered by historical site activities (*i.e.,* no mining activities have occurred in the creek), and the PCRP activities will follow the contours of natural bedrock, and will not alter or change the bedrock surface or its profile as part of restoration construction activities (see 90% Design drawings at Sheet C23). The focus of the Project along the limestone bedrock reaches will be to remove loose material mantled on top of the bedrock.

2.0 DATA SUMMARY

2.1 Material Characterization

Historical mining activities have contributed surficial materials to Permanente Creek in addition to deposition from naturally occurring geologic and geomorphic processes. As part of site operations, regulatory efforts, and reclamation-related activities, a geochemical dataset has been compiled since 2008 to characterize the predominate Permanente Quarry rock types. The data includes work completed as part of the development of National Pollutant Discharge Elimination System (NPDES) permitting[2] and WDRs[3,4] as follows: (1) analysis on acid rock drainage (ARD) potential by acid base accounting (ABA) testing methods, (2) chemical and mineralogical composition by quantitative X-Ray Diffraction (XRD) and, (3) Total Threshold Limit Concentration (TTLC) and leaching potential via the California modified waste extraction test (WET) with deionized water and wall washing samples. The results have been previously summarized in several reports, including the Permanente Site's Conceptual Site Model (CSM) Update prepared in accordance with the WDRs,[5] and are discussed below along with supplemental information.

Golder previously completed sampling and testing of the following major units: limestone, greenstone, graywacke, Santa Clara Formation, and undisturbed soil/colluvium as summarized in the CSM Update.[6] In summary:

---

[2] NPDES No. CA0030210, Regional Water Board Order No. R2-2019-0024, previously Order No. R2-2014-0010, as amended by Order No. R2-2017-0030.

3 SLR, 2014, EMSA and WMSA Material Characterization, Permanente Quarry, Santa Clara, California.

4 Golder Associates, August 2014, WMSA and EMSA Runoff and Seep Investigation Report, Lehigh Southwest Cement Company and Quarry, 24001 Stevens Creek Boulevard, Cupertino, CA

5 Golder Associates, 2020, CSM Update and Proposed SMP, Lehigh Southwest Cement Company and Quarry, 24001 Stevens Creek Boulevard, Cupertino, CA. June 2020.

[6] Golder Associates, 2020 CSM Update and SMP, Lehigh Permanente. December 2020.

- No acid rock drainage potential was identified in the tested samples as would be expected based on the carbonate nature of the rock.
- The leachate testing indicates that greenstone and graywacke are not a significant source of metals.
- Greenstone samples reported higher leachate nickel concentrations as compared to limestone; however, the concentrations are below the San Francisco Bay Regional Water Quality Control Board Environmental Screening Levels (ESLs) based on the California primary maximum contaminant for Freshwater Aquatic levels.
- Molybdenum and selenium leachate concentrations were generally greater in limestone samples compared to the other samples from greenstone and graywacke. Selenium leachate from the limestone has been detected above the Freshwater Aquatic ESL of 5 µg/L consistent with limestone wall washing results.[7]
- The selenium data supports the premise that the oxidation of sulfides in the limestone is the primary mechanism of generating leachable selenium.[8,9]

2.1.1 Sequential Leach Testing via Modified WET Method

In 2020, rock samples were analyzed using the modified WET method and were then subjected to four additional cycles of sequential leaching repeating the same method for a total of five leaching cycles to aid in evaluating long-term leachability. Limestone and greenstone, the predominate rock units, were selected for this analysis. The test results were compared to STLC thresholds and ESLs. Full tabulated leaching results are included as Table 1, Attachment B and time-series plots of the sequential leachate concentrations of the different materials is included as Attachment C. The results of the sequential leach testing are summarized as follows:

Limestone Samples

- STLC limits were not exceeded for any of the samples.
- Limestone leachate concentrations decreased over the leaching sequence for the following constituents: sulfate, chloride, total alkalinity, bicarbonate, antimony, calcium, magnesium, molybdenum, selenium, and vanadium.
- Limestone leachate concentrations were stable or at detection limits over the leaching sequence for the following constituents: carbonate, hydroxide, arsenic, beryllium, cadmium, chromium, cobalt, copper, iron, lead, manganese, mercury, potassium, silver, sodium, thallium, and zinc.
- Sulfate, calcium, and magnesium concentrations were elevated in leachates from the medium-grade non-weathered limestone sample during leaches 1-3 compared to the other limestone samples.
- Barium leachate concentrations gradually increased for all limestone samples over the leaching period.

Greenstone Samples

- STLC limits were not exceeded for any of the samples.
- Greenstone leachate concentrations decreased over the leaching sequence for the following constituents: total alkalinity, bicarbonate, antimony, magnesium, potassium, selenium, and sodium.

---

[7] Golder Associates, 2011 Hydrogeologic Investigation, Lehigh Permanente. 2011.

8 Diener, A., Neuman, T., Kramar, U., Schild, D. 2012. Structure of Selenium Incorporated in Pyrite and Machinawite as Determined by XAFS Analysis. Journal of Contaminant Hydrology: 133 (30-39).

9 Presser, T. S. 1994. Geologic Origin and Pathways of Selenium from the California Coast Ranges to the West-Central San Joaquin Valley. Selenium in the Environment.

- Greenstone leachate concentrations were stable or at detection limits over the leaching sequence for the following constituents: chloride, sulfate, carbonate, hydroxide, arsenic, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, iron, lead, manganese, mercury, molybdenum, nickel, silver, thallium, vanadium, and zinc.
- Total alkalinity, bicarbonate, arsenic, barium, magnesium, potassium, and sodium concentrations were higher in the non-weathered greenstone sample leachate compared to the weathered greenstone sample.
- The vanadium concentration was higher in the weathered greenstone leachate compared to the non-weathered greenstone sample across all leaching cycles.
- Aluminum concentrations in the weathered greenstone sample leachate increased between leaches 1-4 and plateaued after leach 4.

Overall, concentrations generally decrease with each leaching cycle, indicating that readily leachable parameters are depleted within a few flushing cycles and that the short-term metal leaching potential for the materials is low, and below regulatory thresholds. Furthermore, the greenstone samples exhibited less leachable concentrations than the limestone samples.

2.1.2 Material Characterization Summary

The leachate results indicate that greenstone and graywacke are not a significant source of metals to water. Limestone material is a potential source of selenium, though the potential is lesser in combined quantities and in a dynamic environment of a moving stream/creek. Specific observations include:

- Greenstone samples reported higher leachate nickel concentrations compared to limestone; however, the concentrations are below ESLs.
- Molybdenum and selenium leachate concentrations were predominantly greater in limestone samples as compared to the samples from greenstone and graywacke.
- Selenium leachate from the limestone was detected several times slightly above the Freshwater Aquatic ESL of 5 µg/L. The generation of leachable selenium decreases with subsequent leach tests.

The data supports the premise that the oxidation of sulfides in the limestone is the primary mechanism of generating leachable selenium—the primary constituent of concern. Following sulfide oxidation, water flow and/or infiltration is the primary transport mechanism for selenium transport. Greenstone and graywacke do not generate leachable materials at levels that would negatively affect groundwater or surface waters. Sampling and geochemical analysis of the greenstone and graywacke indicates a low potential to leach selenium and other metals at levels above surface or ground water quality standards, and that it is suitable to be used as fill material consistent with Water Board/WDR standards.

2.2 Background Water Samples and Bedrock Influence on Creek Water Quality

Water quality from the upstream headwaters has been monitored as part of the National Pollutant Discharge Elimination System (NPDES) permit sampling program. The upstream surface water results for selenium are consistently less than 1 ug/L. As noted in Section 1.2, bedrock limestone and associated travertine deposits are present in these areas. The results further support the premise that selenium production from oxidized limestone already present in the creek channel is finite. For this reason, we expect that the PCRP as designed, which proposes to remove material and follow the existing bedrock contours for the restored creek channel grade and elevation, will not contribute to increased in-stream concentrations of constituents of concern.

3.0 DISCUSSION AND RECOMMENDATIONS

For areas of the project where fill material is needed, it is recommended that onsite material comprised predominantly of greenstone or graywacke be used where needed for backfill, as both exhibit a low metals leaching potential under natural site conditions. Furthermore, greenstone is the prevalent native material at the Site and already encompasses the majority of the Permanente Creek basin. Based on the available data, we do not expect detrimental water quality impacts from the creek restoration activities (causing exceedance of applicable water quality standards) provided on-site materials adhere to the recommendations herein.

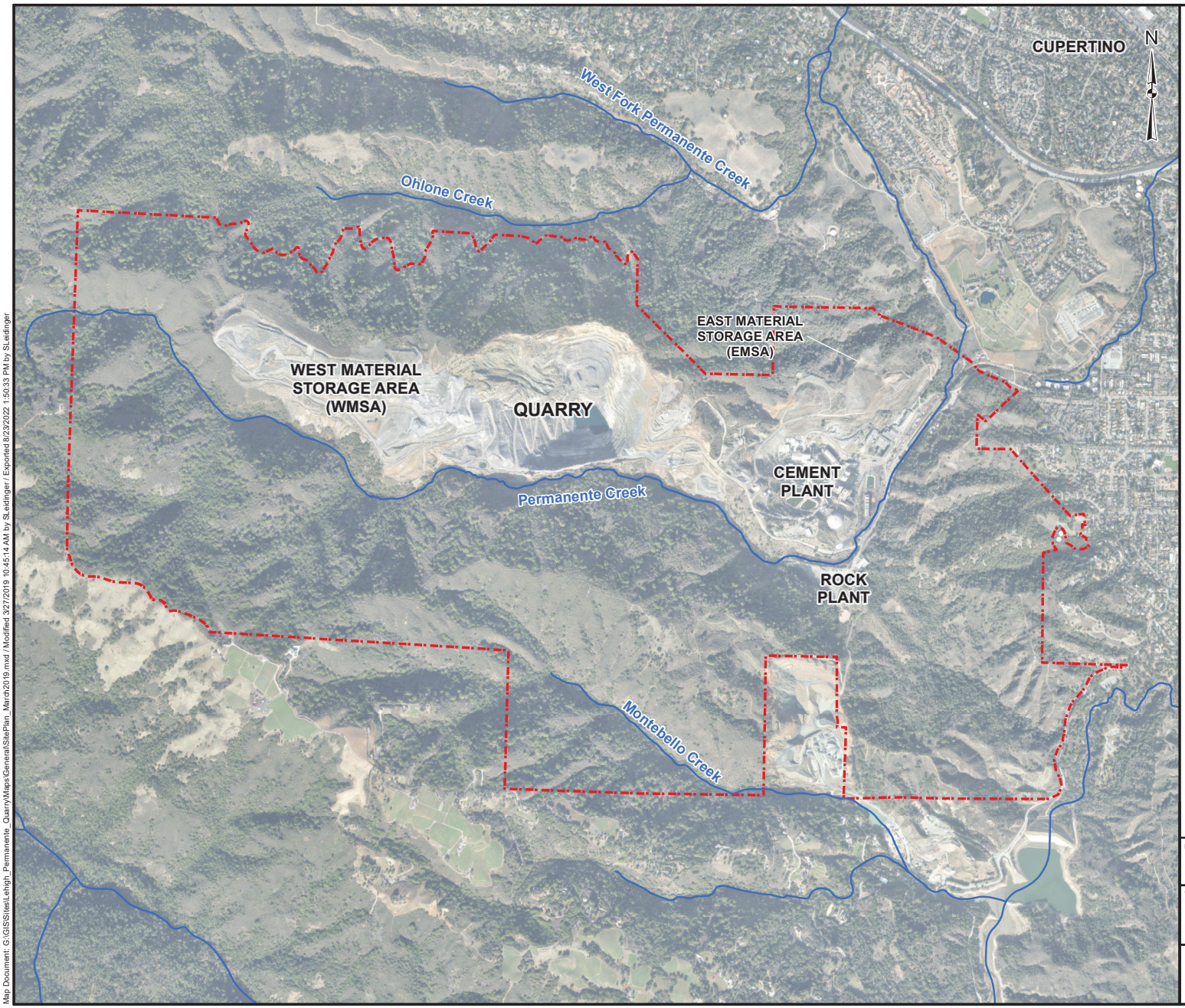
Further, the predominant areas where limestone is to naturally remain, e.g., Reach 18, will consist of non-disturbed bedrock, which, as demonstrated by upstream conditions, is not expected to contribute metals to the water column. Therefore, significant changes in the natural system will not occur and new source material will not be exposed to potentially undergo oxidation and mobilization of selenium based on the limestone bedrock present. As noted in Section 2.3, the water quality upstream of the PCRP is not impaired even though limestone bedrock and travertine deposits are present. As the bedrock surface in Reach 18 is inferred to have been exposed and undisturbed for a similar timeframe as the reaches upstream of the PCRP, impairment to water quality is not expected from the limestone bedrock section. Furthermore, as noted above, the production rate of leachable selenium from limestone decreases as the mobile fraction of selenium is depleted from the system. This process will be further expedited by removing potential sources (e.g., limestone material) via the PCRP, and the PCRP is not expected to interfere with those gains.

Attachments A: Figures 1-3
B: Data Summary Table 1
C: Time-Series Graphs

PCRP_Golder_creek_memo_fnl

ATTACHMENT A

Figures 1-3



LEGEND

- Stream
- Property Boundary

NOTES

1) Locations based on conversion from local coordinates or Google Earth placement.

REFERENCES

1)Service Layer Credits: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community
2)Coordinate System: NAD 1983 StatePlane California III FIPS 0403 Feet
3)

1,200 0 1,200
Feet

PROJECT

PERMANENTE QUARRY
SANTA CLARA COUNTY, CALIFORNIA

TITLE

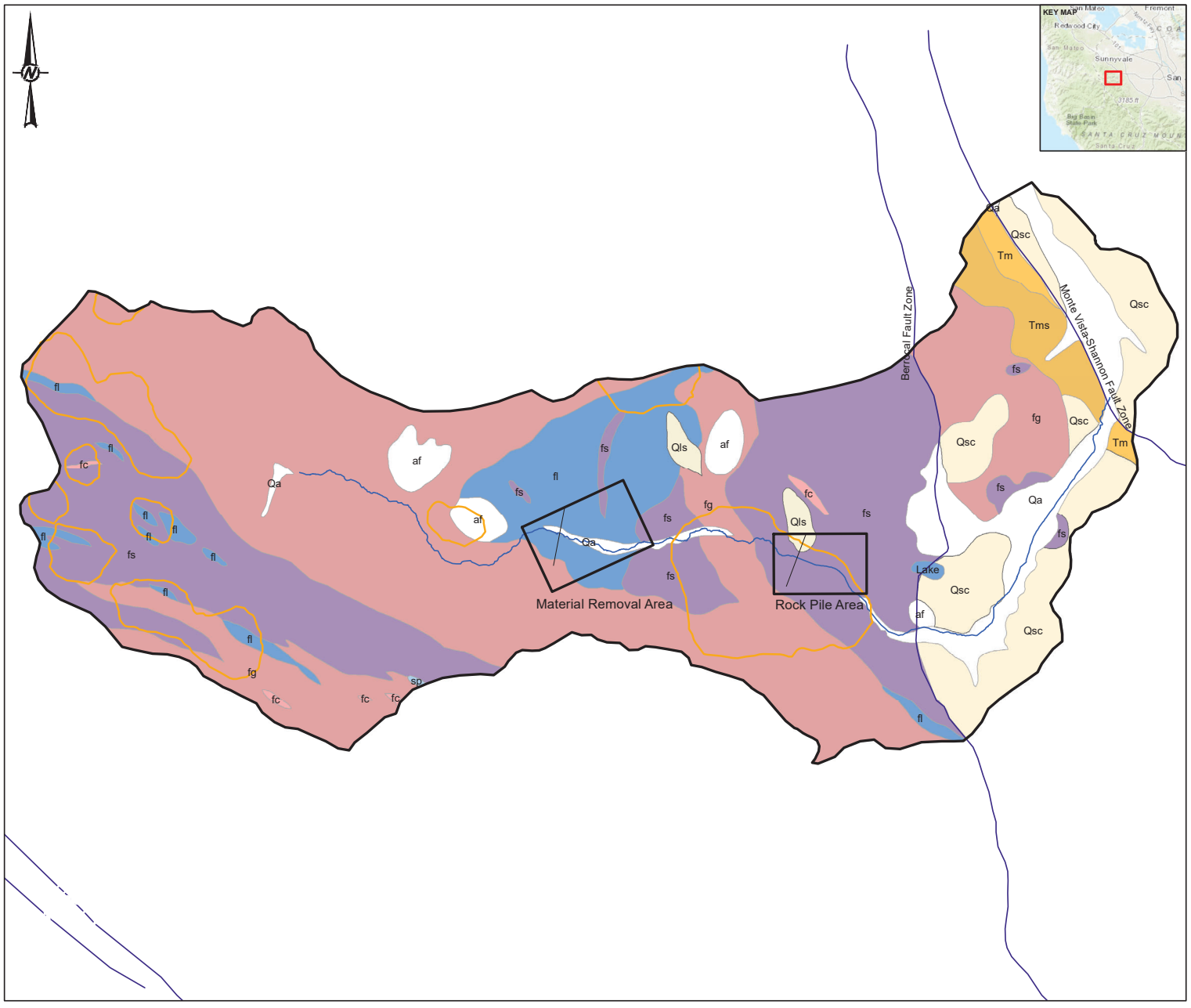
SITE OVERVIEW

GOLDER

PROJECT No.		063-7109	FILE No.	SitePlan_March2019.mxd
DESIGN	SHL	10/31/2013	SCALE: AS SHOWN	REV. 0
GIS	SHL	3/27/2019		
CHECK	GW	3/27/2019		
REVIEW	GW	3/27/2019		

FIGURE 1

Map Document: G:\GIS\Sites\Lehigh_Permanente_Quarry\Maps\General\SitePlan_March2019.mxd / Modified 3/27/2019 10:45:14 AM by SLeidinger / Exported 8/23/2022 1:50:33 PM by SLeidinger



LEGEND

- Areas of Interest
- Cross Sections
- Permanente Creek
- PermCrkBasin_V2
- Faults

Geologic Units

UnitNam

- Lake
- af
- Qa
- Qls
- Qsc
- Tm
- Tms
- sp
- fg
- fs
- fc
- fl

0 2,000 4,000

1 IN = 1,667 FT FEET

NOTE(S)

REFERENCE(S)

1. USGS (LANDSLIDES, 1997; FAULTS, 2000, 2002)
2. CALIFORNIA DIVISION OF MINES AND GEOLOGY (EARTHQUAKES, 1982)
3. WATERWAYS CONSULTING, INC. (PERMANENTE CREEK, 2018)
4. CALIFORNIA DEPARTMENT OF FORESTRY (GEOLOGY AND LANDSLIDES, 1979)
5. COORDINATE SYSTEM: NAD 1983 STATE PLANE CALIFORNIA III (FT)
6. SERVICE LAYER CREDITS: SOURCES: ESRI, HERE, GARMIN, INTERMAP, INCREMENT P CORP., GEBCO, USGS, FAO, NPS, NRCAN, GEOBASE, IGN, KADASTER NL, ORDNANCE SURVEY, ESRI JAPAN, METI, ESRI CHINA (HONG KONG), SWISSTOPO, © OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY

CLIENT
PERMANENTE QUARRY
SANTA CLARA COUNTY, CALIFORNIA

PROJECT

TITLE
GEOLOGIC MAP OF PERMANENTE CREEK BASIN

CONSULTANT
WSP GOLDER

YYYY-MM-DD	2019-10-02
DESIGNED	RPH/BVJ
PREPARED	RPH/BVJ
REVIEWED	BF/CJ/RPH
APPROVED	BF

PROJECT NO.	PHASE	REV.	FIGURE
		0	2

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI B

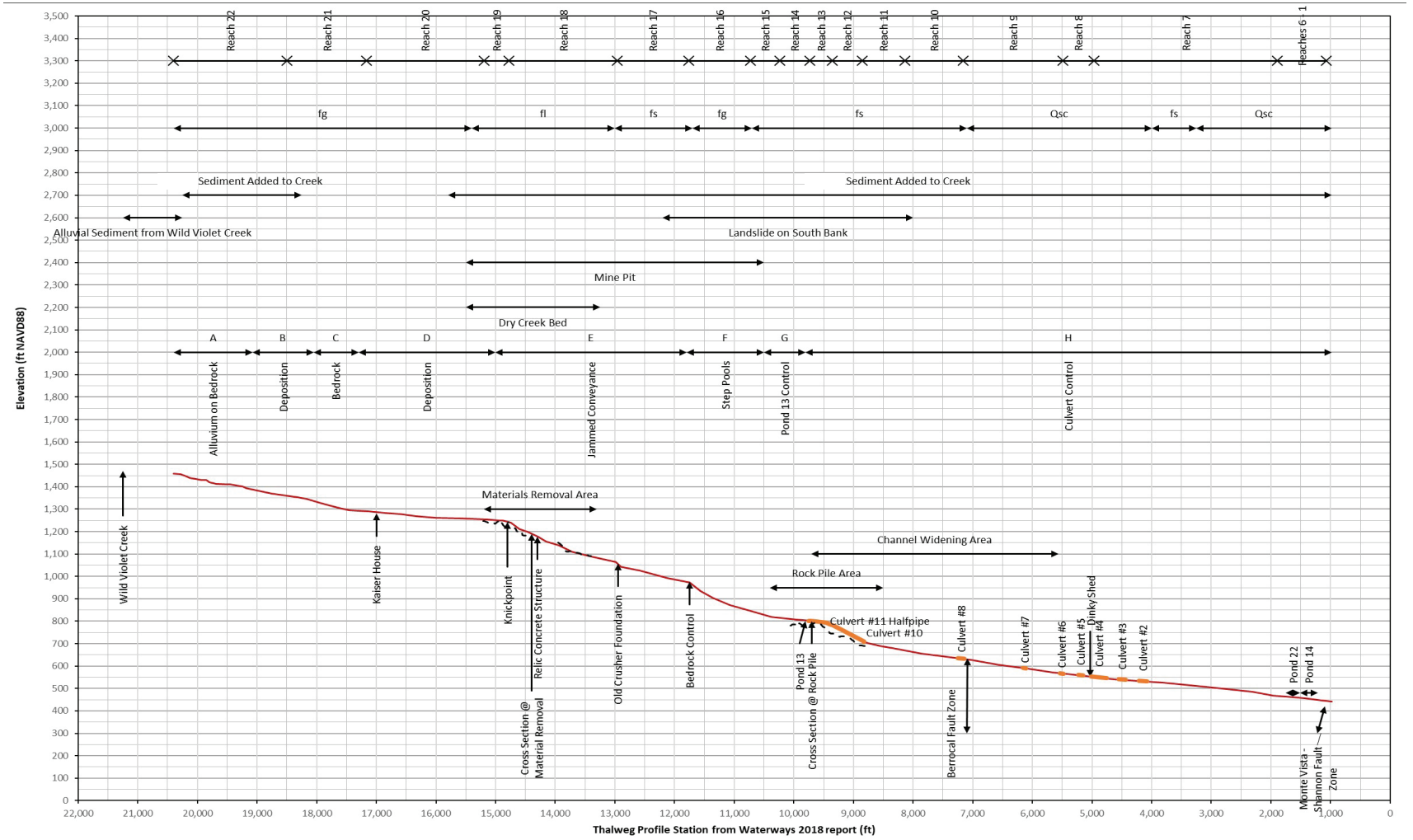


Figure 3: Permanente Creek Profile with geomorphic and geologic delineations. Stationing from Waterways (2019).

ATTACHMENT B

Data Summary Table 1

Table 1: Sequential WET Extraction Chemistry

Analyte	Units	STLC Regulatory Limit	ESL	B-1: High-Grade Limestone, Non-Weathered					B-2: Medium-Grade Limestone, Non-Weathered					B-3: Low-Grade, Limestone Non-Weathered				
				Leach Initial	Leach 1	Leach 2	Leach 3	Leach 4	Leach Initial	Leach 1	Leach 2	Leach 3	Leach 4	Leach Initial	Leach 1	Leach 2	Leach 3	Leach 4
Dissolved Metals																		
Antimony	mg/l	15	0.006	0.0042	0.0025	0.0018 B	0.00123 B	0.0012 B	0.0057	0.0040	0.0032	0.0026	0.0027	0.013	0.0078	0.0052	0.0052	0.0040
Arsenic	mg/l	5	0.01	0.00022 B	0.00047 B	0.0003 B	0.00029 B	<0.001	0.00066 B	0.00088 B	0.00073 B	0.00091 B	0.00080 B	0.0013	0.0011	0.00065 B	0.00073 B	0.00062 B
Barium	mg/l	100	1	0.41	0.70	0.42	0.70	0.96	0.0288 B	0.11	0.13	0.27	0.45	0.15	0.29	0.17	0.32	0.45
Beryllium	mg/l	0.75	0.0027	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025
Cadmium	mg/l	1	0.00025	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025	0.00011 B	<0.00025	<0.00025	<0.00025	<0.00025
Chromium	mg/l	5	0.05	<0.002	0.00157 B	0.0007 B	0.00079 B	0.00079 B	<0.002	0.0031	0.00062 B	0.00077 B	0.0017 B	<0.002	0.0028	0.00059 B	0.00138 B	0.00121 B
Cobalt	mg/l	80	0.003	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025	0.000209 B	0.000062 B	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025
Copper	mg/l	25	0.009	0.0012 B	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.0011 B	<0.002	<0.002	<0.002	<0.002
Lead	mg/l	5	0.0025	<0.0005	<0.0005	<0.0005	<0.0005	0.00028 B	<0.0005	<0.0005	<0.0005	<0.0005	0.0001 B	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Mercury	mg/l	0.2	0.000025	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Molybdenum	mg/l	350	0.1	0.14	0.024 B	0.020 B	<0.1	<0.1	0.27	0.070 B	0.048 B	0.026 B	0.021 B	1.1	0.21	0.10	0.038 B	<0.1
Nickel	mg/l	20	0.052*	<0.001	<0.001	<0.001	<0.001	<0.001	0.0017	0.00042 B	<0.001	<0.001	<0.001	0.00099 B	0.00069 B	<0.001	<0.001	<0.001
Selenium	mg/l	1	0.005*	0.0017	0.0019	0.0011	0.00086	0.00080	0.0062	0.0051	0.0044	0.0049	0.0044	0.0085	0.0051	0.0043	0.0039	0.0033
Silver	mg/l	5	0.00019	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Thallium	mg/l	7	0.002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.00011 B	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Vanadium	mg/l	24	0.019	0.041	0.016	0.0098	0.0097	0.0098	0.0092	0.012	0.014	0.019	0.019	0.37	0.13	0.083	0.083	0.076
Zinc	mg/l	250	0.081	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015
Wet Chemistry																		
Chloride	mg/l			1.4 B	2.5	0.77 B	0.58 B	0.85 B	<2	0.53	0.56 B	<2	<2	2.3	3.6	<2	<2	0.78 B
Sulfate	mg/l			9.0	5.9	7.9	4.4 B	3.3 B	212	31	26	9.2	7.9	22	12	16	9.1	4.8 B
Total Alkalinity	mg/l			14 B	17 B	15 B	14 B	14 B	16 B	24	20	16 B	17 B	18 B	23	18 B	18 B	17 B
Bicarbonate ($CaCO_3$)	mg/l			14 B	17 B	15 B	14 B	14 B	16 B	24	20	16 B	17 B	18 B	23	18 B	18 B	17 B
Carbonate as $CaCO_3$	mg/l			<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
Hydroxide as $CaCO_3$	mg/l			<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20

Notes:

Soluble Threshold Limit Concentrations (STLC) as per California Code of Regulations Title 22, Section 66261.24(2)(A) ESL listed is lower of freshwater aquatic or primary MCL;
As is based on background level.

* = the ESL and surface water quality objective (California Toxics Rule, 40 CFR section 131.38) are the same.

B = estimated value, below laboratory reporting limit; mg/l = milligrams per Liter

Table 1: Sequential WET Extraction Chemistry

Analyte	Units	STLC Regulatory Limit	ESL	B-4: Non-Cement Grade Limestone, Non-Weathered					B-5-9: High-Grade Limestone, Weathered					B-6: Greenstone, Non-Weathered				
				Leach Initial	Leach 1	Leach 2	Leach 3	Leach 4	Leach Initial	Leach 1	Leach 2	Leach 3	Leach 4	Leach Initial	Leach 1	Leach 2	Leach 3	Leach 4
Dissolved Metals																		
Antimony	mg/l	15	0.006	0.0030	0.0018 B	0.0014 B	0.0012 B	0.0011 B	0.0065	0.0038	0.0025	0.0026	0.0021	0.0030	0.00128 B	0.00085 B	0.00054 B	0.00043 B
Arsenic	mg/l	5	0.01	0.0002 B	0.00031 B	<0.001	0.00023 B	<0.001	0.00047 B	0.00069 B	0.00039 B	0.00054 B	0.00046 B	0.0026	0.0029	0.0021	0.0021	0.0017
Barium	mg/l	100	1	0.13	0.40	0.26	0.44	0.60	0.20	0.38	0.21	0.39	0.63	0.11	0.11	0.099	0.11	0.10
Beryllium	mg/l	0.75	0.0027	0.000082 B	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025
Cadmium	mg/l	1	0.00025	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025
Chromium	mg/l	5	0.05	<0.002	0.0007 B	<0.002	<0.002	<0.002	<0.002	0.0026	<0.002	0.00111 B	0.00108 B	<0.002	<0.002	<0.002	0.00114 B	<0.002
Cobalt	mg/l	80	0.003	<0.00025	0.00005 B	0.000092 B	<0.00025	<0.00025	0.000057 B	<0.00025	<0.00025	<0.00025	0.000059 B	<0.00025	0.000051 B	0.000063 B	0.00027	0.000066 B
Copper	mg/l	25	0.009	<0.002	0.0017 B	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Lead	mg/l	5	0.0025	<0.0005	<0.0005	0.00086	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.00015 B	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Mercury	mg/l	0.2	0.000025	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Molybdenum	mg/l	350	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.23	0.067 B	0.044 B	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/l	20	0.052*	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.00071 B	<0.001	<0.001	0.0012	<0.001
Selenium	mg/l	1	0.005*	0.0013	0.0011	0.00092	0.00082	0.00077	0.0040	0.0035	0.0029	0.0028	0.0027	0.00054	0.00017 B	0.00018 B	<0.00025	<0.00025
Silver	mg/l	5	0.00019	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Thallium	mg/l	7	0.002	0.00011 B	<0.0005	0.0005 B	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Vanadium	mg/l	24	0.019	0.0046	0.00161 B	0.0022	0.0022	0.0023	0.036	0.016	0.012	0.014	0.015	0.013	0.012	0.0095	0.0095	0.0090
Zinc	mg/l	250	0.081	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015
Wet Chemistry																		
Chloride	mg/l			2.1	3.5	0.88 B	1.1 B	1.1 B	1.35 B	2.8	<2	<2	0.84 B	<2	<2	<2	<2	<2
Sulfate	mg/l			25	9.3	12	7.4	5.2	16	9.0	13	7.8	4.4 B	12	6.6	4.9 B	2.7 B	1.7 B
Total Alkalinity	mg/l			15 B	22	16 B	16 B	16 B	17 B	22	17 B	16 B	17 B	27	22	21	18 B	17 B
Bicarbonate ($CaCO_3$)	mg/l			15 B	22	16 B	16 B	16 B	17 B	22	17 B	16 B	17 B	27	22	21	18 B	17 B
Carbonate as $CaCO_3$	mg/l			<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
Hydroxide as $CaCO_3$	mg/l			<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20

Notes:

Soluble Threshold Limit Concentrations (STLC) as per California Code of Regulations Title 22, Section 66261.24(2)(A) ESL listed is lower of freshwater aquatic or primary MCL; As is based on background level.

* = the ESL and surface water quality objective (California Toxics Rule, 40 CFR section 131.38) are the same.

B = estimated value, below laboratory reporting limit; mg/l = milligrams per Liter

Table 1: Sequential WET Extraction Chemistry

Analyte	Units	STLC Regulatory Limit	ESL	B-7-10: Greenstone, Weathered				
				Leach Initial	Leach 1	Leach 2	Leach 3	Leach 4
Dissolved Metals								
Antimony	mg/l	15	0.006	0.00065 B	<0.002	<0.002	<0.002	<0.002
Arsenic	mg/l	5	0.01	<0.001	<0.001	<0.001	<0.001	<0.001
Barium	mg/l	100	1	0.029 B	0.0247 B	0.028 B	0.026 B	0.0226 B
Beryllium	mg/l	0.75	0.0027	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025
Cadmium	mg/l	1	0.00025	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025
Chromium	mg/l	5	0.05	<0.002	<0.002	<0.002	0.00058 B	<0.002
Cobalt	mg/l	80	0.003	<0.00025	0.000067 B	0.000051 B	0.00011 B	0.000087 B
Copper	mg/l	25	0.009	0.00133 B	<0.002	<0.002	0.0013 B	<0.002
Lead	mg/l	5	0.0025	<0.0005	<0.0005	<0.0005	<0.0005	0.00018 B
Mercury	mg/l	0.2	0.000025	<0.001	<0.001	<0.001	<0.001	<0.001
Molybdenum	mg/l	350	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/l	20	0.052*	<0.001	<0.001	<0.001	<0.001	<0.001
Selenium	mg/l	1	0.005*	0.00021 B	0.00013 B	<0.00025	<0.00025	0.00014 B
Silver	mg/l	5	0.00019	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Thallium	mg/l	7	0.002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Vanadium	mg/l	24	0.019	0.016	0.019	0.013	0.014	0.013
Zinc	mg/l	250	0.081	<0.015	<0.015	<0.015	<0.015	<0.015
Wet Chemistry								
Chloride	mg/l			<2	<2	<2	<2	<2
Sulfate	mg/l			4.8 B	1.4 B	1.3 B	<5	<5
Total Alkalinity	mg/l			24	22	22	21	20
Bicarbonate ($CaCO_3$)	mg/l			22	20 B	21	18 B	18 B
Carbonate as $CaCO_3$	mg/l			2.3 B	2.5 B	<20	2.4 B	2.2 B
Hydroxide as $CaCO_3$	mg/l			<20	<20	<20	<20	<20

Notes:

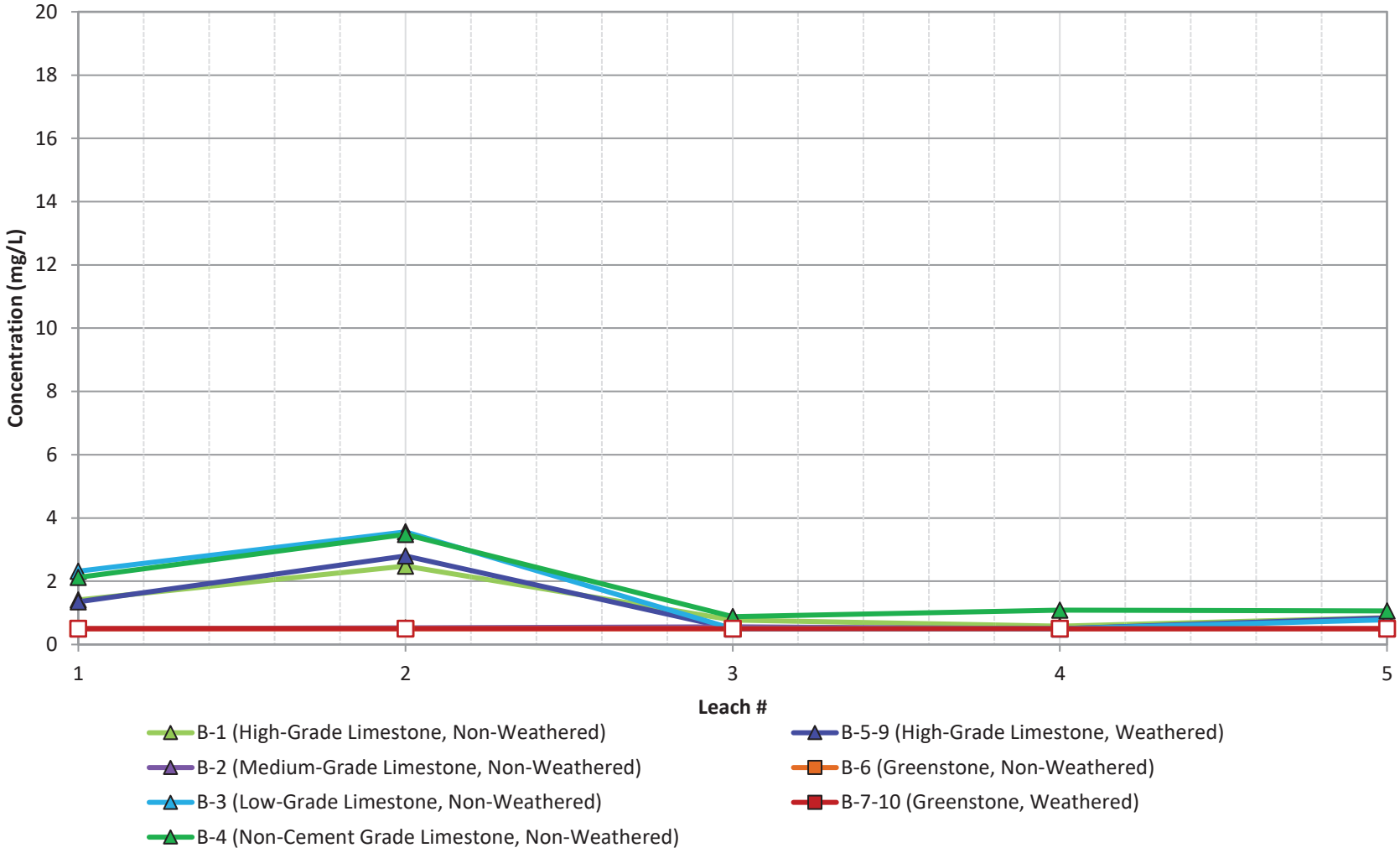
Soluble Threshold Limit Concentrations (STLC) as per California Code of Regulations Title 22, Section 66261.24(2)(A) ESL listed is lower of freshwater aquatic or primary MCL; As is based on background level.

* = the ESL and surface water quality objective (California Toxics Rule, 40 CFR section 131.38) are the same.

B = estimated value, below laboratory reporting limit; mg/l = milligrams per Liter

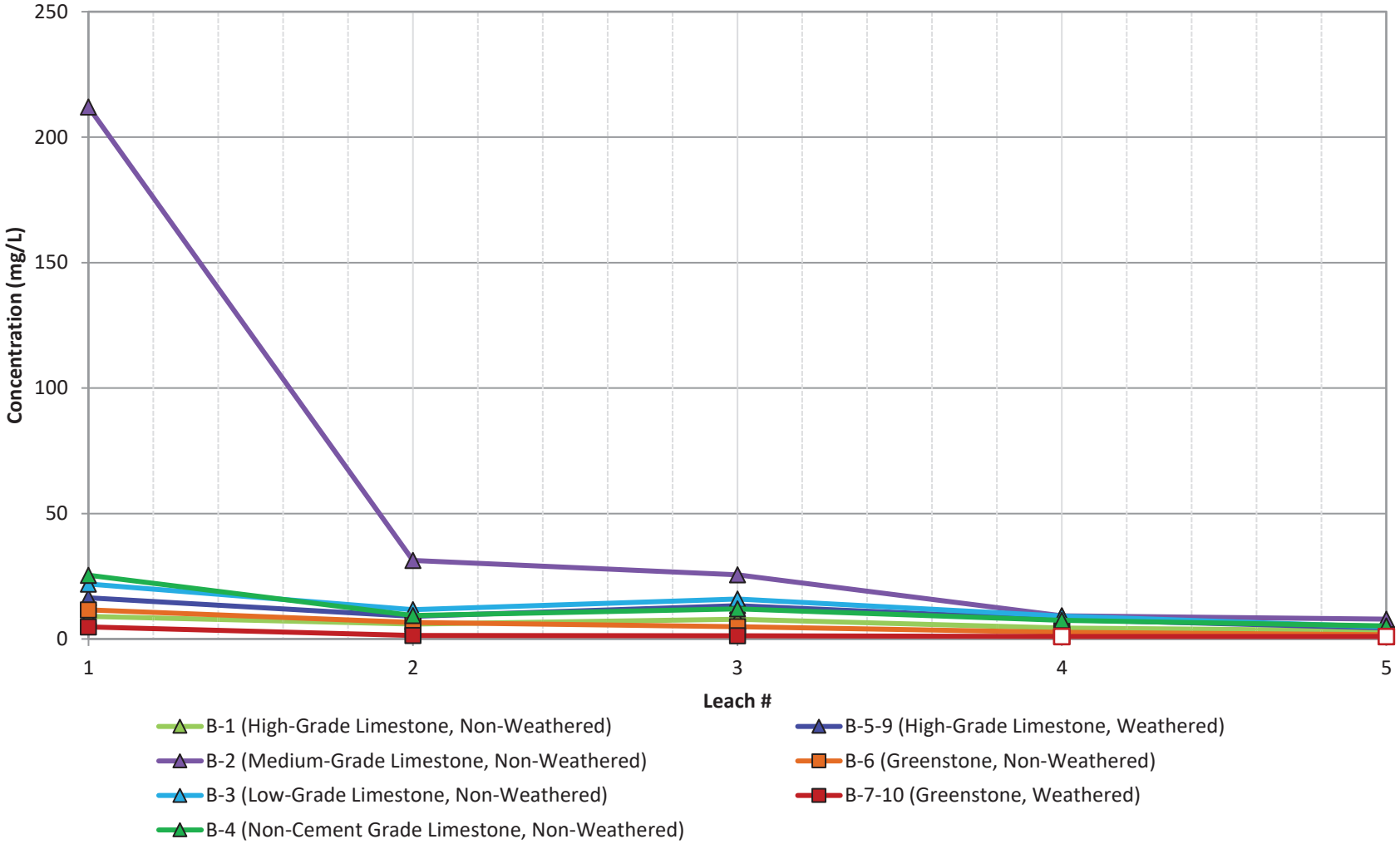
ATTACHMENT C

Time-Series Graphs



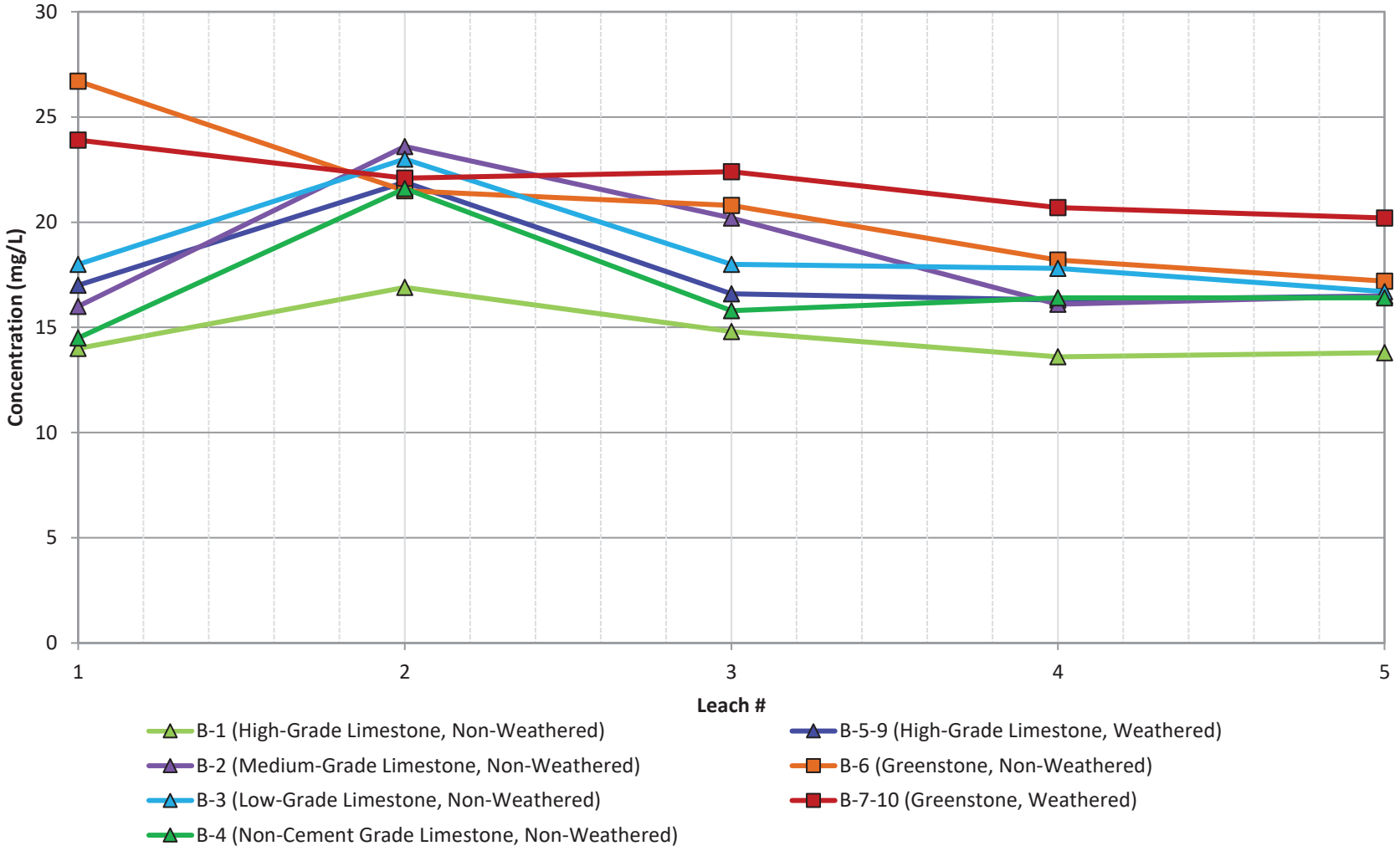
*Open symbols denote values at or below the method detection limit

WSP GOLDER	Title: **Sequential Modified WET- Chloride**		
	Project Name	Project No. 31405507	FIGURE C-1
	Client Name: Lehigh Permanente	Date: 8/4/2022	



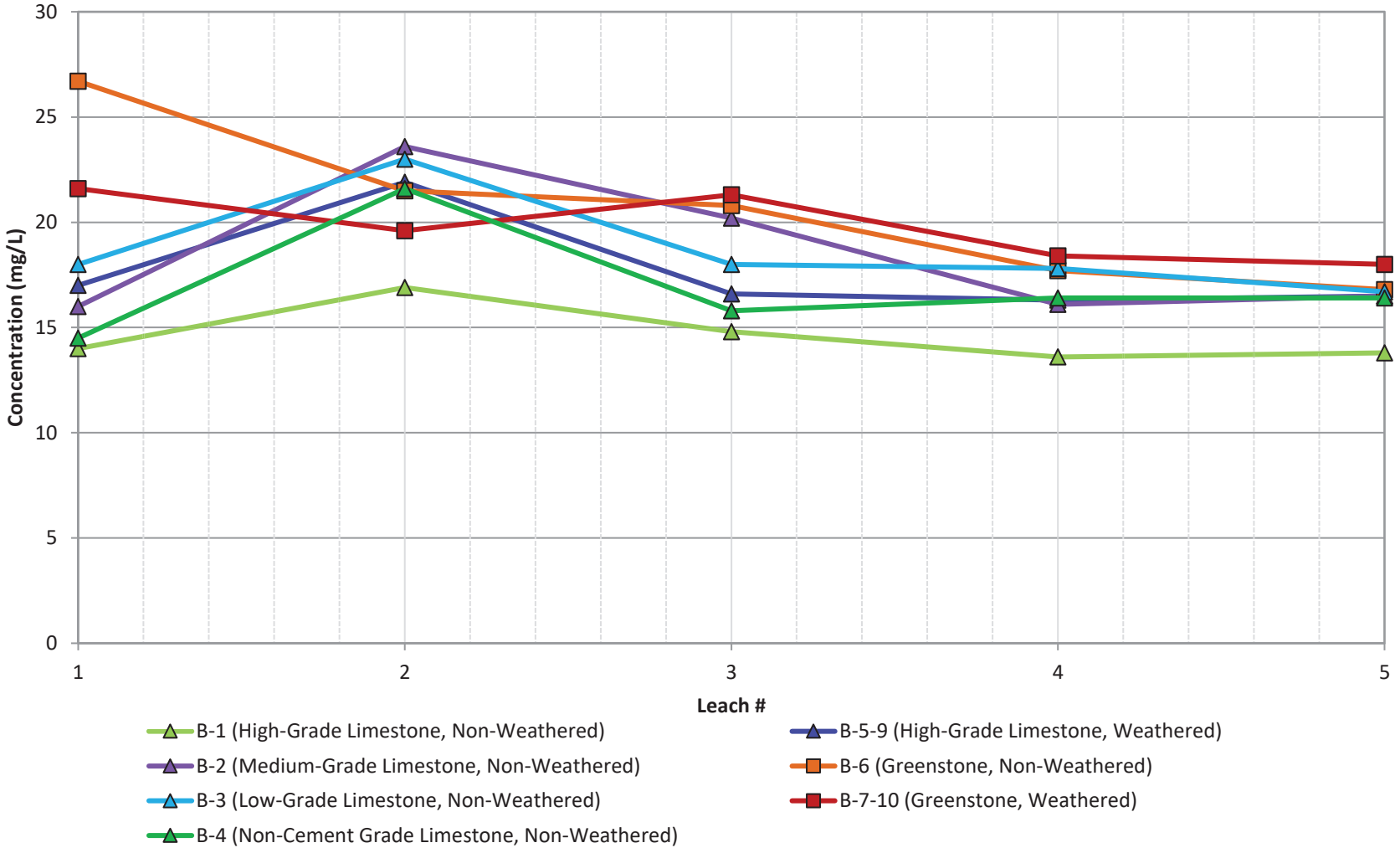
*Open symbols denote values at or below the method detection limit

GOLDER	Title: **Sequential Modified WET- Sulfate**		
	Project Name	Project No. 31405507	FIGURE C-2
	Client Name: Lehigh Permanente	Date: 8/4/2022	



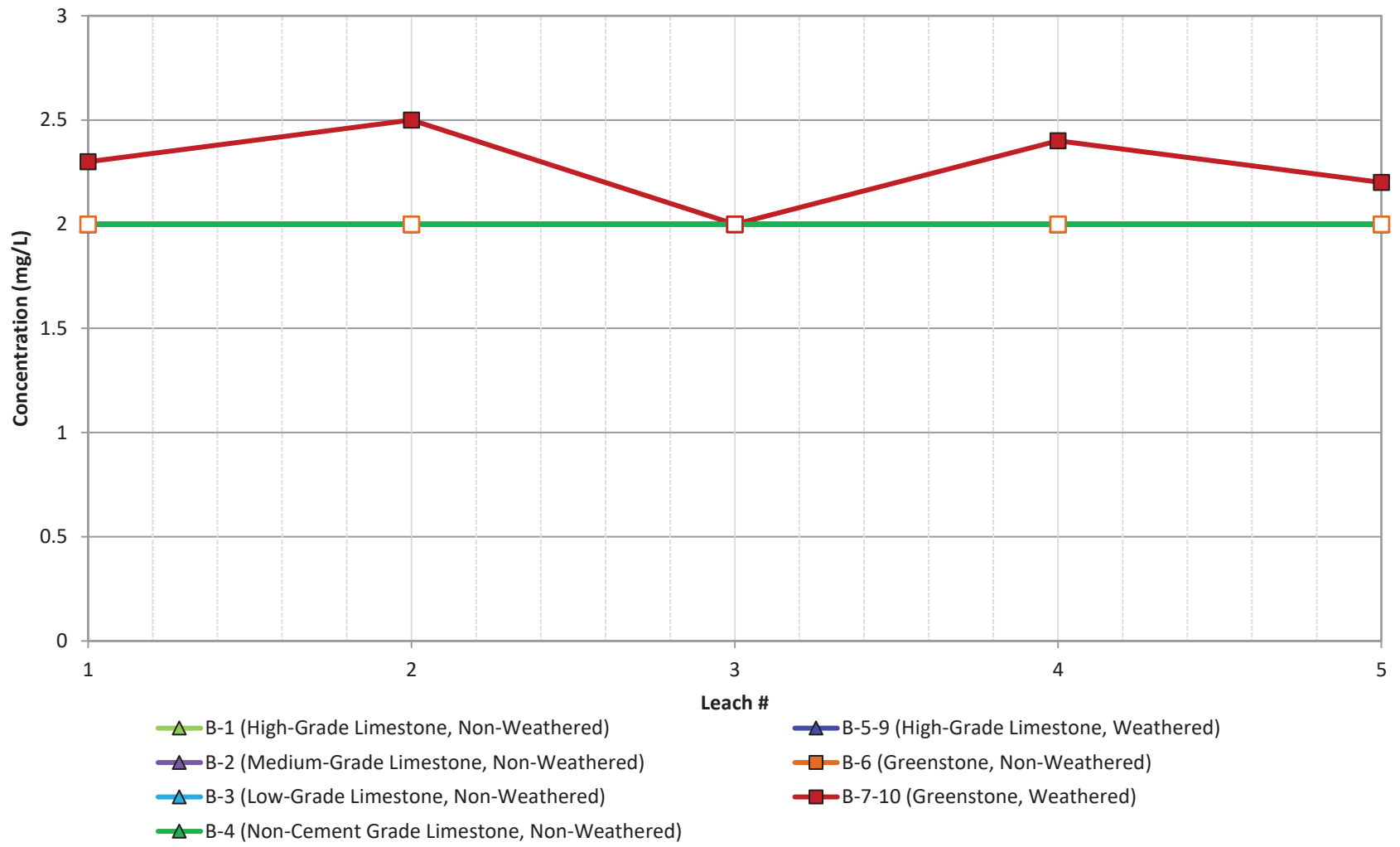
*Open symbols denote values at or below the method detection limit

WSP GOLDER	Title: **Sequential Modified WET- Total Alkalinity**		
	Project Name	Project No. 31405507	FIGURE C-3
	Client Name: Lehigh Permanente	Date: 3/4/2022	



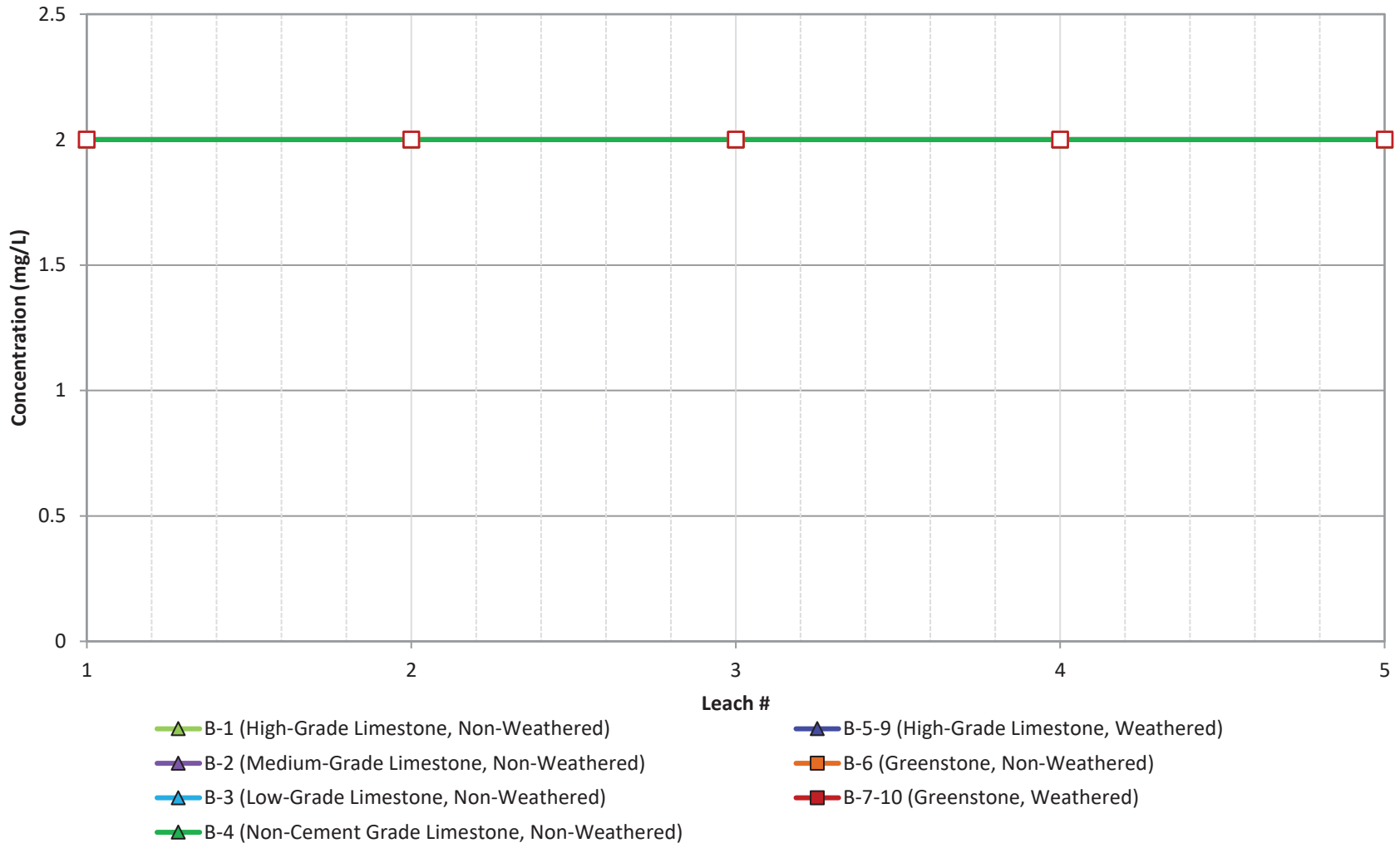
*Open symbols denote values at or below the method detection limit

WSP GOLDER	Title: **Sequential Modified WET- Bicarbonate as CaCO3**		
	Project Name	Project No. 31405507	FIGURE C-4
	Client Name: Lehigh Permanente	Date: 8/4/2022	



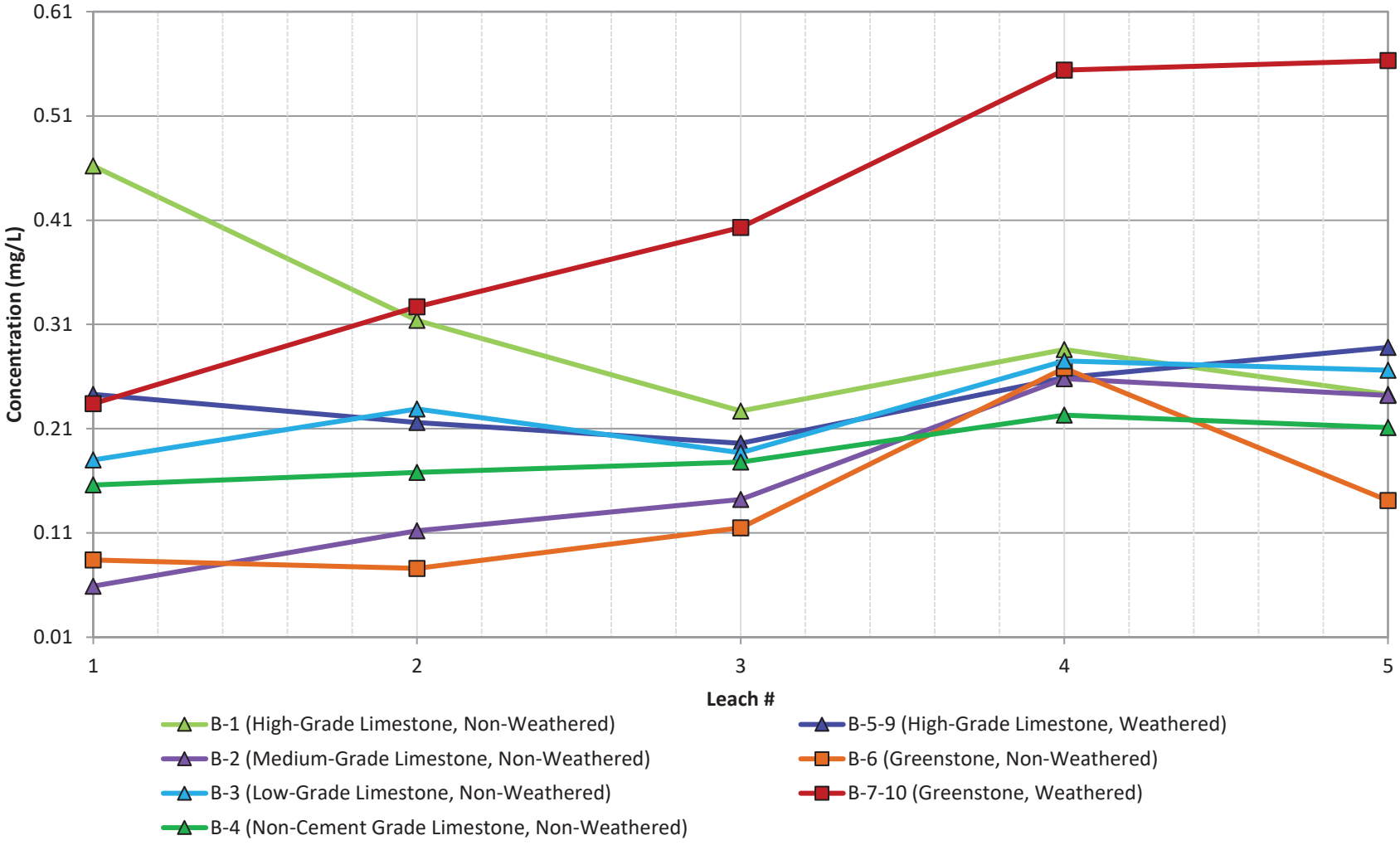
*Open symbols denote values at or below the method detection limit

WSP GOLDER	Title: **Sequential Modified WET- Carbonate as CaCO3**		
	Project Name	Project No. 31405507	FIGURE C-5
	Client Name: Lehigh Permanente	Date: 8/4/2022	



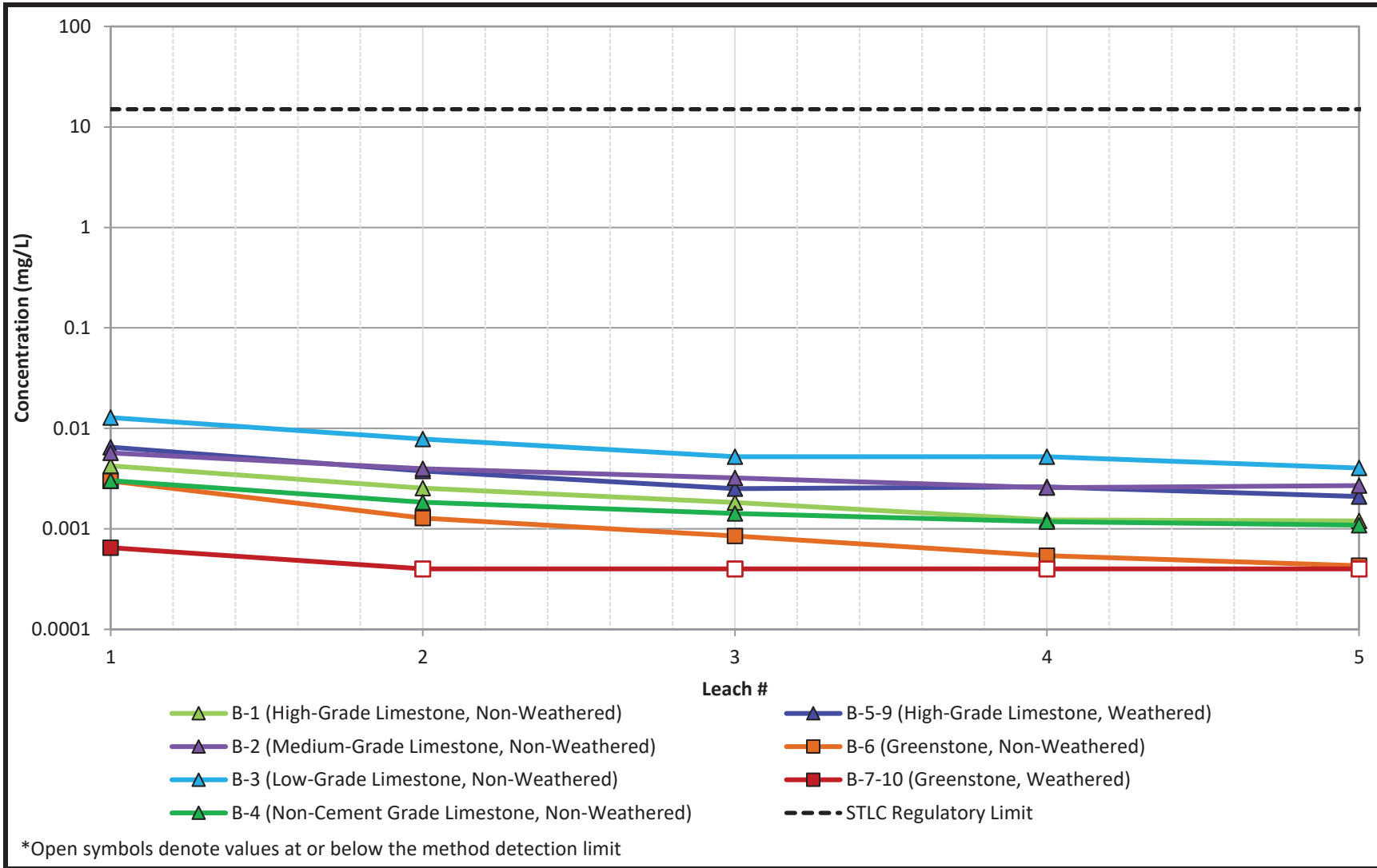
*Open symbols denote values at or below the method detection limit

WSP GOLDER	Title: **Sequential Modified WET- Hydroxide as CaCO3**		
	Project Name	Project No. 31405507	FIGURE C-6
	Client Name: Lehigh Permanente	Date: 8/4/2022	



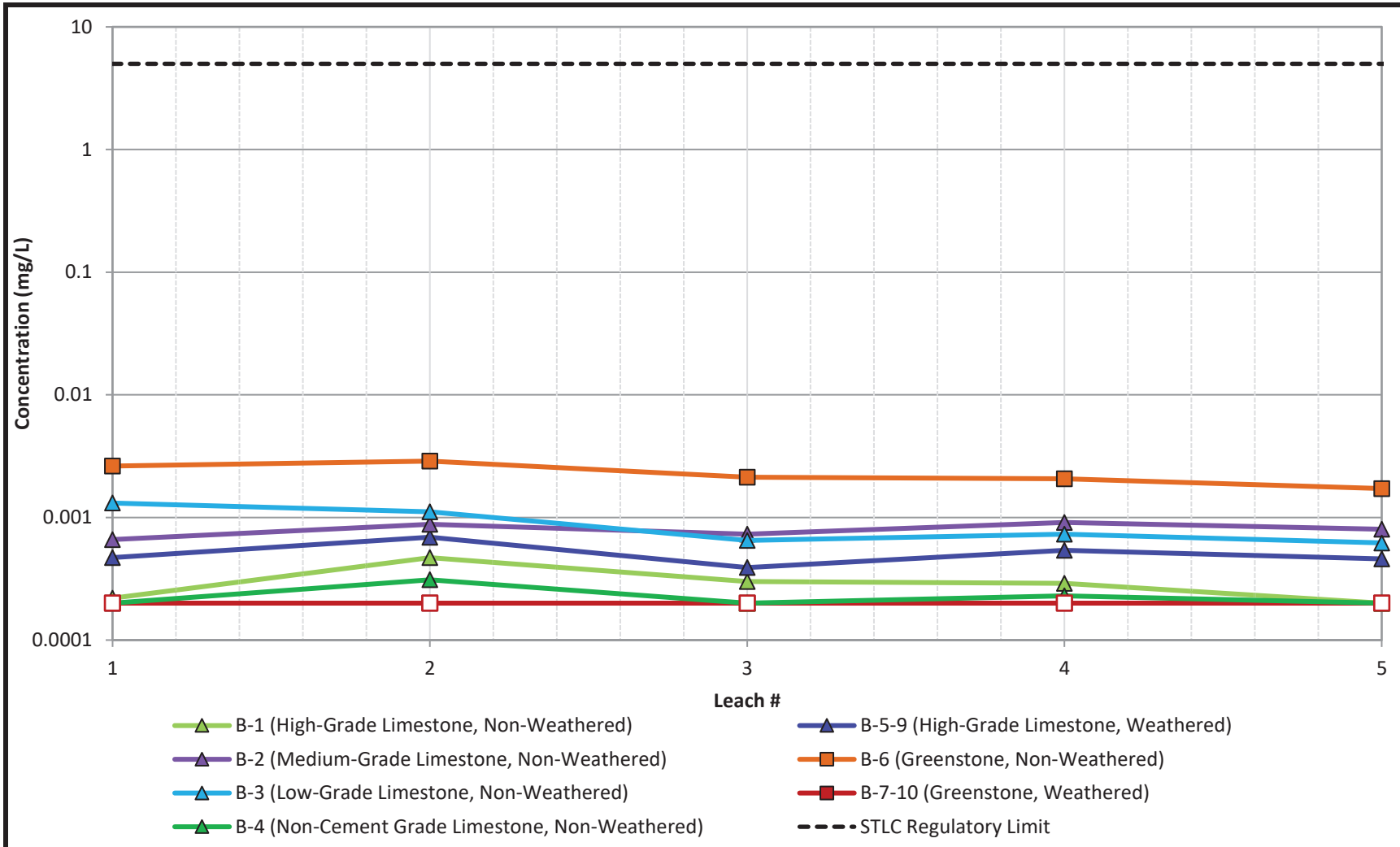
*Open symbols denote values at or below the method detection limit

WSP GOLDER	Title: **Sequential Modified WET- Aluminum**		
	Project Name	Project No. 31405507	FIGURE C-7
	Client Name: Lehigh Permanente	Date: 8/4/2022	



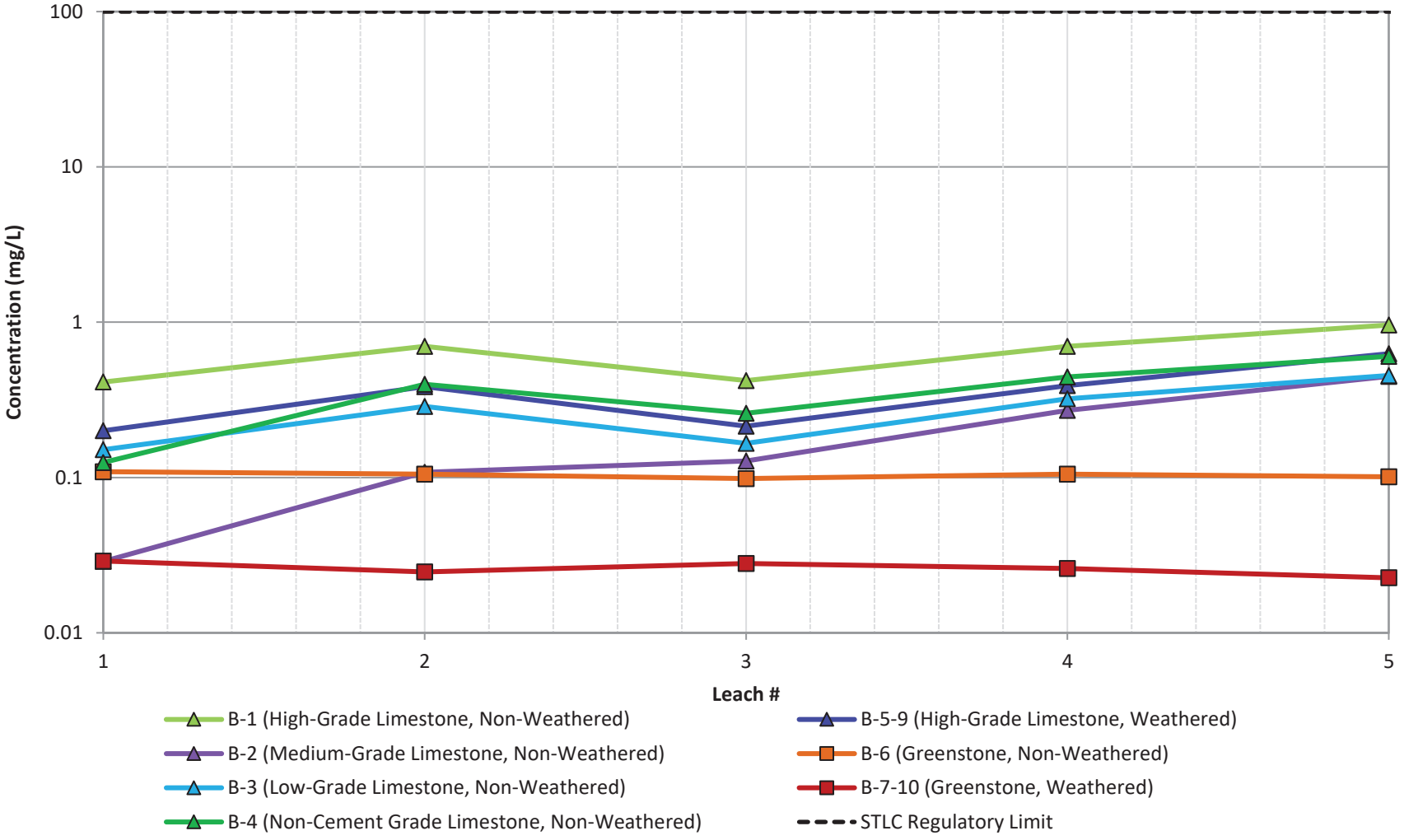
*Open symbols denote values at or below the method detection limit

WSP GOLDER	Title: **Sequential Modified WET- Antimony**		
	Project Name	Project No. 31405507	FIGURE C-8
	Client Name: Lehigh Permanente	Date: 8/4/2022	



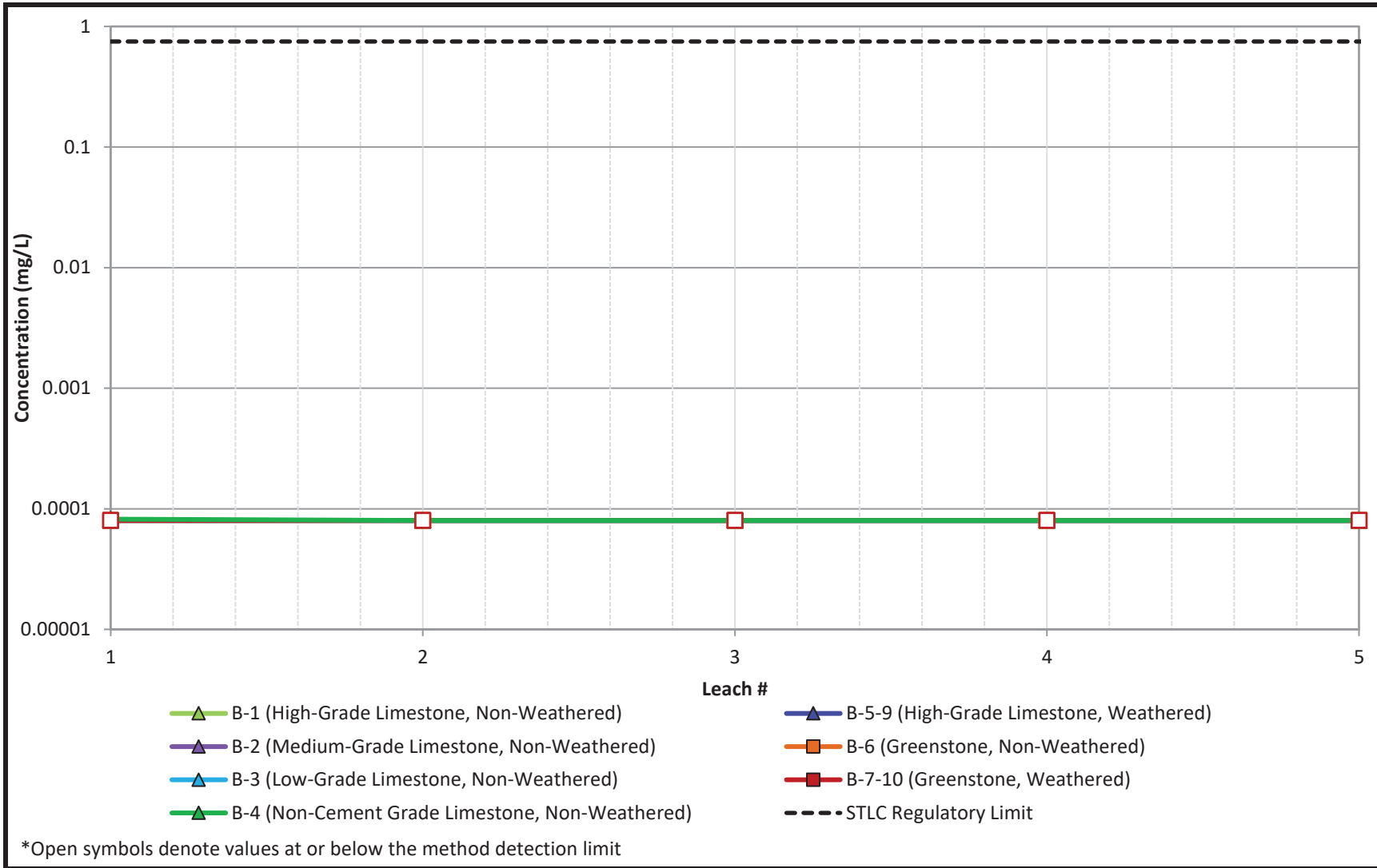
*Open symbols denote values at or below the method detection limit

WSP GOLDER	Title: **Sequential Modified WET- Arsenic**		
	Project Name	Project No. 31405507	FIGURE C-9
	Client Name: Lehigh Permanente	Date: 8/4/2022	



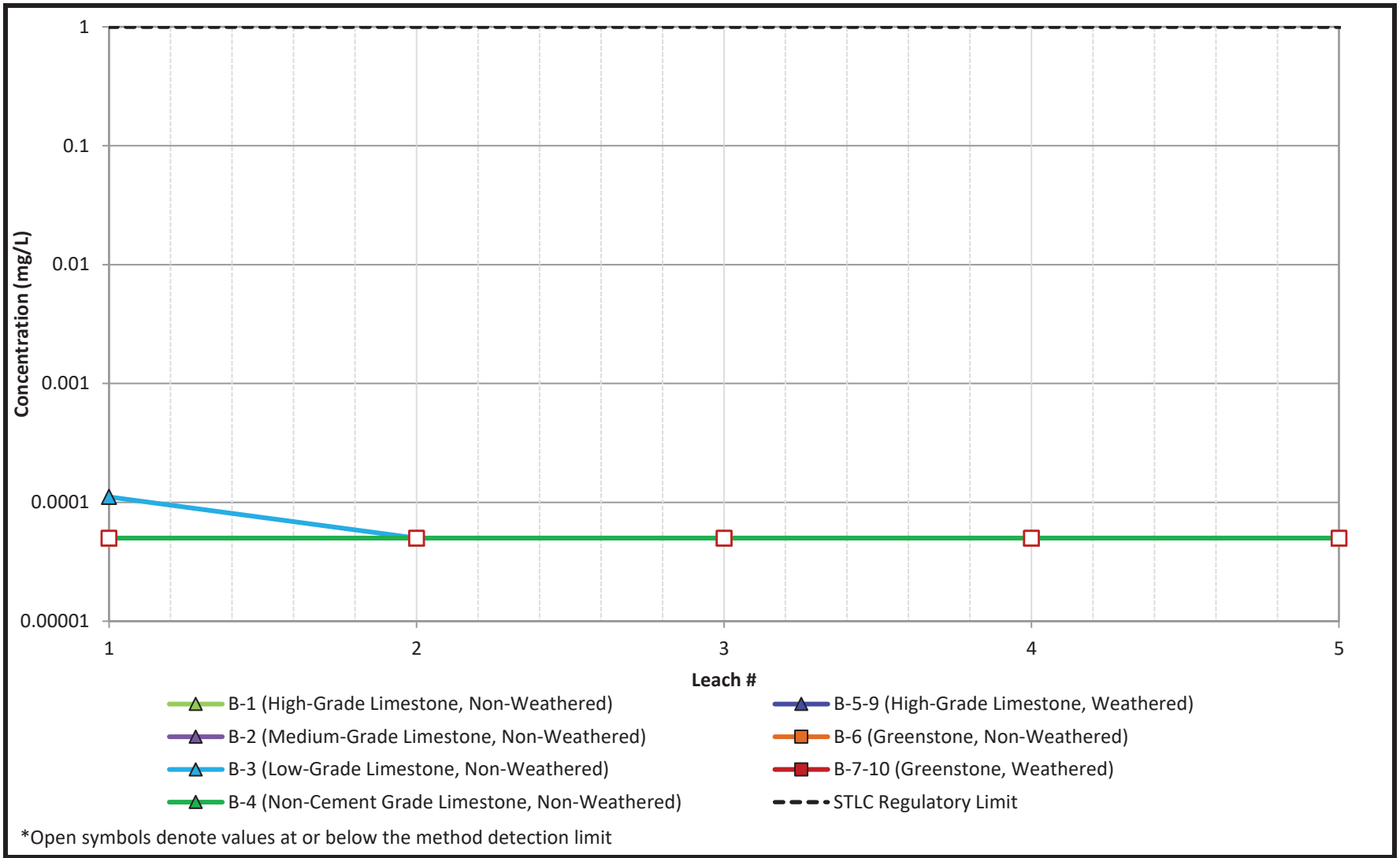
*Open symbols denote values at or below the method detection limit

WSP GOLDER	Title: **Sequential Modified WET- Barium**		
	Project Name	Project No. 31405507	FIGURE C-10
	Client Name: Lehigh Permanente	Date: 8/4/2022	



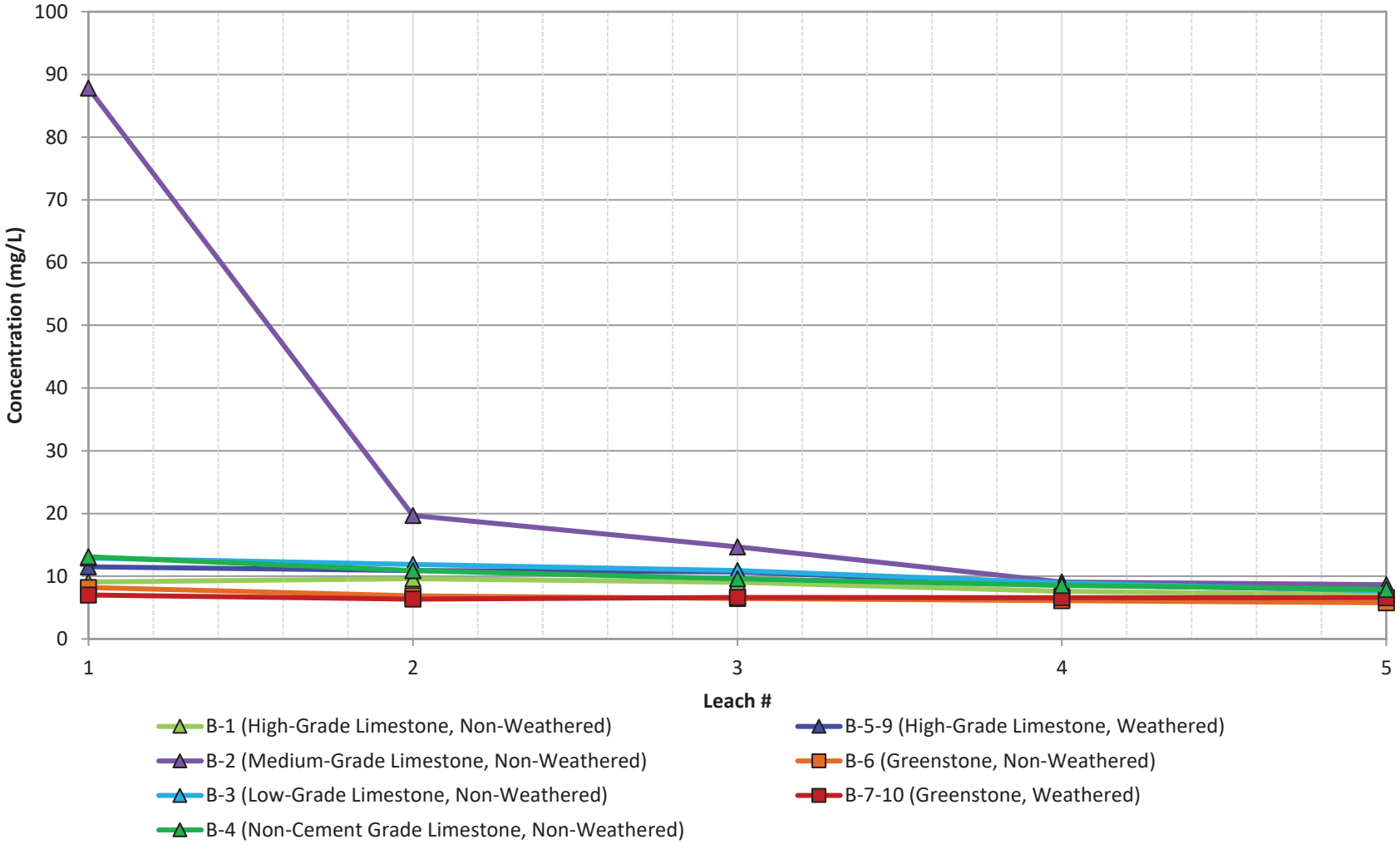
*Open symbols denote values at or below the method detection limit

WSP GOLDER	Title: **Sequential Modified WET- Beryllium**		
	Project Name	Project No. 31405507	FIGURE C-11
	Client Name: Lehigh Permanente	Date: 8/4/2022	



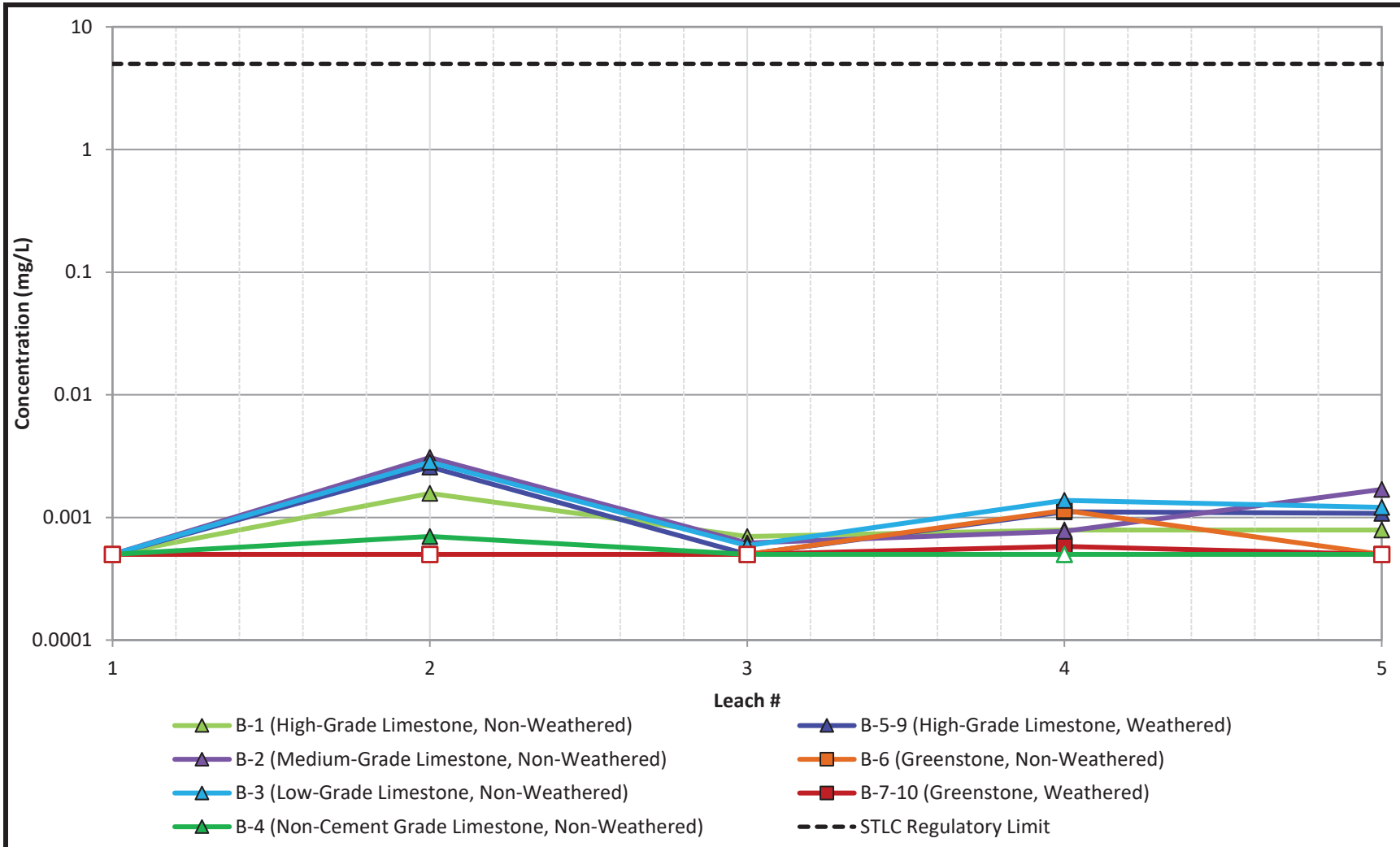
*Open symbols denote values at or below the method detection limit

WSP GOLDER	Title: **Sequential Modified WET- Cadmium**		
	Project Name	Project No. 31405507	FIGURE C-12
	Client Name: Lehigh Permanente	Date: 8/4/2022	



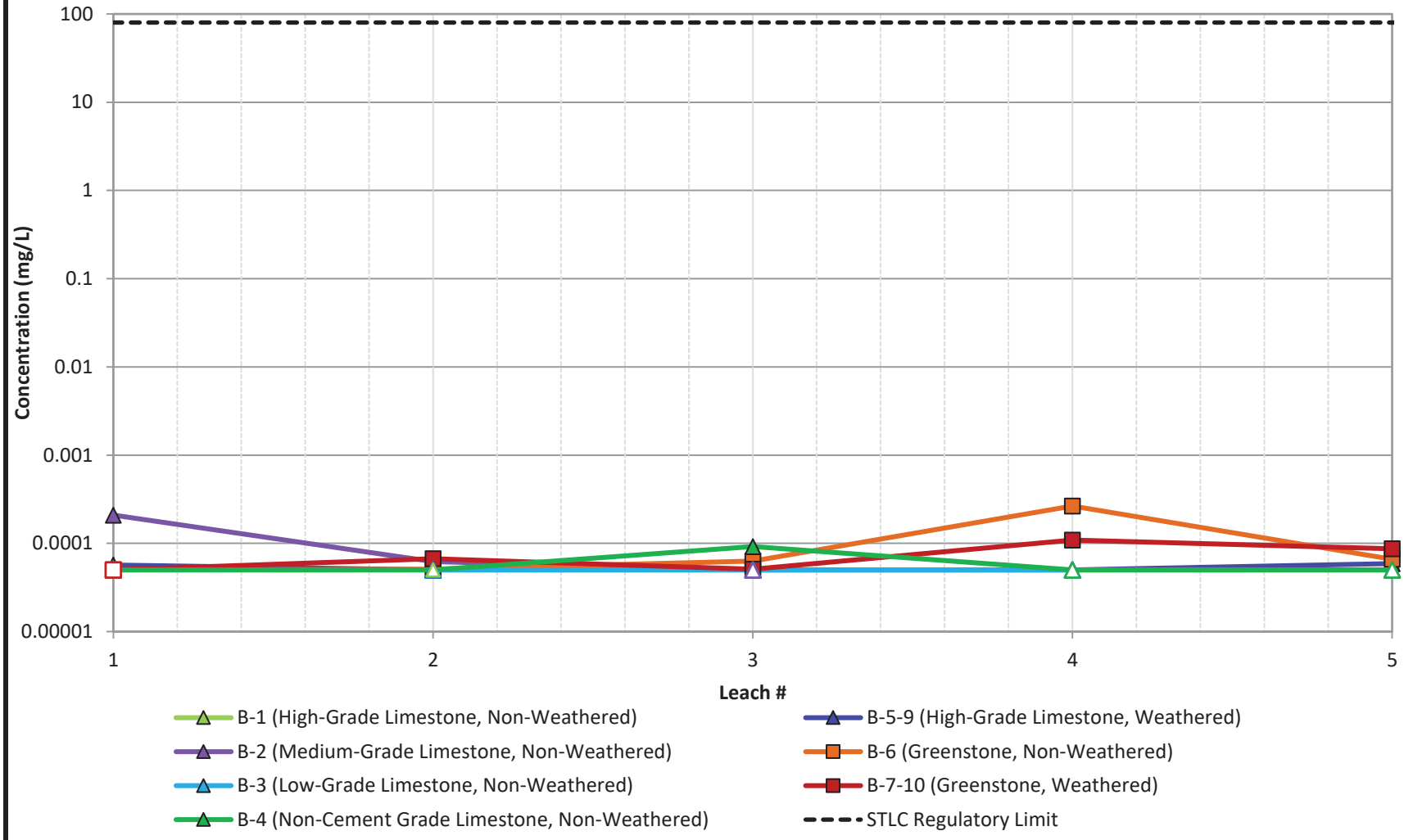
*Open symbols denote values at or below the method detection limit

WSP GOLDER	Title: **Sequential Modified WET- Calcium**		
	Project Name	Project No. 31405507	FIGURE C-13
	Client Name: Lehigh Permanente	Date: 8/4/2022	



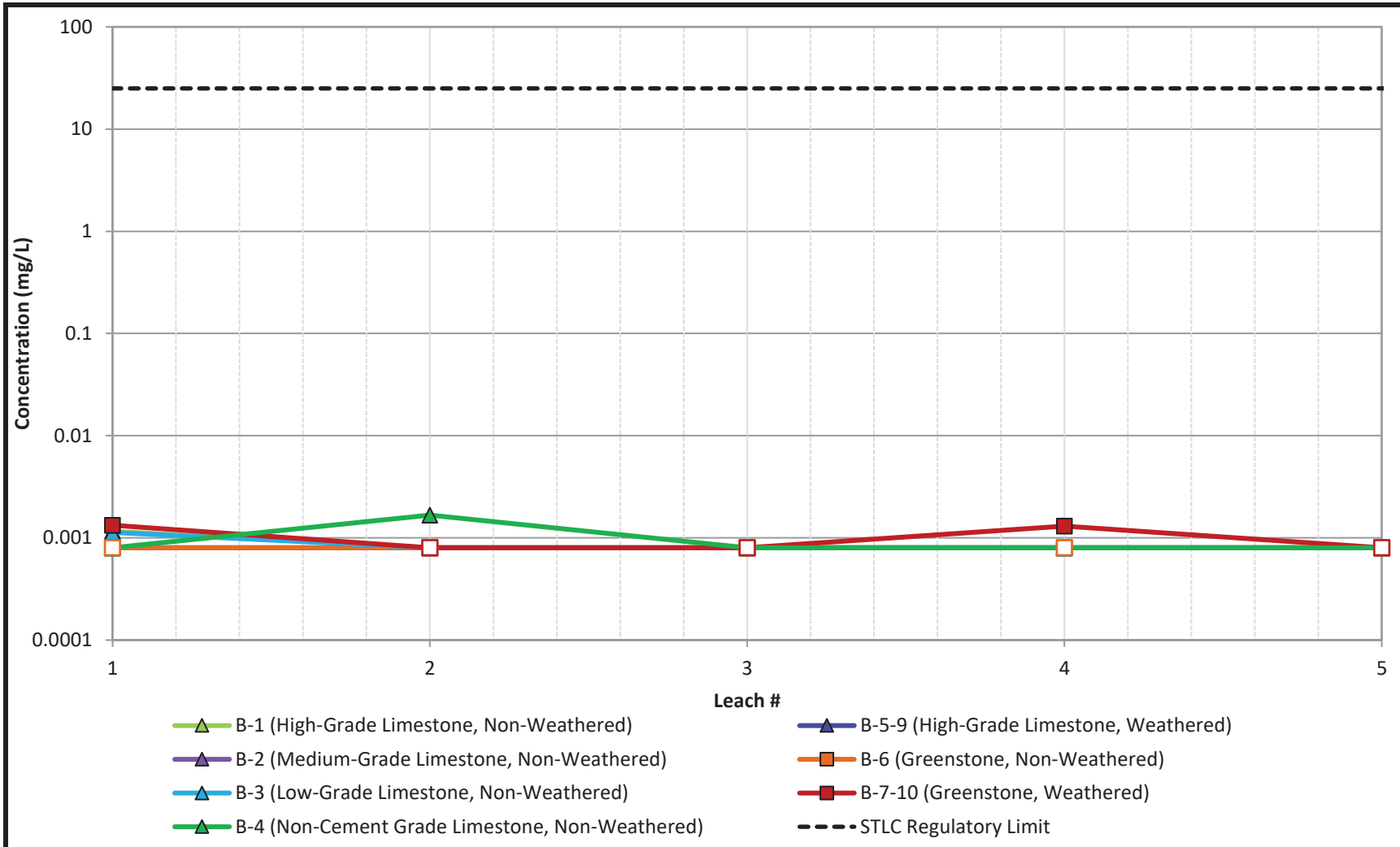
*Open symbols denote values at or below the method detection limit

WSP GOLDER	Title: **Sequential Modified WET- Chromium**		
	Project Name	Project No. 31405507	FIGURE C-14
	Client Name: Lehigh Permanente	Date: 8/4/2022	



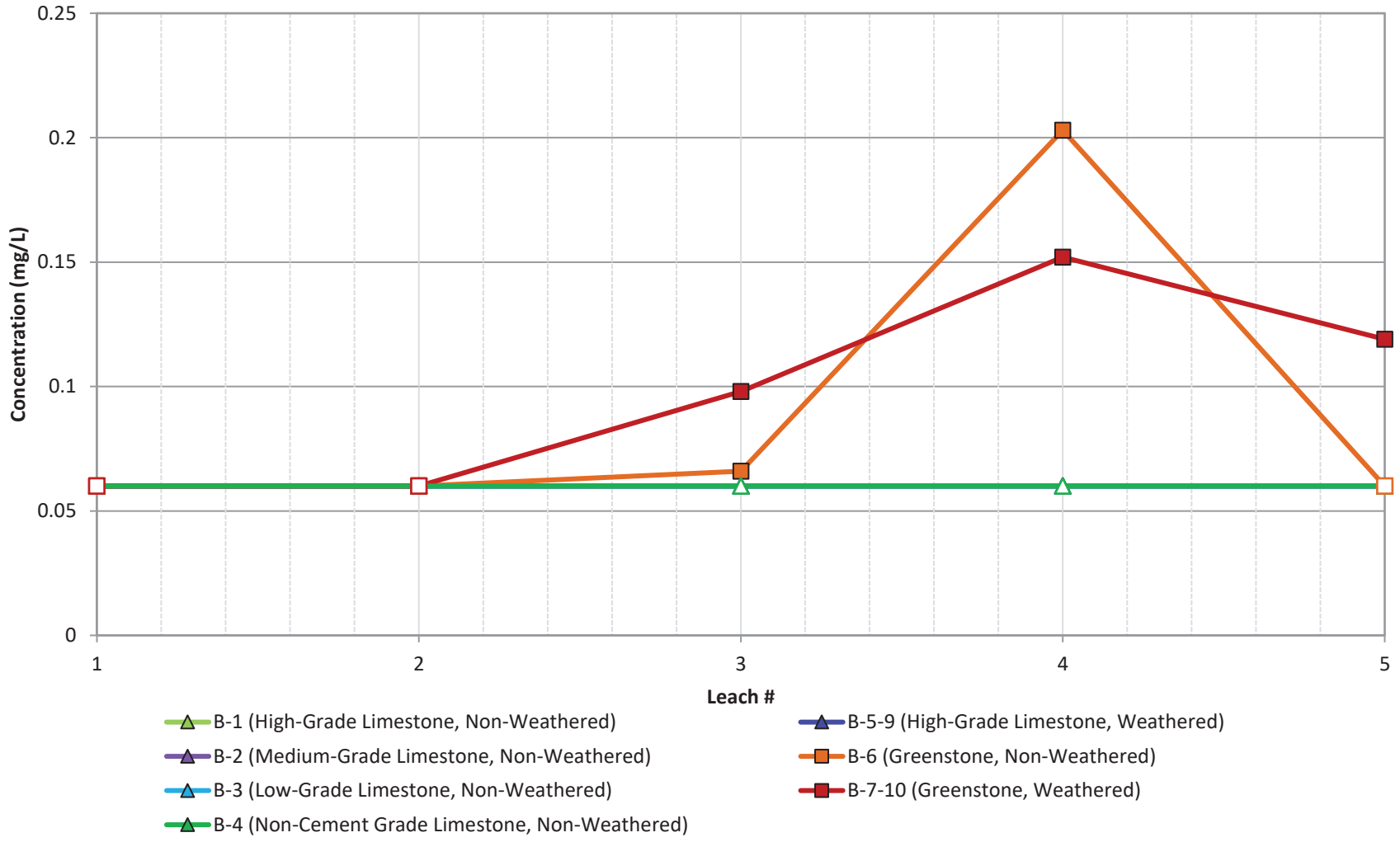
*Open symbols denote values at or below the method detection limit

WSP GOLDER	Title: **Sequential Modified WET- Cobalt**		
	Project Name	Project No. 31405507	FIGURE C-15
	Client Name: Lehigh Permanente	Date: 8/4/2022	



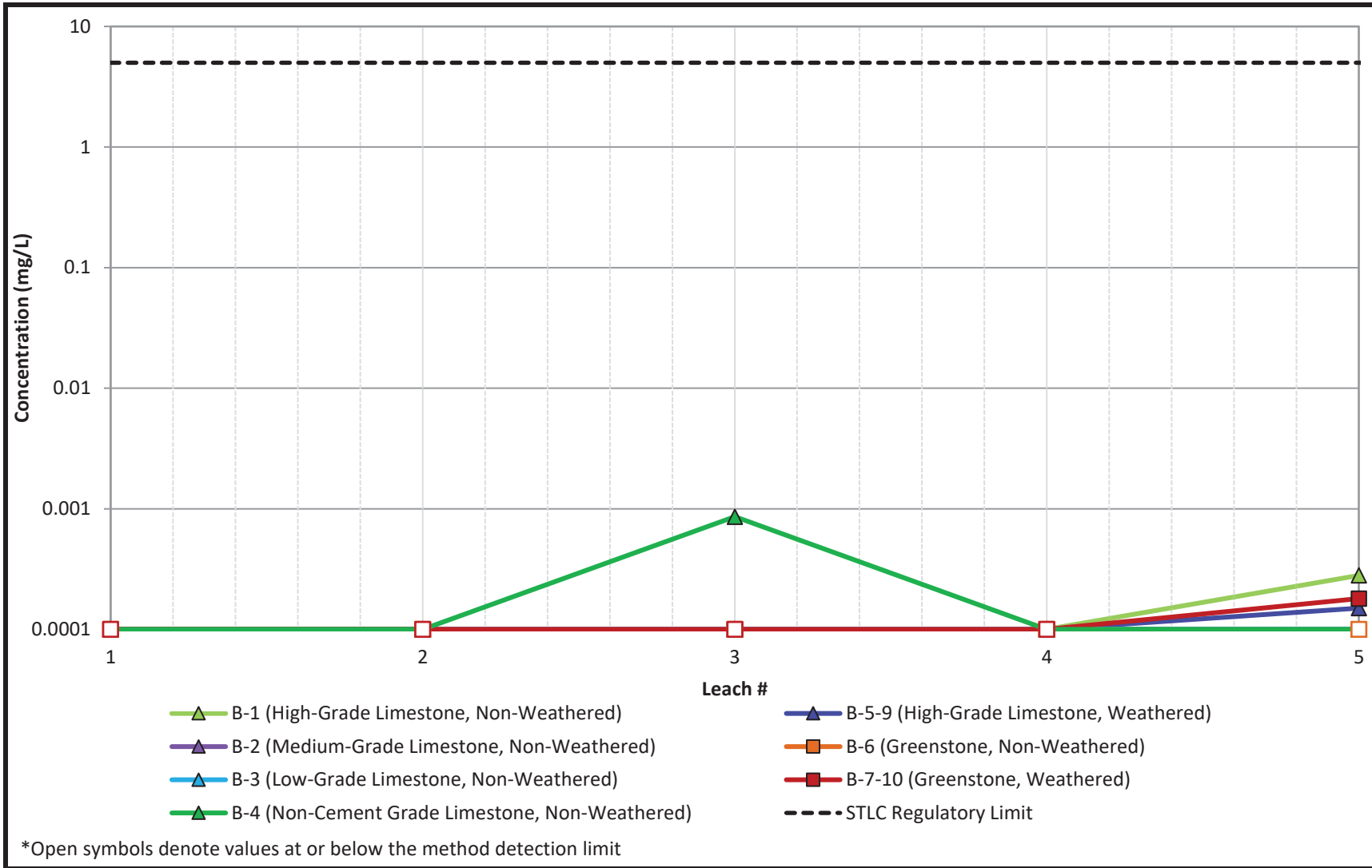
*Open symbols denote values at or below the method detection limit

WSP GOLDER	Title: **Sequential Modified WET- Copper**		
	Project Name	Project No. 31405507	FIGURE C-16
	Client Name: Lehigh Permanente	Date: 8/4/2022	



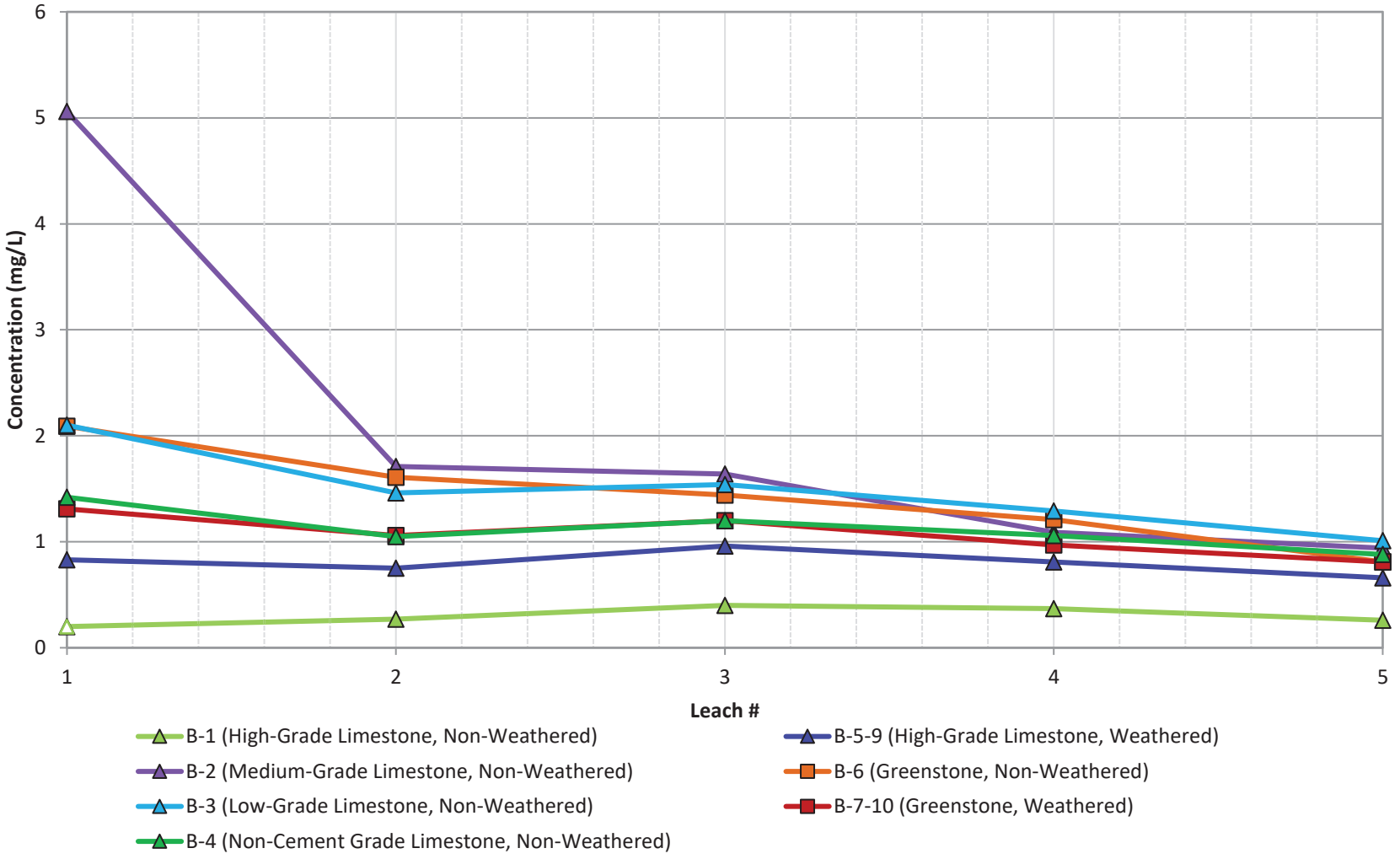
*Open symbols denote values at or below the method detection limit

WSP GOLDER	Title: **Sequential Modified WET- Iron**		
	Project Name	Project No. 31405507	FIGURE C-17
	Client Name: Lehigh Permanente	Date: 8/4/2022	



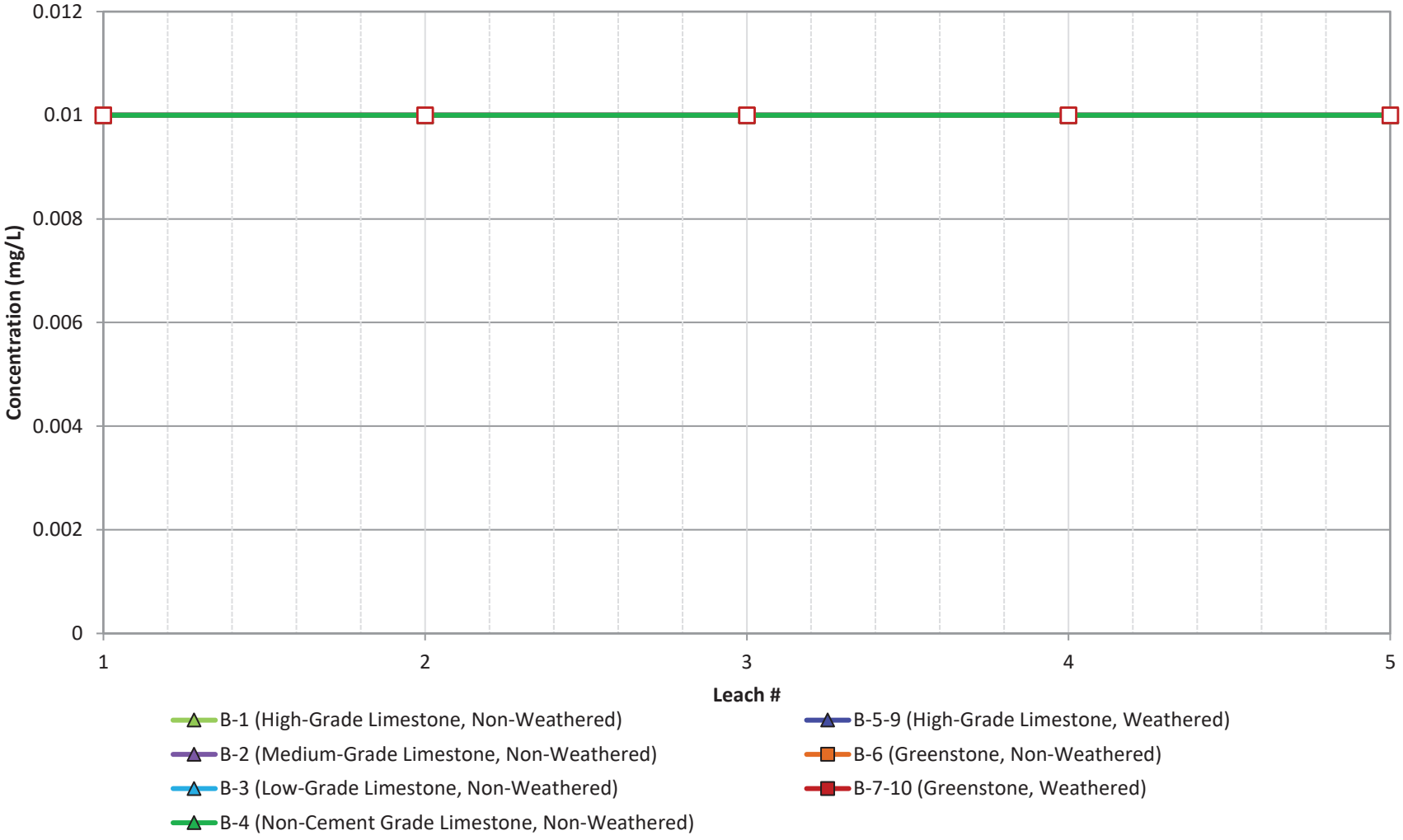
*Open symbols denote values at or below the method detection limit

WSP GOLDER	Title: **Sequential Modified WET- Lead**		
	Project Name	Project No. 31405507	FIGURE C-18
	Client Name: Lehigh Permanente	Date: 8/4/2022	



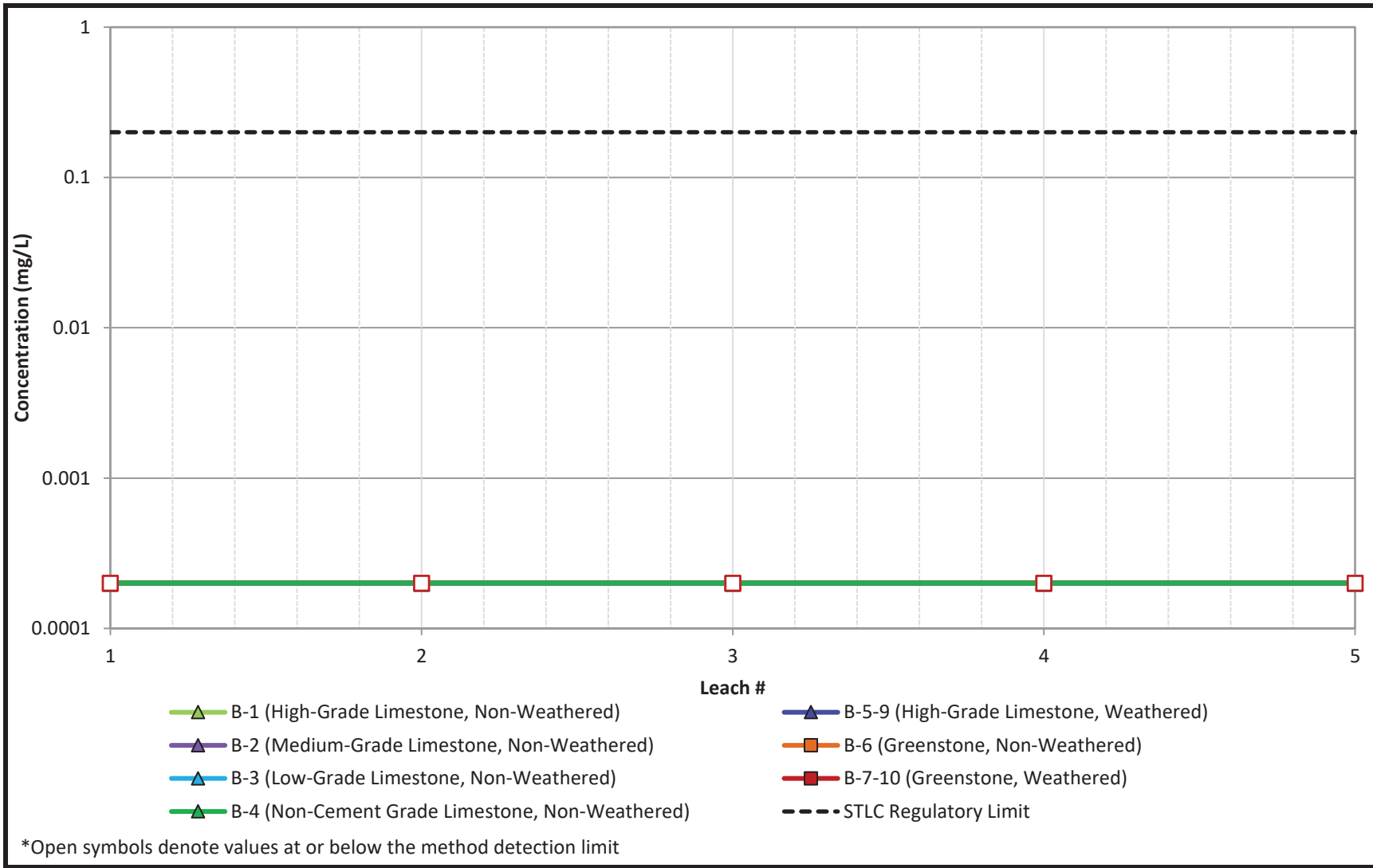
*Open symbols denote values at or below the method detection limit

WSP GOLDER	Title: **Sequential Modified WET- Magnesium**		
	Project Name	Project No. 31405507	FIGURE C-19
	Client Name: Lehigh Permanente	Date: 8/4/2022	



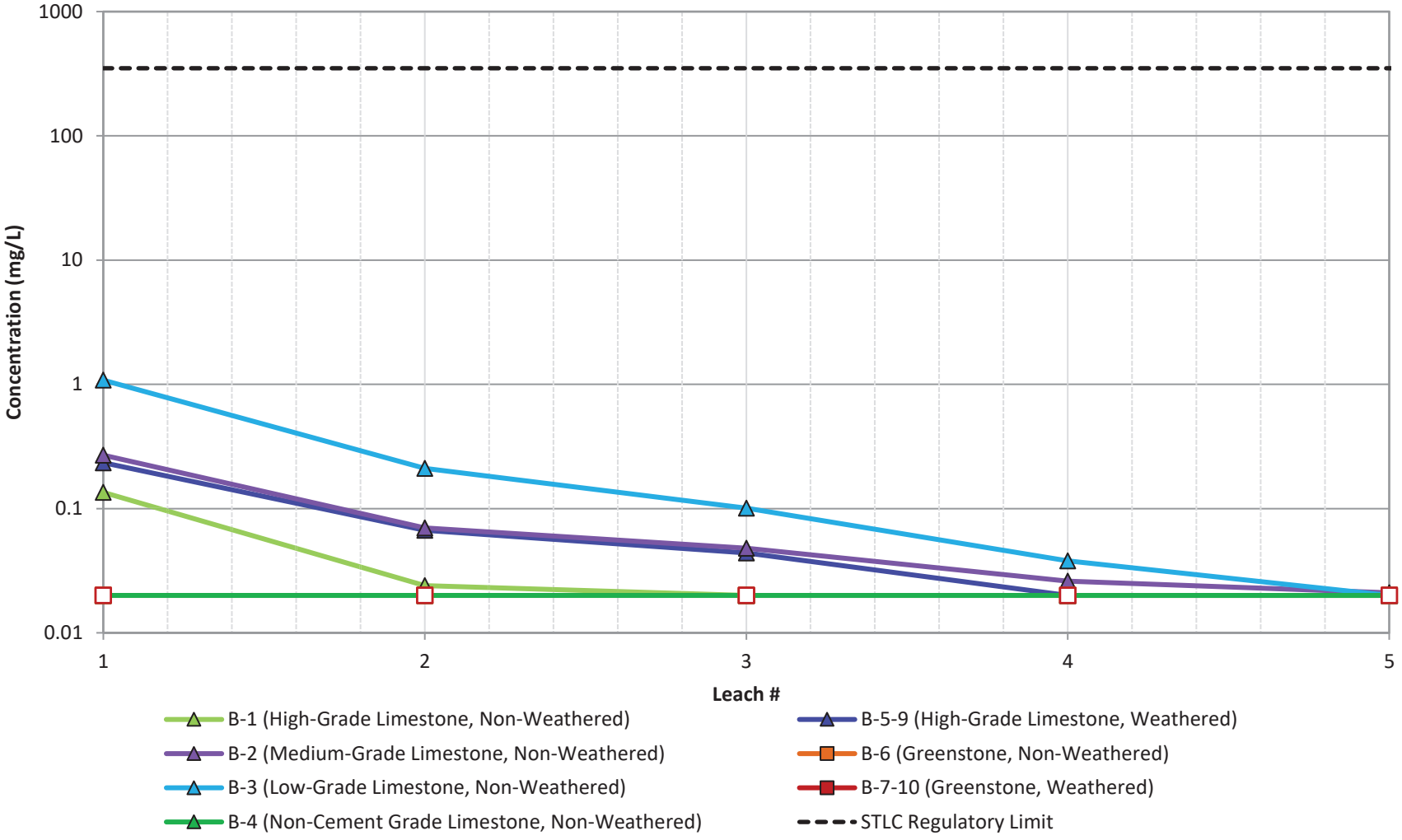
*Open symbols denote values at or below the method detection limit

WSP GOLDER	Title: **Sequential Modified WET- Manganese**		
	Project Name	Project No. 31405507	FIGURE C-20
	Client Name: Lehigh Permanente	Date: 8/4/2022	



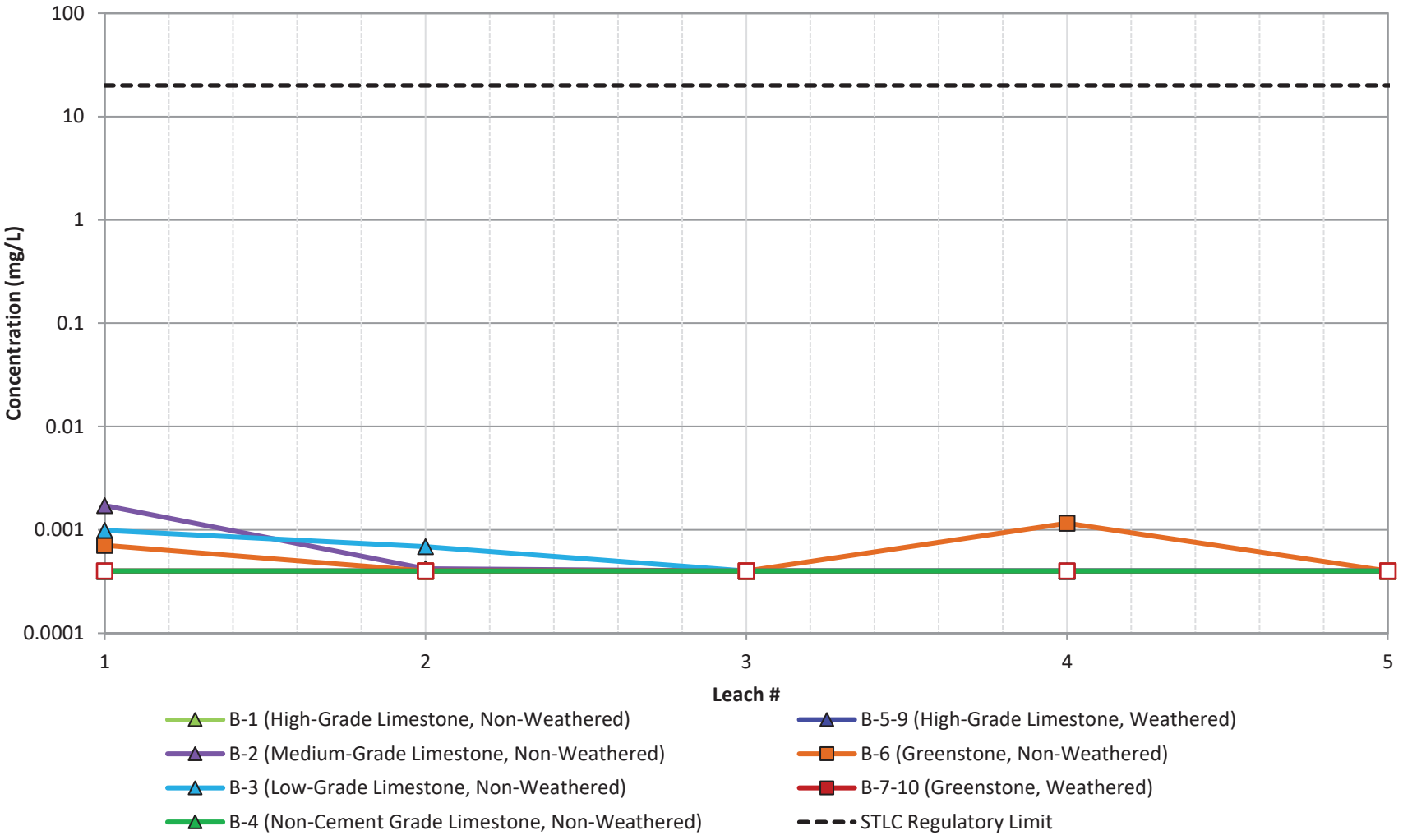
*Open symbols denote values at or below the method detection limit

WSP GOLDER	Title: **Sequential Modified WET- Mercury**		
	Project Name	Project No. 31405507	FIGURE C-21
	Client Name: Lehigh Permanente	Date: 8/4/2022	



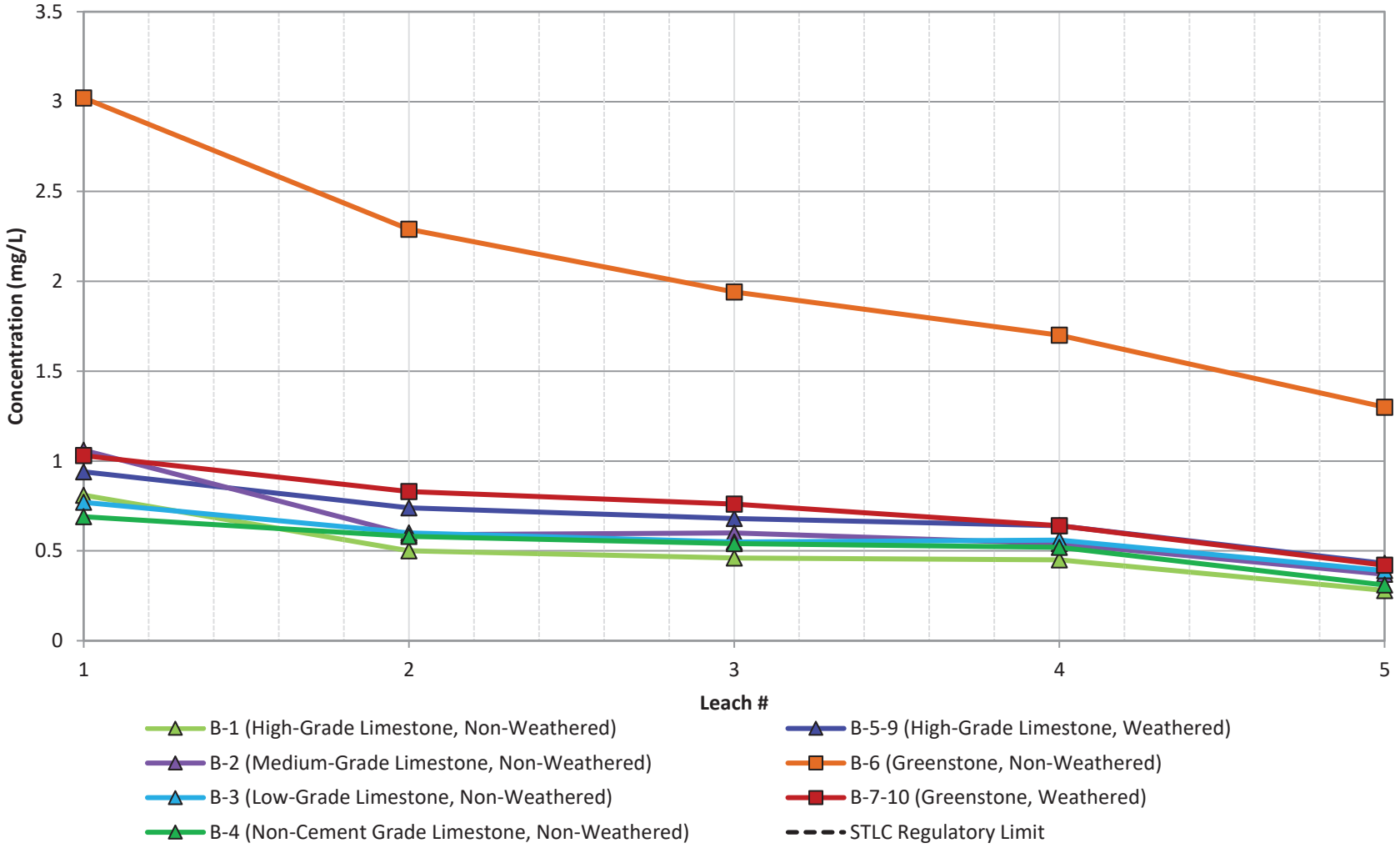
*Open symbols denote values at or below the method detection limit

WSP GOLDER	Title: **Sequential Modified WET- Molybdenum**		
	Project Name	Project No. 31405507	FIGURE C-22
	Client Name: Lehigh Permanente	Date: 8/4/2022	



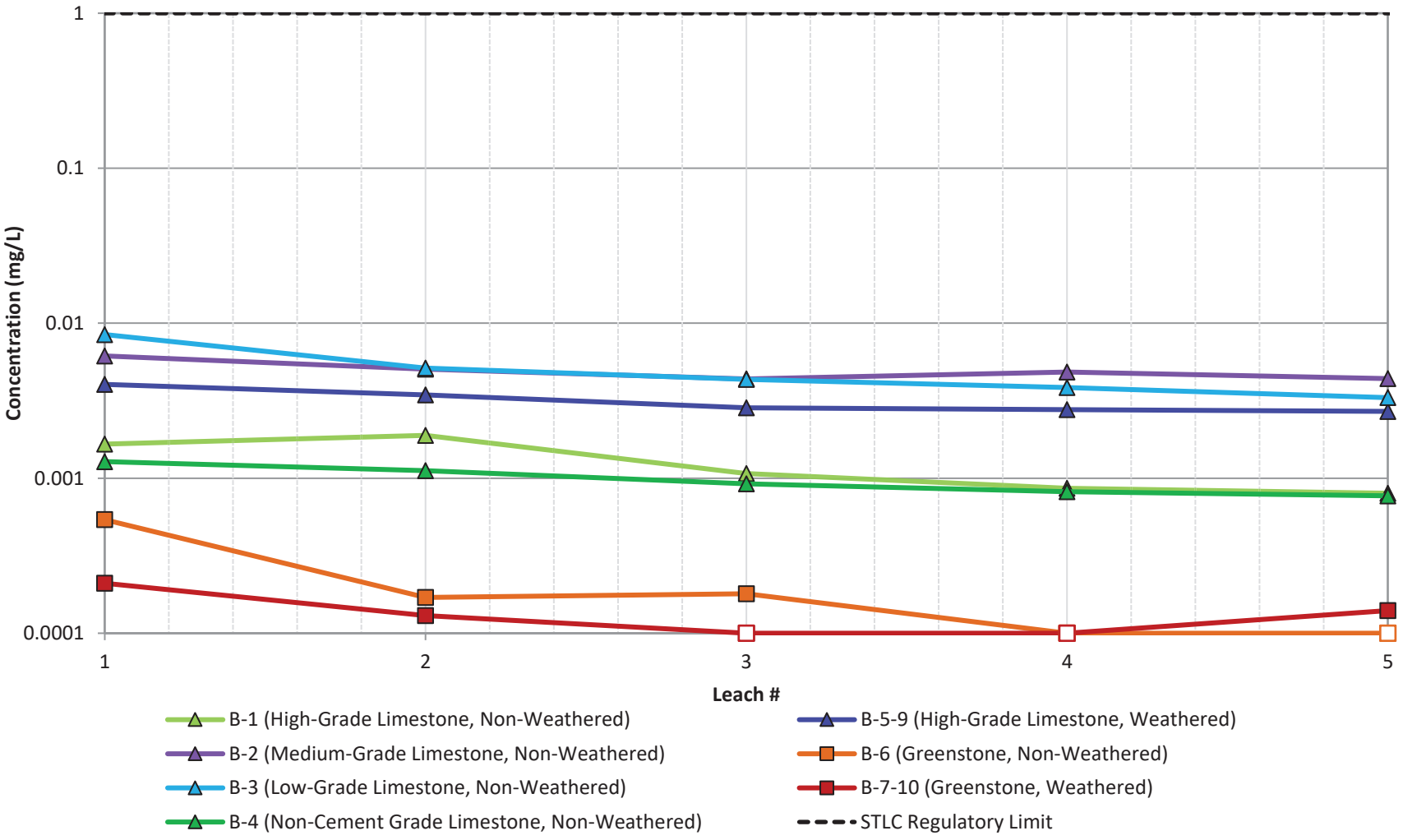
*Open symbols denote values at or below the method detection limit

WSP GOLDER	Title: **Sequential Modified WET- Nickel**		
	Project Name	Project No. 31405507	FIGURE C-23
	Client Name: Lehigh Permanente	Date: 8/4/2022	



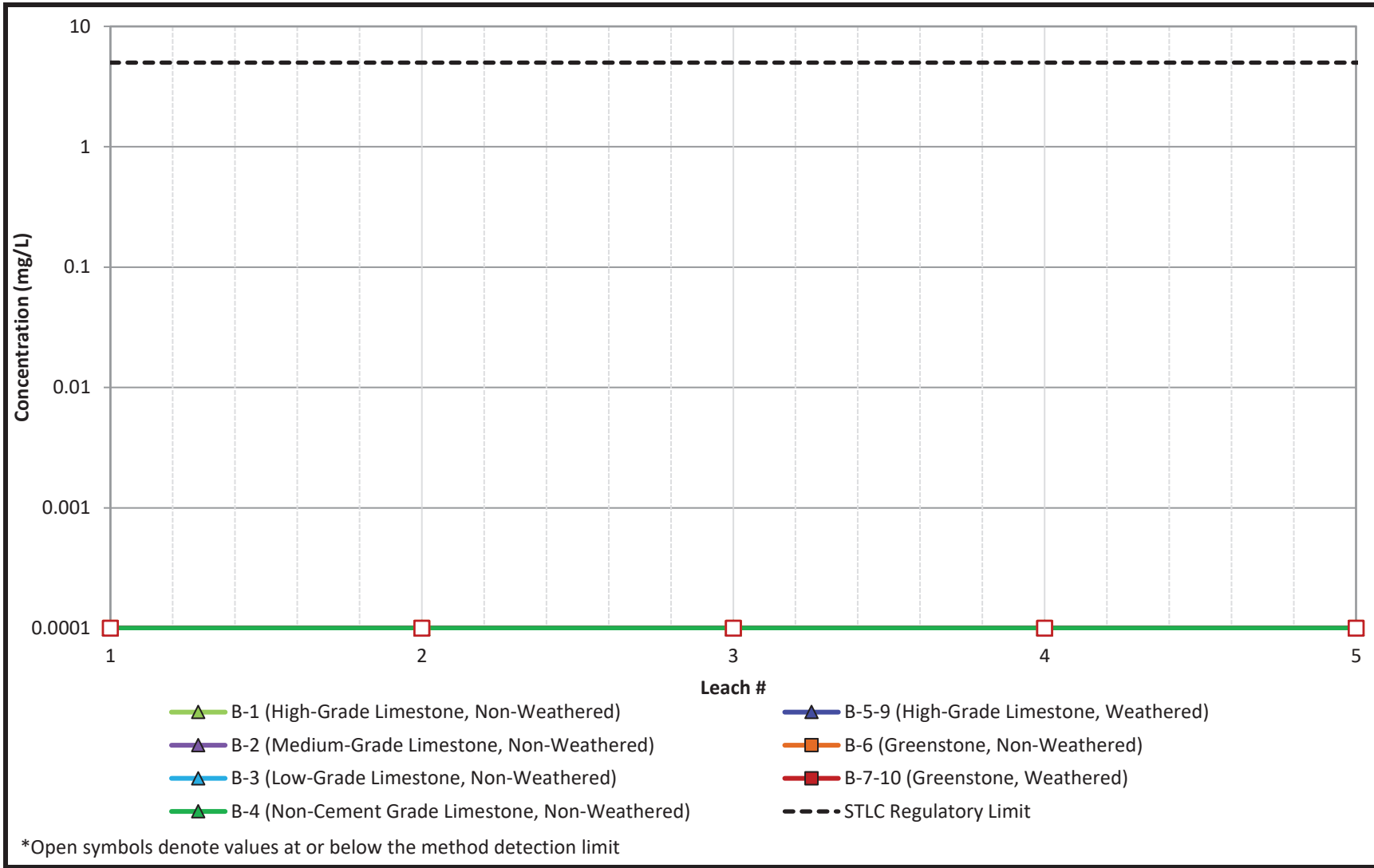
*Open symbols denote values at or below the method detection limit

WSP GOLDER	Title: **Sequential Modified WET- Potassium**		
	Project Name	Project No. 31405507	FIGURE C-24
	Client Name: Lehigh Permanente	Date: 8/4/2022	



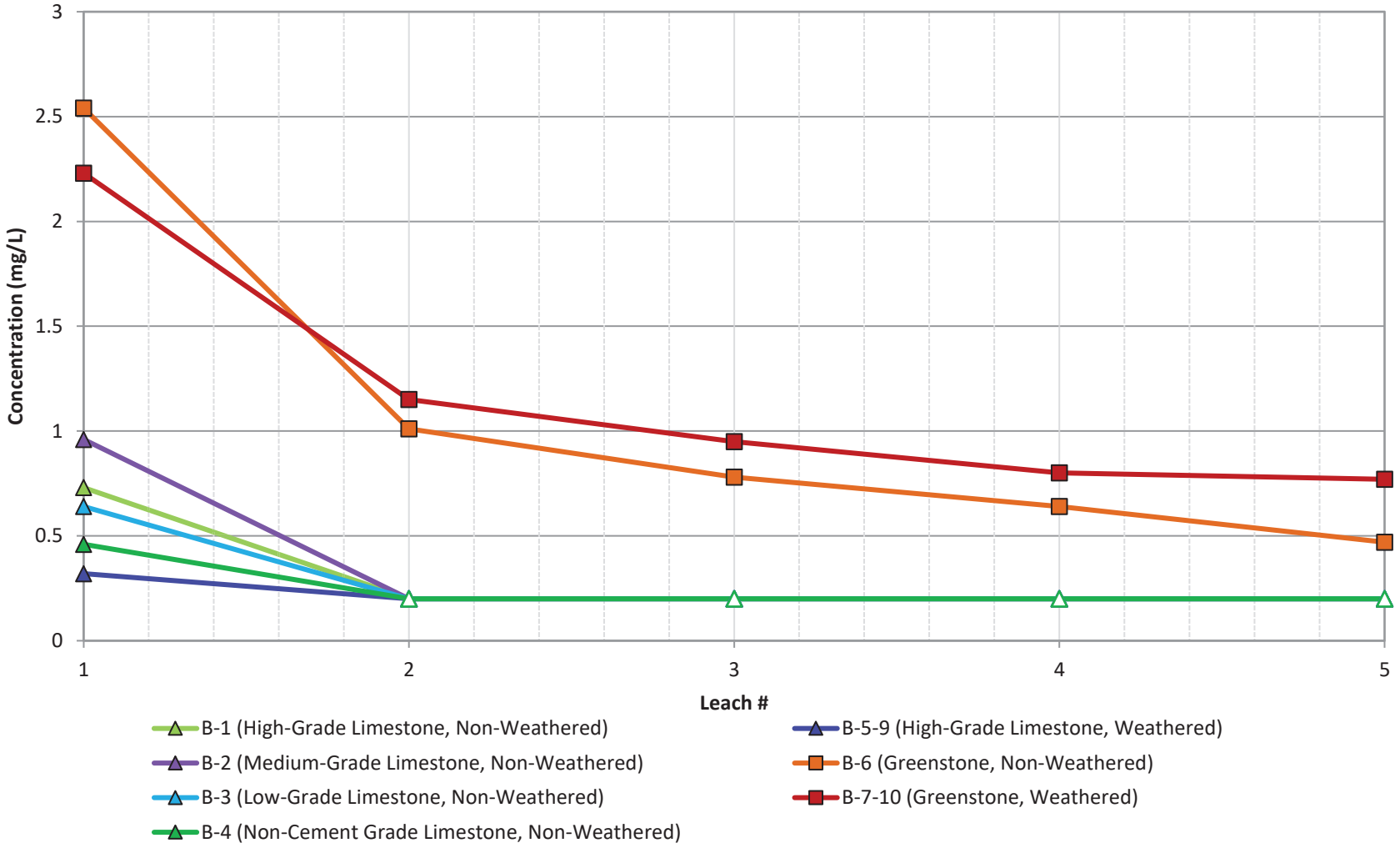
*Open symbols denote values at or below the method detection limit

WSP GOLDER	Title: **Sequential Modified WET- Selenium**		
	Project Name	Project No. 31405507	FIGURE C-25
	Client Name: Lehigh Permanente	Date: 8/4/2022	



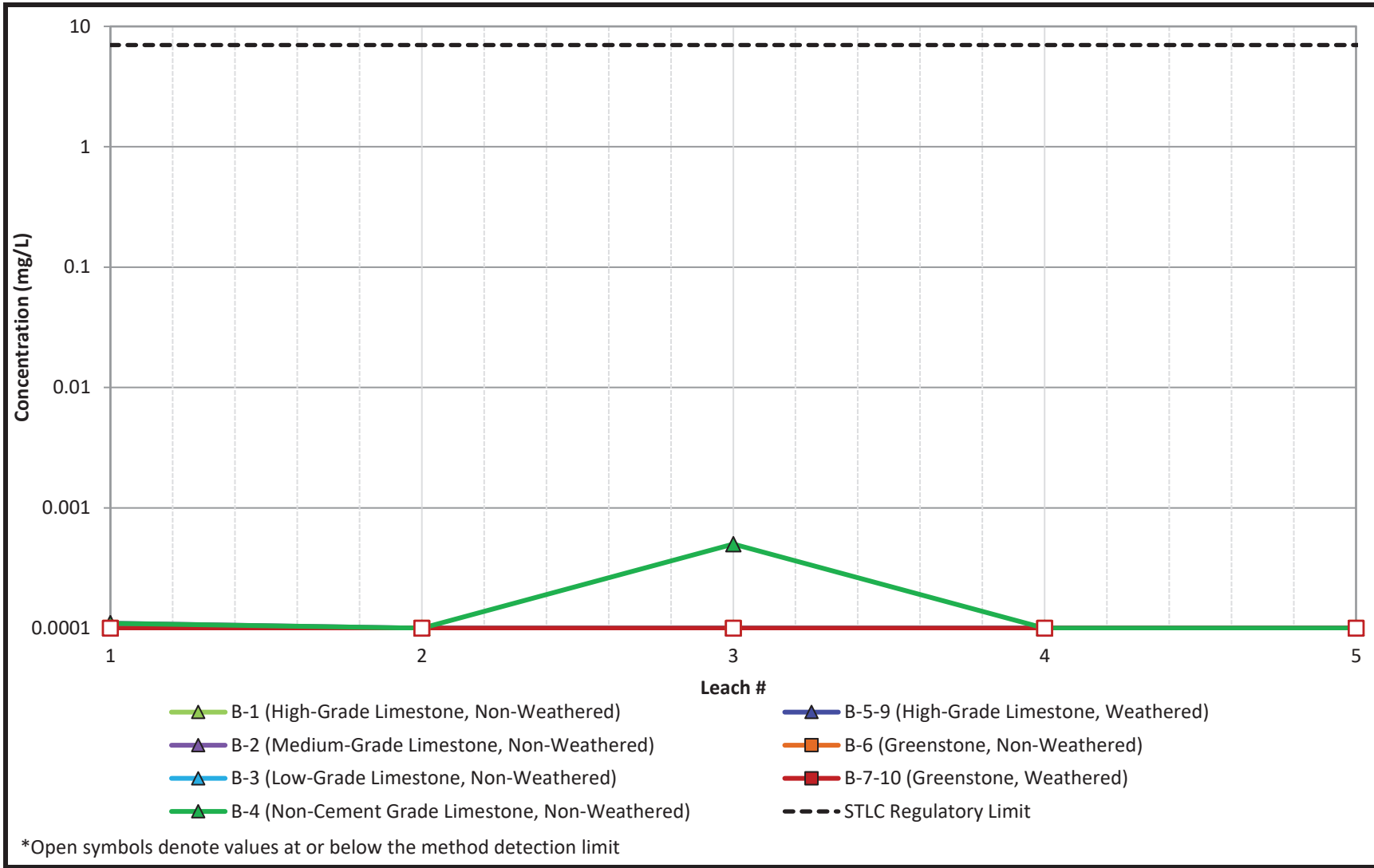
*Open symbols denote values at or below the method detection limit

WSP GOLDER	Title: **Sequential Modified WET- Silver**		
	Project Name	Project No. 31405507	FIGURE C-26
	Client Name: Lehigh Permanente	Date: 8/4/2022	



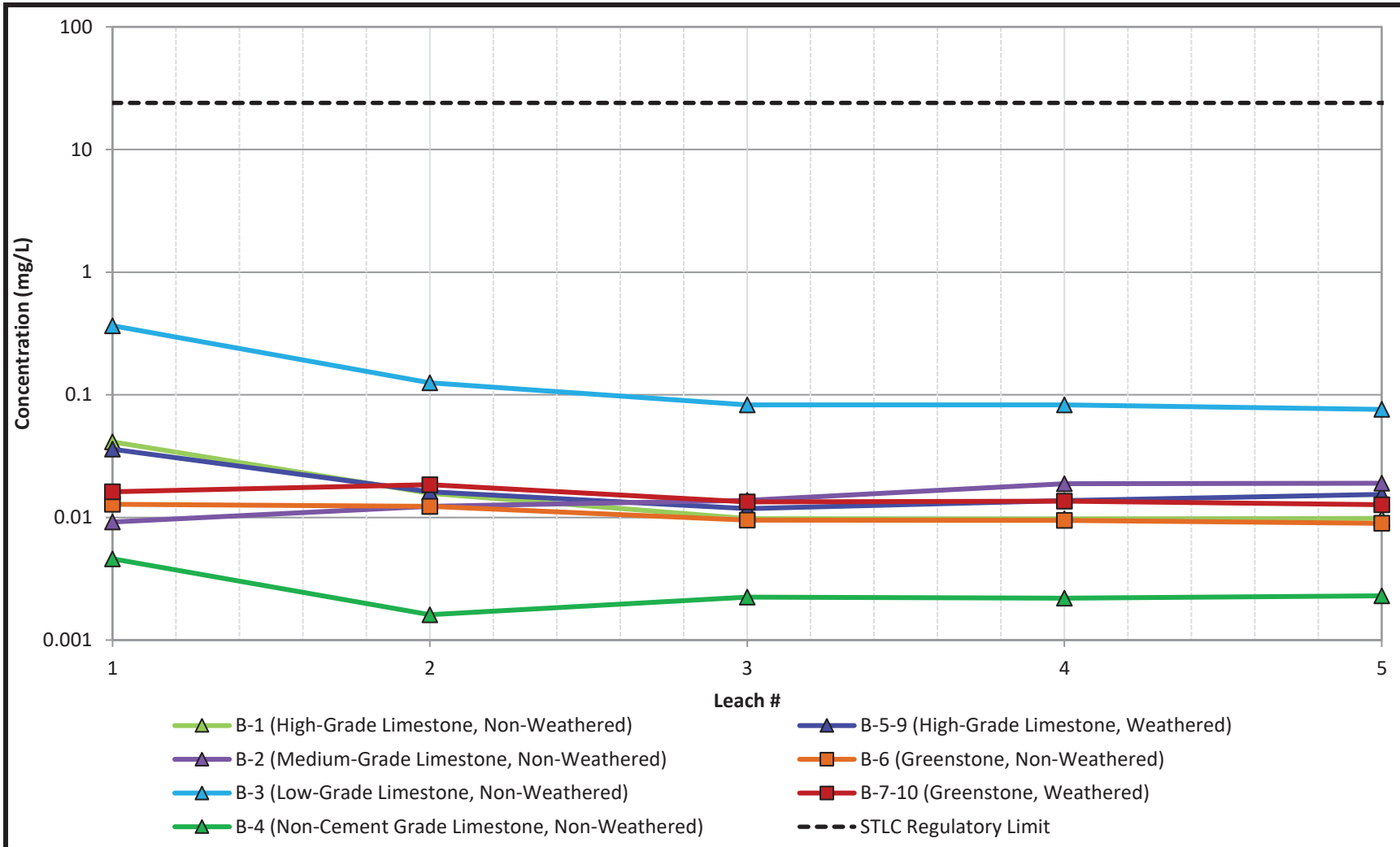
*Open symbols denote values at or below the method detection limit

WSP GOLDER	Title: **Sequential Modified WET- Sodium**		
	Project Name	Project No. 31405507	FIGURE C-27
	Client Name: Lehigh Permanente	Date: 8/4/2022	



*Open symbols denote values at or below the method detection limit

WSP GOLDER	Title: **Sequential Modified WET- Thallium**		
	Project Name	Project No. 31405507	FIGURE C-28
	Client Name: Lehigh Permanente	Date: 8/4/2022	



*Open symbols denote values at or below the method detection limit

WSP GOLDER	Title: **Sequential Modified WET- Vanadium**		
	Project Name	Project No. 31405507	FIGURE C-29
	Client Name: Lehigh Permanente	Date: 8/4/2022	

G4. Seismic Refraction Survey (NorCal Geophysical Consultants, Inc. May 22, 2014)

NORCAL GEOPHYSICAL CONSULTANTS, INC.

May 22, 2014

Golder Associates, Inc.
425 Lakeside Drive
Sunnyvale, CA 94085

Subject: Seismic Refraction Survey
Sites 4 and 11
Permanente Quarry
Cupertino, California

NORCAL Job #14-245.15B

Attention: George Wegmann,

This report presents the findings of seismic surveys performed by NORCAL Geophysical Consultants, Inc. for Golder Associates, Inc. at Permanente Quarry in Cupertino, California. The surveys were performed during the period March 4 through 11th, 2014 by NORCAL Professional Geophysicist William J. Henrich, PGp 893. Geologist Jeff Linder and Field Technician Dave Walter of Golder Associates, Inc. provided field assistance throughout the duration of the survey.

1.0 SITE DESCRIPTION AND PURPOSE

The seismic surveys were conducted at two locations referred to as Area 11 and Area 4, as shown on Plates 1A and 1B, respectively. Both areas encompass sections of Permanente Creek which drains in a general west to east direction. The area north of the creek has been subjected to accumulations of overburden materials related to quarrying operations. Particle sizes of the mine wastes ranged from sand and gravel size up to boulders that, on the surface, were several feet across. The local bedrock consisted of greywacke (sandstone), greenstone and limestone belonging to the Franciscan Complex.

The purpose of the seismic survey was to determine the thickness of alluvium and alluvium-rock fills at accessible select areas within the stream channel, along parallel haul roads and areas north of the stream channel. This data will be used by others to assess volumes of unconsolidated materials needed to be removed for restoration to the original stream channel grade and configuration as part of a reclamation plan for the quarry.

2.0 METHODOLOGY

We collected seismic data using two methods known as seismic refraction (SR) and multi-channel analysis of surface waves (MASW). The SR method was used to determine the compressional (P-) wave velocity of subsurface materials. The P-wave velocity (Vp) of fill, sediments, and rock are dependent on physical properties such as compaction, density, hardness, and induration. However, other factors such as bedding, fracturing, and saturation also affect Vp.

Typically, low Vp is indicative of loose, dry soils, poorly compacted fill material, poorly to semi-consolidated sediments, or alternatively, deeply weathered and/or highly fractured rock. Moderate Vp usually indicates dense and highly compacted or saturated sedimentary deposits or fill, and/or moderately weathered and fractured sedimentary rock. High Vp typically represent un-weathered sedimentary (i.e., sandstone, conglomerate, meta-sandstone or basalt) bedrock. A more detailed description of the SR methodology is provided in Appendix A.

The MASW method was used to determine both the P-wave and the shear (S-) wave velocity of subsurface materials in areas where limited access precluded the use of the SR method. S-waves typically propagate through earth materials at roughly one-half the velocity of P-waves. However, S-wave velocities are more directly related to the strength of fill, sediments, and rock than P-waves. Furthermore, unlike Vp, S-wave velocity (Vs) is not affected by saturation. Typically, low Vs is indicative of loose, dry soils, poorly compacted fill material, poorly to semi-consolidated sediments, or alternatively, deeply weathered and/or highly fractured rock. Moderate Vs usually indicates dense and highly compacted sedimentary deposits or fill, and/or moderately weathered and fractured sedimentary rock. High Vs typically represent un-weathered sedimentary (i.e., sandstone, conglomerate, meta-sandstone or basalt) bedrock. A more detailed description of the MASW method is provided in Appendix B.

3.0 DATA ACQUISITION

SR surveys were conducted in two locations referred to as the Rock Pile Area (Area 11) and the Material Removal Area (Area 4). The SR surveys were conducted according to the procedures described in Appendix A. MASW soundings were conducted in Area 11 according to the procedures described in Appendix B. The salient features of the data acquisition procedures used in each area are described in the following sections.

3.1 AREA 11

In Area 11 we collected SR data from 8-lines ranging in length from 75- to 250-ft. The locations of these lines, labeled Line 1 through Line 8, are shown on Plate 1A. We also conducted two MASW soundings. The locations of the soundings, labeled MASW-9 and MASW-10 are also shown on Plate 1A. Where possible, the SR lines and MASW soundings were located within the stream channel. However, there were some areas where the lines had to be placed on adjacent compacted gravel roads because of the presence of dense vegetation, concrete linings or steel culverts within the channel.

3.2 AREA 4

In Area 4, we acquired SR data from 13-lines ranging in length from 125- to 250-ft. The locations and orientations of the SR lines are shown on Plate 1B. The SR lines were positioned within the stream channel and on the northern portions (hill slopes, access roads and parking area) of the site.

4.0 DATA PROCESSING

4.1 SEISMIC REFRACTION (SR)

The refraction data were processed as described in Appendix A. Elevation data were provided by Waterways Consultants, Inc. at each shot point location within every seismic line. These elevation data were incorporated into the final processed seismic models. Further information regarding specific data input and sample compilations can be found in Appendix A.

4.2 MULTI-CHANNEL ANALYSIS OF SURFACE WAVES (MASW)

The MASW data were processed according to the procedures described in Appendix B.

5.0 RESULTS

The results of the seismic refraction survey are illustrated by the seismic velocity cross-sections (profiles) shown on Plates 2 through 8. On each profile the vertical axis represents elevation above mean sea level (MSL) and the horizontal axis represents draped survey distance (Station) along each line. Color shaded areas represent the lateral and vertical extent of the seismic layers comprising each profile. Modelled layer depths (thicknesses) as described in the Appendix A were determined beneath each geophone. These data were interpolated/extrapolated beneath each shot point. The relationship between color and seismic velocity is indicated by the color scales plotted to the right of each seismic refraction profile. In order to indicate how velocity varies from line to line within each survey area, the same scale was used for every profile. The results obtained in each area are described in the following sections. Specific results are presented for areas where two or more seismic refraction profiles either cross each other or are in a local proximity. It was useful to group seismic lines in this manner because of common characteristics involving of topography, location or surface conditions.

5 .1 AREA 11

5.1.1 Lines 1 and 2 (Plate 2)

Lines 1 and 2 were located within the stream channel, just west of a retention pond, as shown on Plate 1A. During the survey, water from remote pumping was actively being discharged to the stream channel above the seismic lines. The profile for Line 1 indicates velocities (Vp) ranging from 1200- to 7200-ft/sec. Our interpretation of the data resolves this range into two seismic layers labeled V1 and V2 in order of increasing depth and velocity. We interpret V1as representing unconsolidated stream deposits and V2 as representing bedrock. The depth to rock ranged from 18- to 25-ft. The Profile for Line 2 indicates velocities (Vp) ranging from 1150- to 2550-ft/sec. Our interpretation of the data resolves this range into two seismic layers labeled V1 and V2 in order of increasing depth and velocity. Given the low velocities of these layers, we interpret both as representing unconsolidated stream deposits. The difference in velocity between the two layers is related to their relative degree of compaction. V2 has a higher velocity than V1 because it is more highly compacted, probably because of the overbearing weight of V1. Line 2 did not detect bedrock because it was a relatively short line length which limited the depth of exploration.

5.1.2 Line 3 – 6, MASW Soundings 9 and 10 (Plate 3)

Lines 3 through 5 were located on access roads that parallel the stream channel, as shown on Plate 1A. Line 6 was situated in open, gravel packed area that ranged from 40 to 60-ft north of a subsurface diversion channel. The profiles for Lines 3-6 indicate velocities (Vp) ranging from 2300- to 7800-ft/sec. Our interpretation of the data resolves this range into two seismic layers designated as V1 and V2 in order of increasing depth and velocity. We interpret V1 as representing unconsolidated materials, e.g. road fill and/or alluvium. Given the high velocity range of V2 (6850- to7800-ft/sec) we interpret it as representing bedrock. The depths to bedrock ranged from 8- to 35-ft bgs.

MASW Soundings 9 and 10 were located north of Seismic Refraction Line 3, as shown on Plate 1A. The MASW soundings were acquired for the purpose of assessing possible near surface high velocity layers and providing depth to bedrock information further north of the stream channel. The 1D MASW Velocity Models (9 and 10) shown at the top of Plate 3 indicate a near surface high velocity layer (Vs=1500- to 2000-ft/sec) that is 8- to 16-ft thick. We interpret this high velocity layer as representing compacted (by very heavy vehicle loads) road fill. The materials underlying the compacted fill have lower velocities (Vs=500- to1000-fps) and thus constitute a velocity inversion. This velocity inversion, which is typically about 8- to 9-ft thick, is characteristic of alluvium. It is underlain, at depths of 17- to 26-ft bgs by velocities (Vs) of about 1800-ft/sec. We interpret these velocities as being indicative of consolidated bedrock. The bedrock depth indicated by the MASW-9 model (about 17-ft) is more shallow than the depth

indicated by the Line 3 profile (23-ft) at its point of closest approach. Conversely, the bedrock depth indicated by the MASW-10 model (26-ft) is significantly greater than the 5- to 10-ft depth indicated by the Line 3 and Line 4 profiles at their points of closest approach to MASW-10. These factors highlight the erratic nature of the bedrock surface and can be, in part, attributed to the fact that MASW-9 and MASW-10 are 25-ft north of Lines 3 and 4.

Additionally, the MASW soundings were undertaken to provide a constraint on the seismic refraction results in the general area (Seismic Refraction Lines 3 and 4) as the MASW techniques can accommodate shallow velocity inversions in processing. The MASW bedrock depths (17- to 26-ft bgs) derived from MASW analysis thus formed an approximate magnitude range of values. Our seismic refraction results indicated that bedrock depths ranged from 5- to 35-ft bgs which is in the same order of magnitude as the MASW estimate of depths to bedrock in the general area.

5.1.3 Lines 7, 8 and 11(Plate 4)

Lines 7, 8 and 11 trend northward, away from the stream channel, as shown on Plate 1A. Lines 7 and 8 cross an uphill section of accumulated mine waste and packed surficial gravel. The local topography was highly variable and steep. Line 11 crosses a gently sloping, open, gravel packed area from the edge of a metal culvert up to point 50-ft distant from the rock discharge pile (Rock Pile). The profiles for Lines 7, 8 and 11indicate velocities ranging from 1850- to 5700-ft/sec. Our interpretation of the data resolves this range into two seismic layers designated as V1 and V2, in order of increasing depth and velocity. Because of its relatively low velocity and highly variable thickness, we interpret V1 as representing mine wastes and/or alluvium. We interpret V2 as representing bedrock. Beneath Lines 7 and 8, the depth to rock ranges from less than 10- to over 50-ft. The Time-Distance plot for Line 11 indicated a relatively high velocity V1 layer associated with the road bed. No characteristic higher V2 bedrock velocity layer was detected. Therefore, no modeling results are presented for this line.

5.2 AREA 4

5.2.1 Lines 12, 13, 14 and 15 (Plate 5)

Lines 12, 13 and 14 were situated within a relative wide section of the stream channel, as shown on Plate 1B. Line 15 was located along a man-made bench that parallels the stream channel, about 20-ft upslope from the channel. The profiles for the four lines indicate velocities (Vp) ranging from about 900- to 3550-ft/sec. Our interpretation of the refraction data resolves this velocity range into three layers labeled V1 through V3 in order of increasing depth and velocity. We interpret the V1 and V2 layers as representing unconsolidated stream deposits and V3 as representing weathered bedrock. The depth to rock (V2/V3 interface) ranges from 7- to 23-ft bgs.

The relatively low velocity of V3 (2800- to 3450-ft/sec) suggests that it comprises a very weak rock like a meta-shale. The profile for Line 15 indicates that bedrock deepens to the east (downstream), reaching a maximum depth of 36-ft-bgs at the east end of the line. This puts it at an elevation of 1190-1192-ft MSL, which corresponds to the bedrock elevations at the west end of Line 12 and the east end of Line 13.

5.2.2. Lines 16 and 17 (Plate 6)

Lines 16 and 17 were situated on top of a gravel packed, level parking area, as shown on Plate 1B. The profiles for both lines indicate velocities (Vp) ranging from 1150- to 6200-ft/sec. Our interpretation of the Line 16 and Line 17 data resolves this range into two seismic layers labeled V1 and V2 in order of increasing depth and velocity. We interpret V1 as representing fill and alluvium and V2 as representing bedrock. The depth to rock ranges from17- to 23-ft bgs.

5.2.3 Lines 18, 19, 20 and 21 (Plate 7)

Lines 18 through 20 were located within the active stream channel, as shown on Plate 1B. However, there was no water in the channel at the time the survey was conducted. Line 21 extended north and upslope from the west end of Line 19. The profiles for these lines indicate velocities (Vp) ranging from 1100- to 4150-ft/sec. Our interpretation of the data resolves this range into three layers labeled V1 through V3 in order of increasing depth and velocity. V2 is absent beneath Line 18 and V3 is absent beneath Line 19. We interpret the combined V1 and V2 layers, with velocities ranging from 1050- to 2650-ft/sec, as representing unconsolidated stream and slope deposits. However, below Lines 19 and 20, the V2 layer could represent decomposed bedrock or dense gravel deposits. In addition, our field observations indicate that, beneath Line 21, V2 could represent mining waste that contains a high percentage of boulder size fill. We interpret theV3 layer as representing bedrock with velocities, where defined, ranging from 3400- to 4150-ft/sec. The depth to rock ranges from about 8- to 32-ft.

5.2.4 Lines 22, 23 and 24 (Plate 8)

Line 22 and Line 23 were located on an access road, as shown on Plate 1B. This road leads to Pond 4 (not shown). Line 24 extended southeast and down slope, from the access road towards the stream channel. The profiles for the three lines indicate velocities (Vp) ranging from 1200- to 6700-ft/sec. Our interpretation of the data resolves the velocity range into two layers labeled V1 and V2 in order of increasing depth and velocity. We interpret V1 as representing unconsolidated stream deposits. We interpret V2 as representing bedrock. Beneath Lines 22 and 23, the computed depths to bedrock ranged from 18- to 30-ft bgs. Beneath Line 24, the depths to bedrock decrease in the down slope direction; ranging from 18-ft bgs near the access road to only 8-ft bgs at the southeast edge of the profile.

6.0 STANDARD CARE

The scope of NORCAL's services for this project consisted of using geophysical methods to characterize the subsurface. The accuracy of our findings is subject to specific site conditions and limitations inherent to the techniques used. We performed our services in a manner consistent with the standard of care ordinarily exercised by members of the profession currently employing similar methods. No warranty, with respect to the performance of services or products delivered under this agreement, expressed or implied, is made by NORCAL.

We appreciate having the opportunity to provide you with this information.

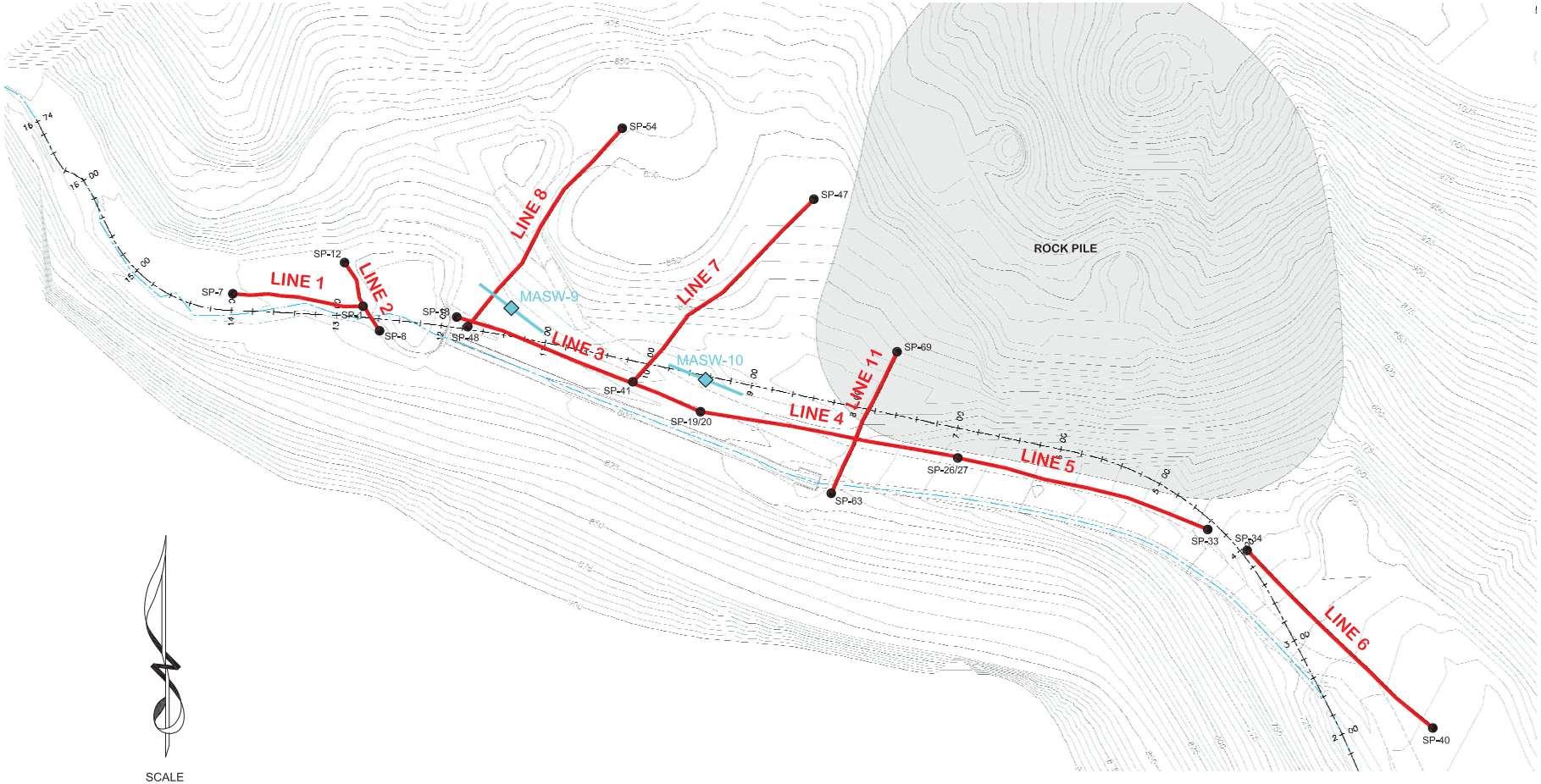
Respectfully,

NORCAL Geophysical Consultants, Inc.

William J Henrich
Professional Geophysicist PGp 893

WEB/tlt

Enclosures: Plates 1A, 1B and 2 through 8
Appendix A - Seismic Refraction (SR)
Appendix B – Multi-channel Analysis of Surface Waves (MASW)



SCALE

0 50 100 200

(1 inch = 100 feet)

LEGEND

	SEISMIC REFRACTION LINE
SP-1	SHOT POINT LOCATION
	CENTER POINT OF MASW LINE

NOTE: BASE MAP PROVIDED BY WATERWAYS CONSULTING, INC.

NORCAL

SITE LOCATION MAP
PERMANENTE QUARRY AREA 11
SEISMIC REFRACTION SURVEY

LOCATION: CUPERTINO, CALIFORNIA

CLIENT: GOLDER ASSOCIATES, INC.

JOB #: 14-245.15B

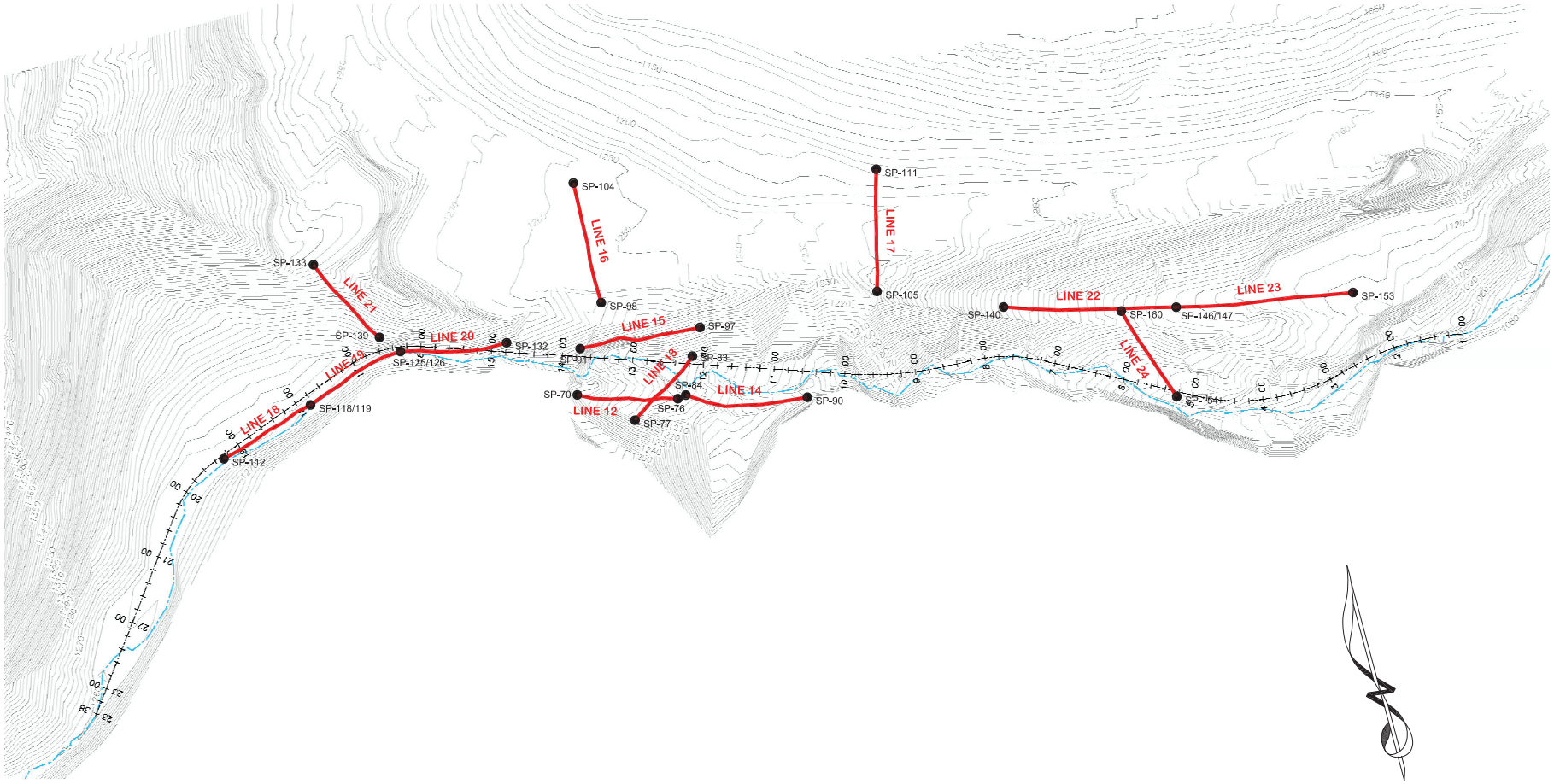
NORCAL GEOPHYSICAL CONSULTANTS INC.

DATE: MAY 2014

DRAWN BY: G.RANDALL

APPROVED BY: WJH

PLATE 1A



LEGEND	
	SEISMIC REFRACTION LINE
SP-1	SHOT POINT LOCATION

NOTE: BASE MAP PROVIDED BY WATERWAYS CONSULTING, INC.

NORCAL

SITE LOCATION MAP
PERMANENTE QUARRY AREA 4
SEISMIC REFRACTION SURVEY

LOCATION: CUPERTINO, CALIFORNIA

CLIENT: GOLDER ASSOCIATES, INC.

JOB #: 14-245.15B

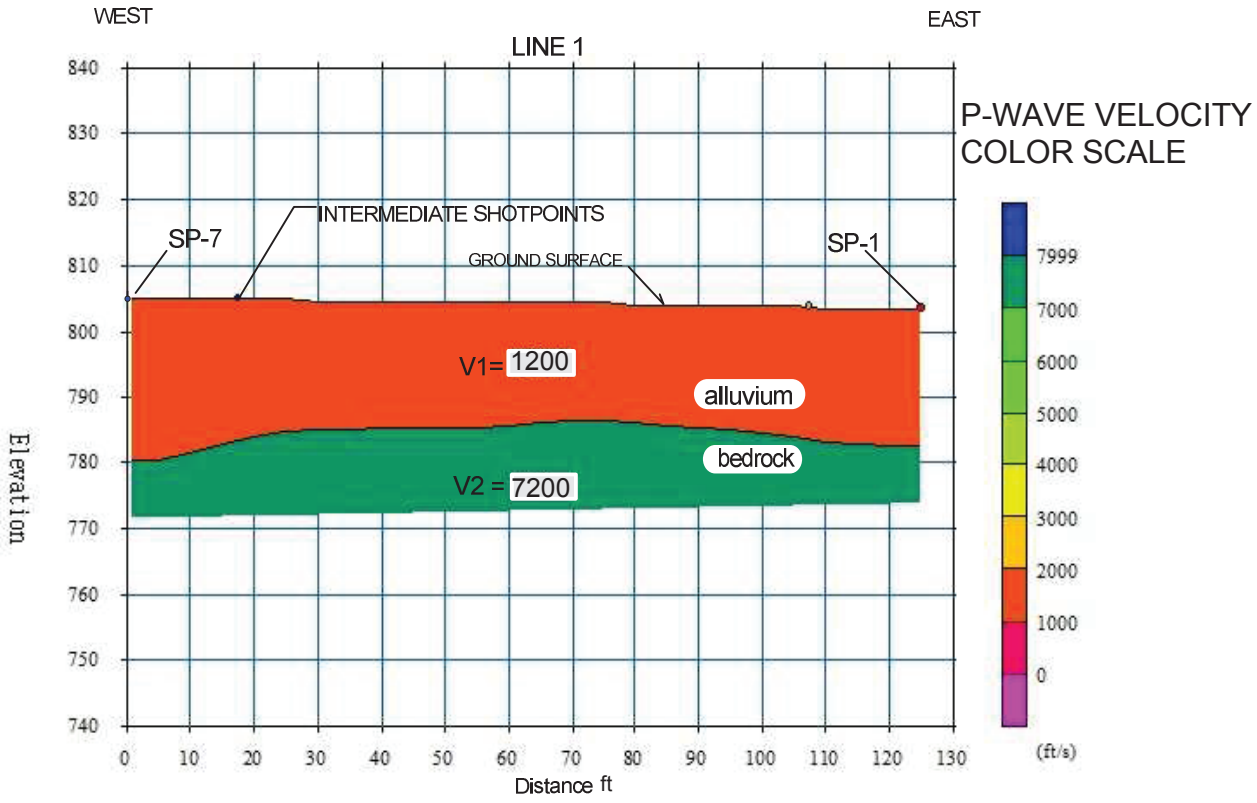
NORCAL GEOPHYSICAL CONSULTANTS INC.

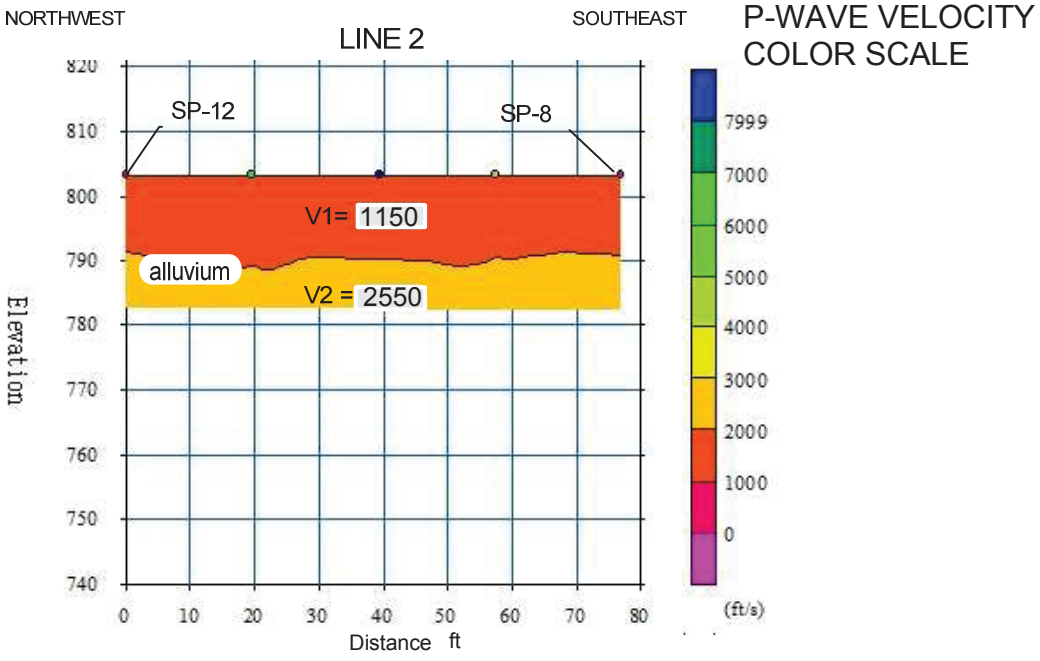
DATE: MAY 2014

DRAWN BY: G.RANDALL

APPROVED BY: WJH

PLATE 1B





EXPLANATION

V2 = 7200 Velocity Layer in ft/sec

Horizontal/Vertical Scale 1' = 30 feet

NORCAL

SEISMIC REFRACTION PROFILES LINES 1 AND 2

LOCATION: PERMANENTE QUARRY, CUPERTINO, CA

CLIENT: GOLDER ASSOCIATES, INC.

JOB #: 14-245.15B

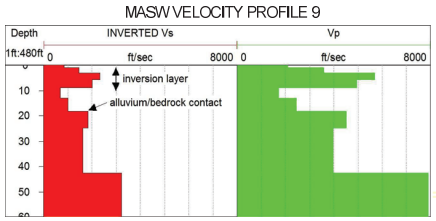
NORCAL GEOPHYSICAL CONSULTANTS INC.

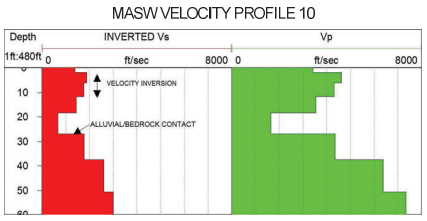
DATE: APRIL, 2014

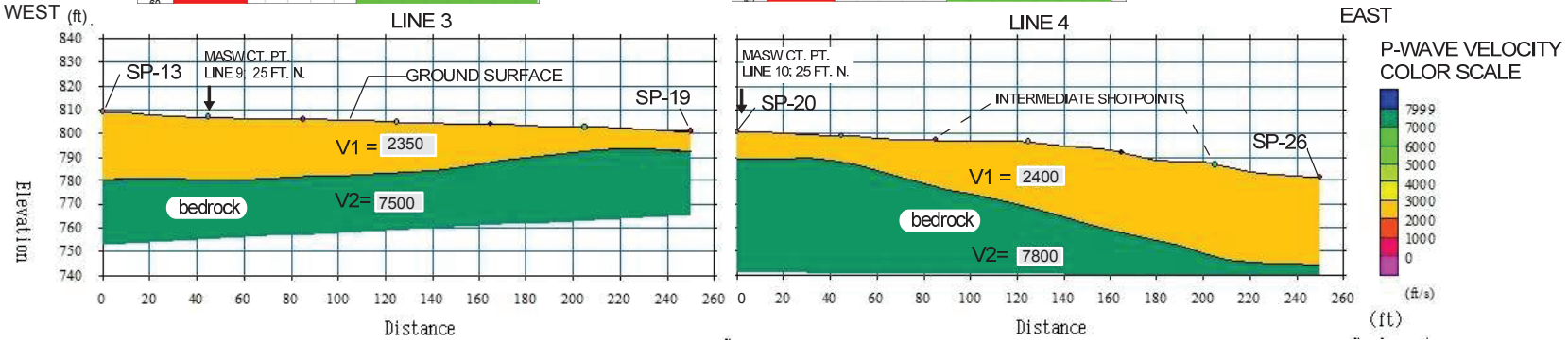
DRAWN BY: W HENRICH

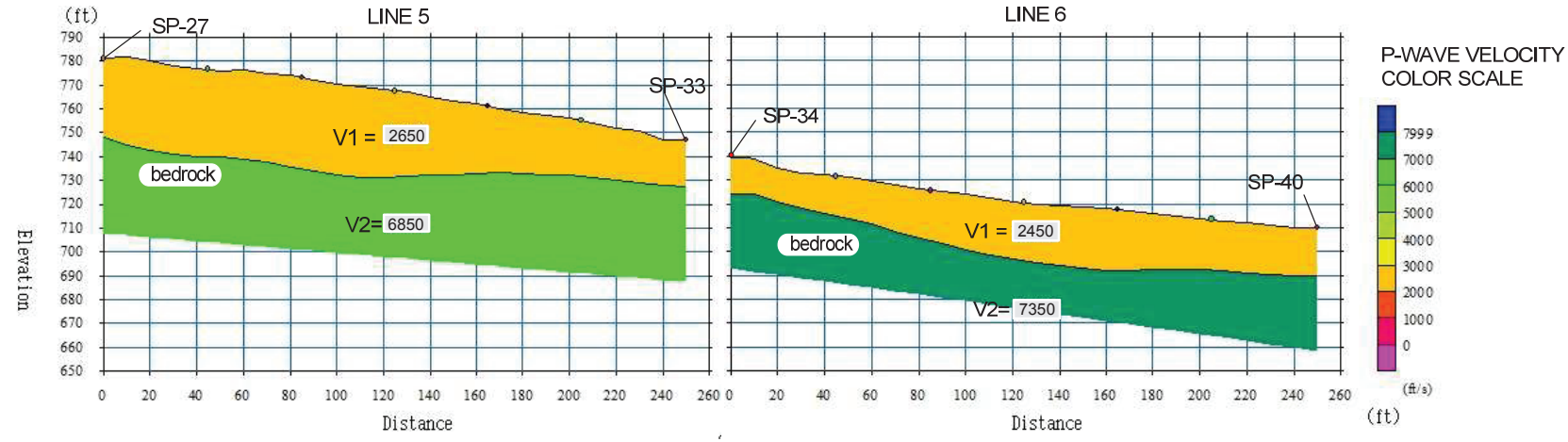
APPROVED BY: WJH

PLATE 2









EXPLANATION

V2 = 7200 Velocity Layer in ft/sec

HORIZONTAL/VERTICAL SCALE: 1" APPROX. EQUALS 50 FEET

NORCAL

SEISIMC REFRACTION PROFILES
LINES 3, 4, 5 AND 6;
MASW PROFILES 9 AND 10

LOCATION: PERMANENTE QUARRY, CUPERTINO, CA

CLIENT: GOLDER ASSOCIATES, INC

JOB #: 14-245.15B

NORCAL GEOPHYSICAL CONSULTANTS INC.

DATE: APRIL, 2014

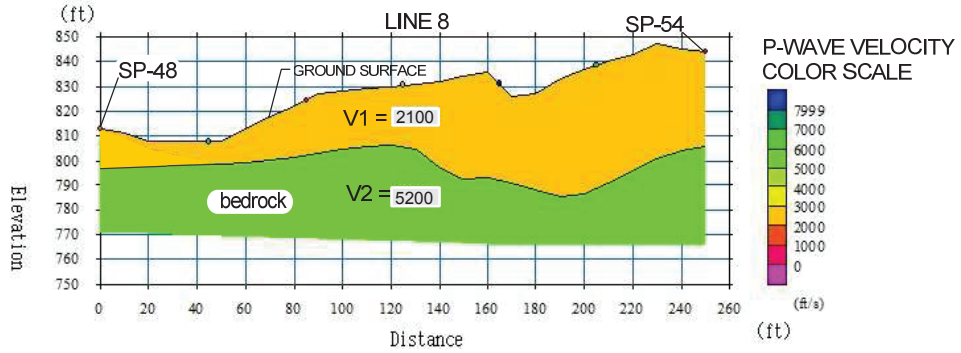
DRAWN BY: W. HENRICH

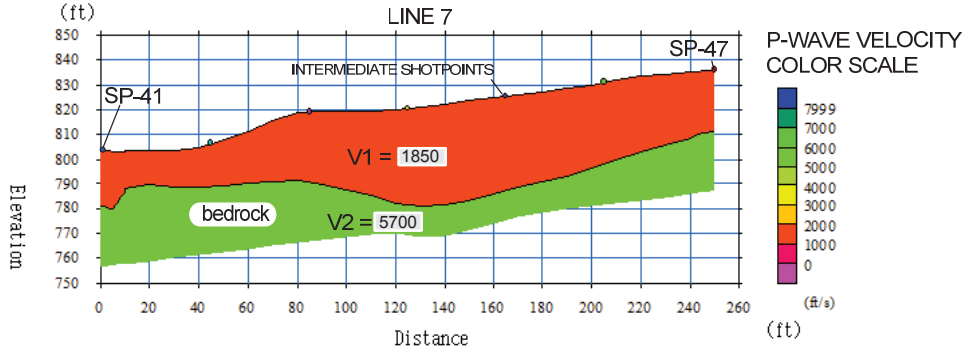
APPROVED BY: WJH

PLATE 3

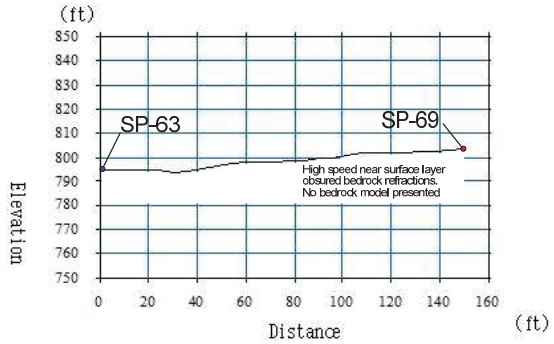
SOUTHWEST

NORTHEAST





LINE 11



EXPLANATION

V2 = 7200 Velocity Layer in ft/sec

HORIZONTAL/VERTICAL SCALE: ONE INCH APPROX. EQUAL 50 FEET

NORCAL

SEISIMC REFRACTION PROFILES
LINES 7, 8, AND 11

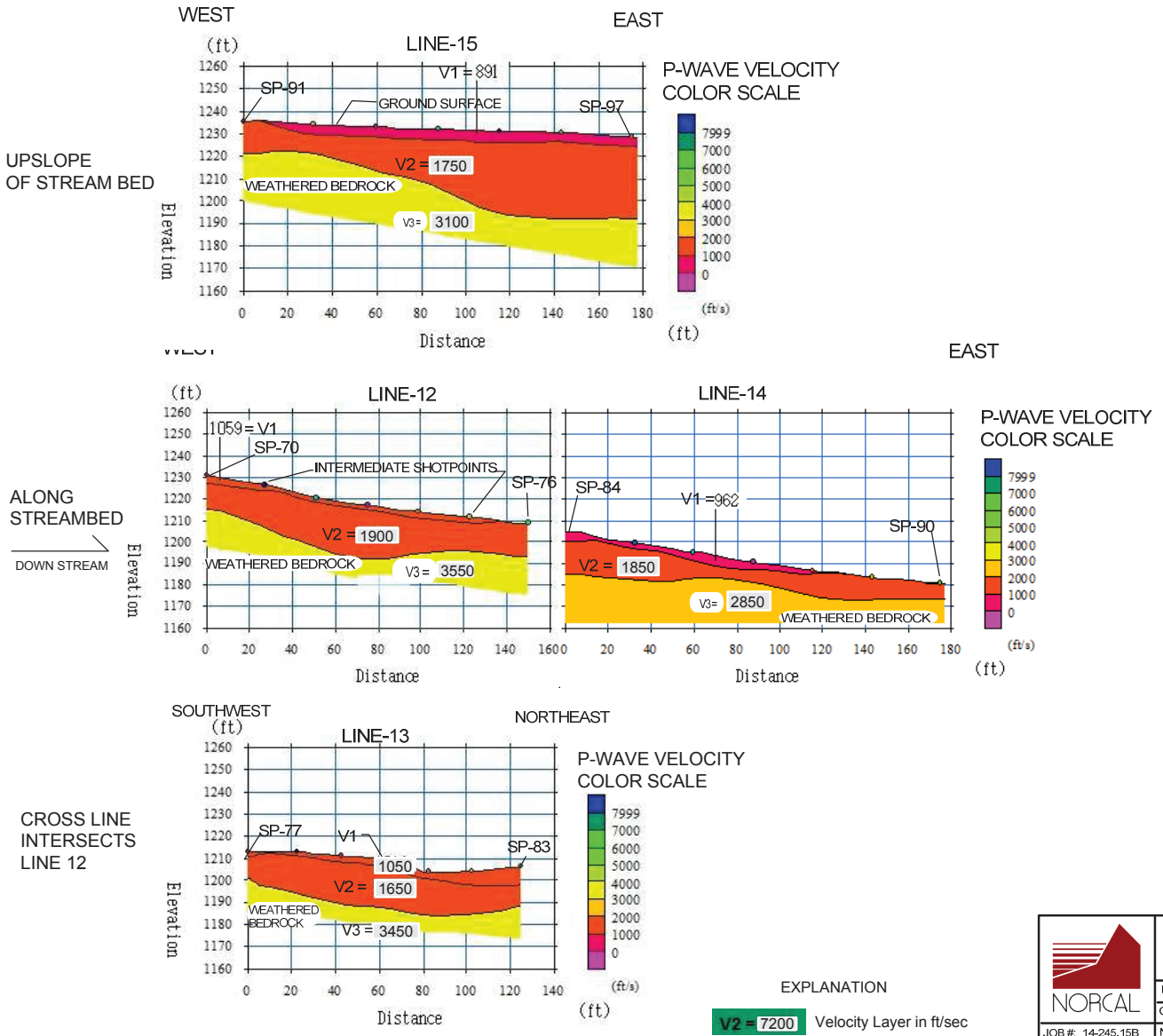
LOCATION: PERMANENTE QUARRY, CUPERTINO, CA

CLIENT: GOLDER ASSOCIATES, INC

JOB #: 14-245.15B | NORCAL GEOPHYSICAL CONSULTANTS INC.

DATE: APRIL, 2014 | DRAWN BY: W. HENRICH | APPROVED BY: WJH

PLATE 4

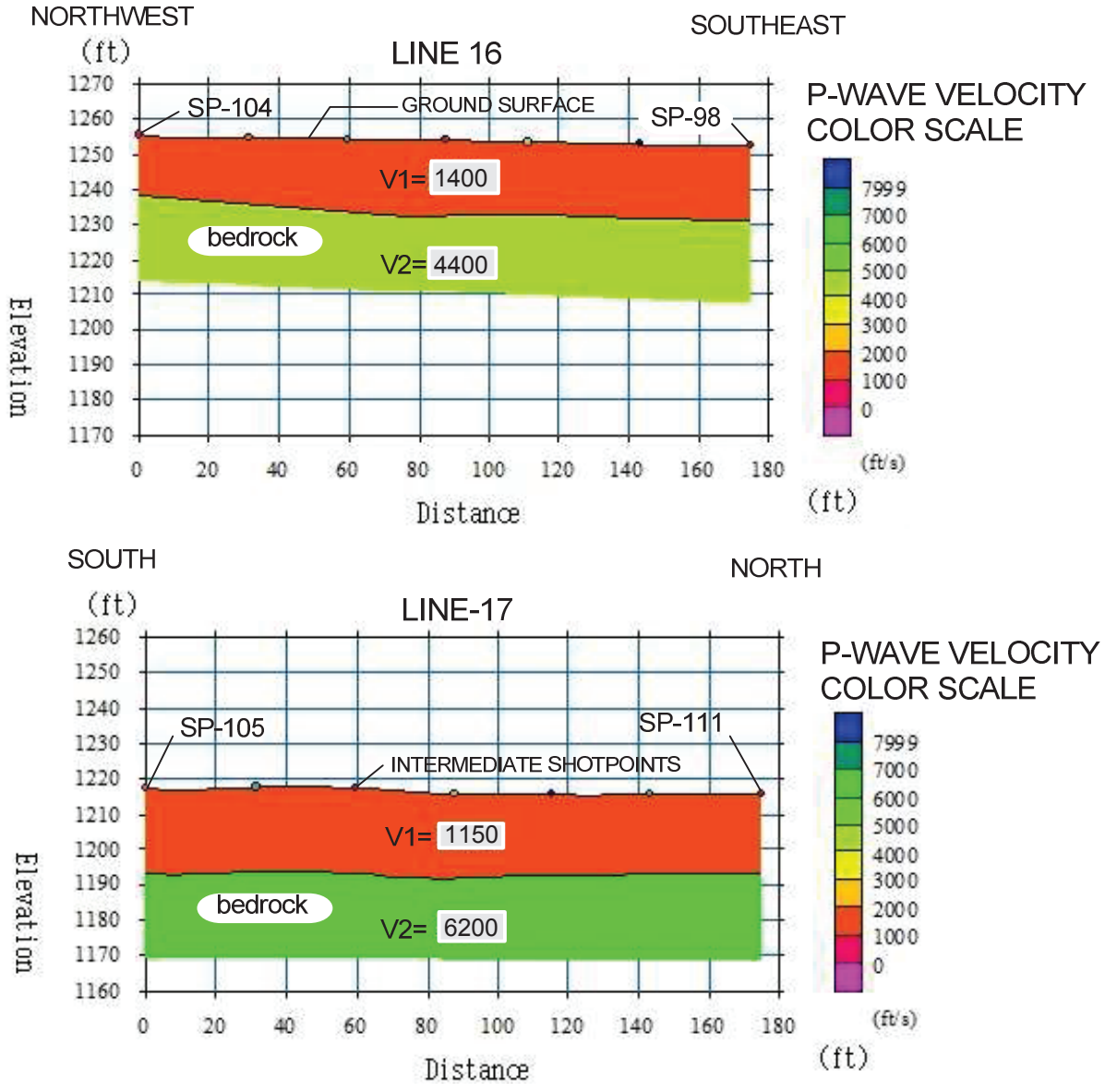


NORCAL

SEISIMC REFRACTION PROFILES
LINES 12, 13, 14, AND 15

LOCATION: PERMANENTE QUARRY, CUPERTINO, CA
CLIENT: GOLDER ASSOCIATES, INC
JOB #: 14-245.15B
NORCAL GEOPHYSICAL CONSULTANTS INC.
DATE: APRIL, 2014
DRAWN BY: W. HENRICH
APPROVED BY: WJH

PLATE
5



EXPLANATION

V2 = 7200 Velocity Layer in ft/sec

HORIZONTAL/VERTICAL SCALE: ONE INCH APPROX. EQUAL TO 50 FEET

NORCAL

SEISMIC REFRACTION
PROFILES LINES 16 AND 17

LOCATION: PERMANENTE QUARRY, CUPERTINO, CA

CLIENT: GOLDER ASSOCIATES, INC.

JOB #: 14-245.15B

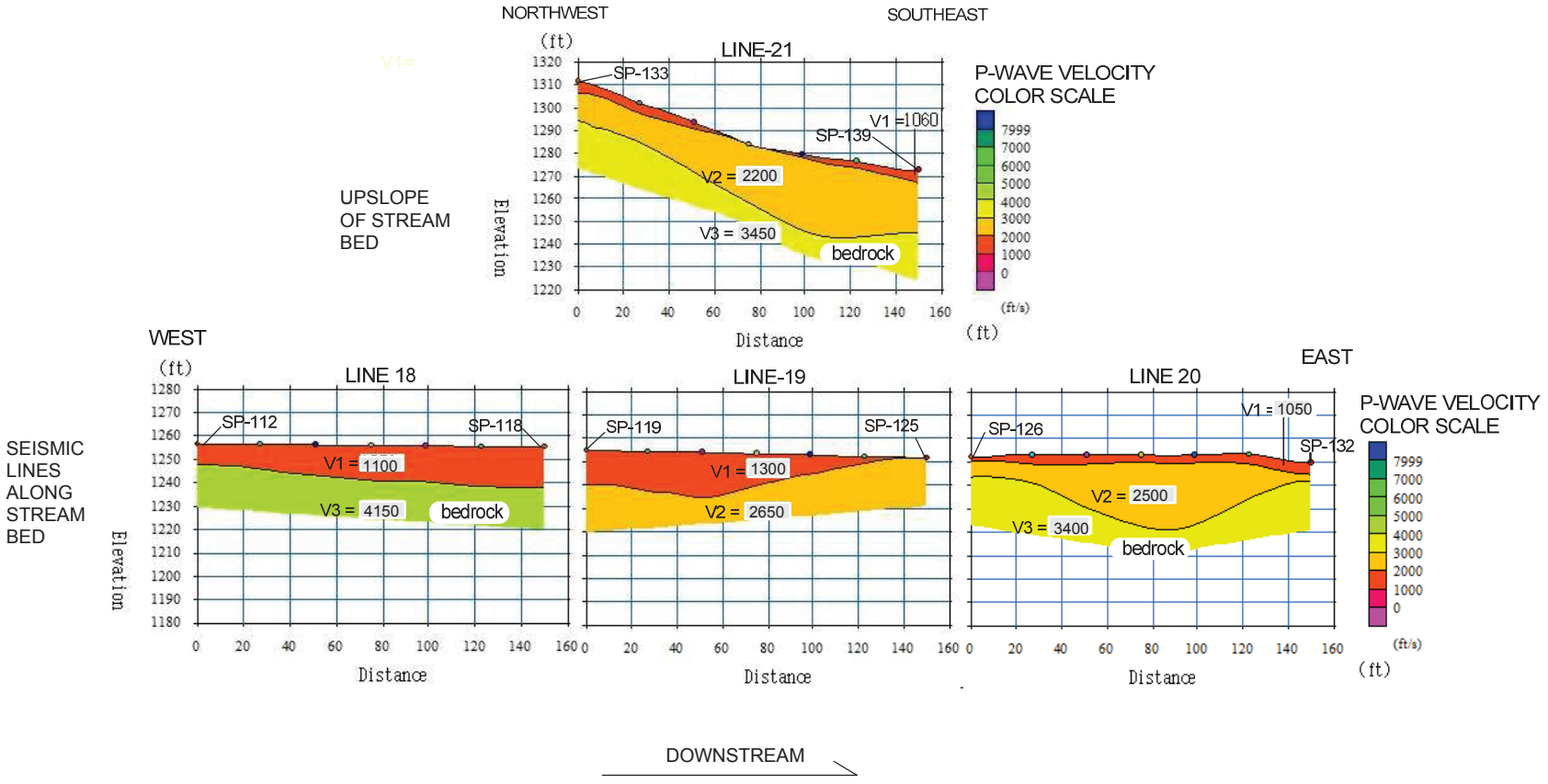
NORCAL GEOPHYSICAL CONSULTANTS INC.

DATE: APRIL, 2014

DRAWN BY: W HENRICH

APPROVED BY: WJH

PLATE 6



EXPLANATION

V2 = 7200 Velocity Layer in ft/sec

HORIZONTAL/VERTICAL SCALE: ONE INCH APPROX. EQUAL 50 FEET

NORCAL

SEISIMC REFRACTION PROFILES
LINES 18, 19, 20 AND 21

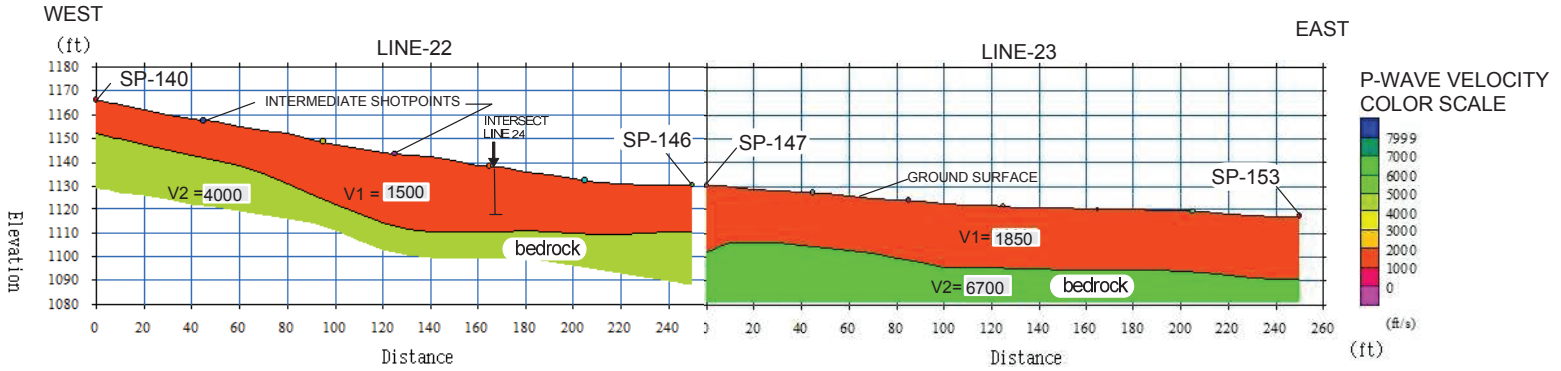
LOCATION: PERMANENTE QUARRY, CUPERTINO, CA

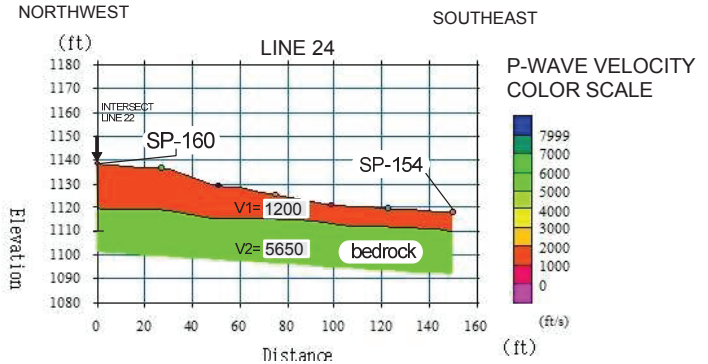
CLIENT: GOLDER ASSOCIATES, INC

JOB #: 14-245.15B | NORCAL GEOPHYSICAL CONSULTANTS INC.

DATE: APRIL, 2014 | DRAWN BY: W. HENRICH | APPROVED BY: WJH

PLATE 7





EXPLANATION

V2 = 7200 Velocity Layer in ft/sec

NORCAL	SEISIMC REFRACTION PROFILES LINES-22, -23 and -24	
	LOCATION: PERMANENTE QUARRY, CUPERTINO, CA	
	CLIENT: GOLDER ASSOCIATES, INC	PLATE 8
JOB #: 14-245.15B	NORCAL GEOPHYSICAL CONSULTANTS INC.	
DATE: APRIL, 2014	DRAWN BY: W. HENRICH / APPROVED BY: WJH	

Appendix A

SEISMIC REFRACTION (SR)

SEISMIC REFRACTION (SR)

1.0 METHODOLOGY

The seismic refraction method provides information regarding the seismic velocity structure of the subsurface. An impulsive (mechanical or explosive) source is used to produce compressional (P) wave seismic energy. The P-waves propagate into the earth and are refracted along interfaces caused by an increase in velocity. A portion of the P-wave energy is refracted back to the surface where it is detected by sensors (geophones) that are coupled to the ground surface in a collinear array (spread). The detected signals are recorded on a multi-channel seismograph and are analyzed to determine the shot point-to-geophone travel times. These data can be used along with the corresponding shot point-to-geophone distances to determine the depth, thickness, and velocity of subsurface seismic layers.

The seismic refraction technique is based on several assumptions. Paramount among these are that seismic velocity:

1) Increases with depth, and,
2) Is uniform within each layer over the length of the given spread.

In cases where these assumptions do not hold, the accuracy of the technique decreases. For example, if a low velocity layer occurs between two layers of higher velocity, the low velocity layer will not be detected and the depth to the underlying high velocity layer will be erroneously large. Also, if the velocity of a seismic layer varies laterally within a spread, those variations will be interpreted as fluctuations in the elevation of the underlying seismic layer.

2.0 DATA ACQUISITION/INSTRUMENTATION

Each SR line consisted of 24-geophones and 7-shot points distributed in a collinear array (spread). In most areas, the geophones were coupled to the ground surface by metal spike affixed to the bottom of each geophone case. In areas where the ground surface was too hard to penetrate (e.g. the road) the geophones were mounted on weighted pedestals that coupled them to the ground by their weight. The geophone intervals ranged from 3- to 10-ft depending on access. For each spread, the two end shot points were located one-geophone spacing beyond the end geophone at both ends of the spread. The remaining five shot points were evenly spaced along the spread. This distribution of shot points and geophones yielded total draped line lengths (end-geophone to end-geophone) ranging from 77- to 250-ft. The SR survey was designed to target the upper 15 to 50 feet of geologic material beneath each line, generally consisting of native soil, fill (mine waste) alluvium/stream deposits, weathered and un-weathered bedrock.

Data acquisition was initiated along each SR line by producing seismic energy using a mechanical source. Seismic energy was produced by impacting a metal strike plate on the ground surface with a 12-16 pound sledge hammer. The resulting seismic waveforms are recorded using a Geometrics ***Geode*** 24-channel engineering distributed array seismograph and Mark Products geophones with a natural frequency of 8-Hz. The seismic waveforms were digitized, processed and amplified by the Geode and transmitted via a ruggedized Ethernet cable to a field computer. There the data were archived for subsequent processing and displayed on the computers LCD screen in the form of seismograms. These were subsequently used to determine the time required for P-waves to travel from each shot point to each geophone in a given array (spread).

3.0 DATA ANALYSIS

The recorded seismic data were processed using the software package ***SeisImager*** which was written by Oyo Corporation (Japan) and distributed by Geometrics Inc. The first stage of seismic processing included compilation (7 shot points per line) and identification of first arriving P-wave energy. This process was conducted using ***Pickwin, Version 3.2.0.1*** (2004), which is part of the ***SeisImager*** package. A second interactive program ***Plotrefa, Version 2.8.0.1*** (2006) was used to assign geophone travel times, geophone/shot point surface elevations and velocity layer assignments to compute a 2D seismic velocity model based on these inputs. Example Time-Distance graph from a 7 shot point refraction line and inverted seismic layer model are presented in the following figures.

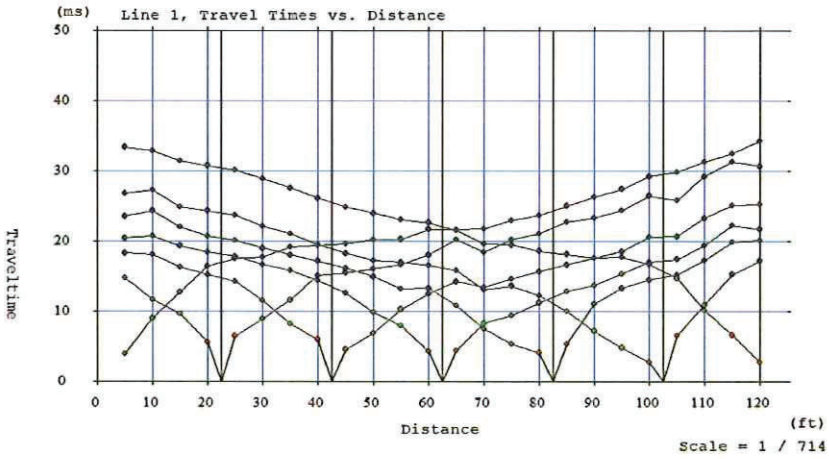


Figure 1 Example SR Time-Distance Graph, 24-geophones; 7 equal spaced shot points

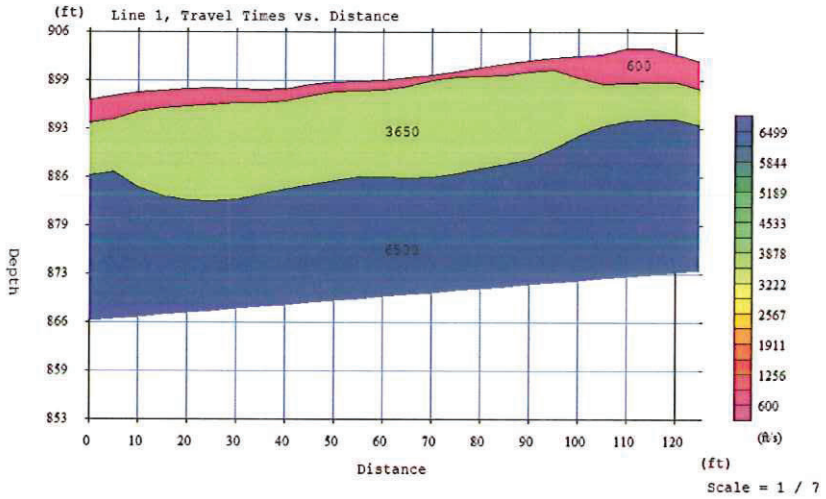


Figure 2 Time-Term Inverted Seismic Velocity Model

For this survey we have chosen an inversion routine that is based on the time-term method. The time-term method employs a combination of linear least squares and delay time analysis to invert the first arrivals into a velocity model. The model can consist of two or three velocity layers depending on the presence of significant line slopes that can be fitted to the first arrival times. Depths to the tops of the velocity layers are calculated below each geophone. For end and interior shot points the depths are extrapolated from the nearest geophone. This inversion as described above produces simplified velocity layers that, though generalized, will provide an adequate, useable characterization of the depth to bedrock.

4.0 LIMITATIONS

In general, there are limitations unique to the SR method. These limitations are primarily based on assumptions that are made by the data analysis routine. First, the data analysis routine assumes that the velocities along the length of each spread are uniform. If there are localized zones within each layer where the velocities are higher or lower than indicated, the analysis routine will interpret these zones as changes in the surface topography of the underlying layer. A zone of higher velocity material would be interpreted as a low in the surface of the underlying layer. Zones of lower velocity material would be interpreted as a high in the underlying layer.

Second, the data analysis routine assumes that the velocity of subsurface materials increase with depth. Therefore, if a layer exhibits velocities that are slower than those of the material above it, the slower layer will not be resolved. Also, a velocity layer may simply be too thin to be detected. Due to these and other limitations inherent to the SR method, the results of the SR survey should be considered only as approximations of the subsurface conditions. The actual conditions may vary locally. Other independent data (e.g., surface and borehole geology) should be integrated with SR data to enhance the subsurface interpretation.

Appendix B

MULTI-CHANNEL ANALYSIS OF SURFACE WAVES (MASW)

MULTI-CHANNEL ANALYSIS OF SURFACE WAVES (MASW)

1.0 METHODOLOGY

When seismic energy is generated at or near the ground surface, seismic waves are produced. Those that travel along the ground surface are referred to as ground roll or surface waves. Those that propagate into the earth are referred to as body waves. When a vertical impact seismic energy source is used, the resulting surface waves account for more than two-thirds of the energy that is produced. As a result, surface waves are the most prominent signal on multi-channel seismic records. In addition, surface waves have dispersion properties that body waves lack. That is, different wavelengths have different penetration depths and, therefore, propagate at different velocities. This is referred to as dispersion. Since surface waves travel at 0.9 times the velocity of S-waves, it is possible to determine subsurface Vs by analyzing the dispersion of surface waves. Furthermore, since S-wave velocities are directly proportional to shear modulus, this provides a direct indication in the variation of stiffness (or rigidity) of subsurface materials.

Computer software and processing techniques developed by researchers at the University of Kansas have made it possible to analyze surface waves using a large number of shot points and geophones. This is referred to as multi-channel analysis of surface waves (MASW). Surface wave data are gathered in much the same way as high resolution seismic reflection data. Seismic energy generated by vertical impacts on the ground surface is detected by an array of closely spaced geophones (spread). The energy source and the geophones are sequentially moved along a profile as the survey progresses.

The data gathered from each shot point are analyzed to determine the variation in surface wave velocity versus frequency (dispersion curve). Computer software then inverts the dispersion curve to determine the variation in Vs versus depth. The data gathered from multiple shot points and geophone locations can be collated to produce a two dimensional (2D) cross-section showing the variation in Vs with depth and distance beneath a line.

2.0 DATA ACQUISITION/INSTRUMENTATION

Soundings MASW-9 and -10 each comprised an array of 24-geophones distributed at 3-ft intervals in a collinear array (spread). Seismic energy was produced at four shot points on each spread through multiple impacts with a 12-pound sledge hammer against a metal strike plate placed on the ground surface. The shot points were positioned at distances of 3- and 12-ft beyond the end geophones at both ends of each spread. The resulting seismic waveforms were recorded using a Geometrics ***Geode*** 24-channel distributed array seismograph and Oyo ***Geospace*** geophones with a natural frequency of 8-Hz. The seismograph was networked to a field computer where the data were displayed on a LCD screen for QA/QC review and archived for subsequent processing.

3.0 DATA ANALYSIS

The MASW data were processed using the software package ***SurfSeis 2.05*** which was developed by the Kansas Geological Survey. Using this software, the data acquired from each shot point were processed to develop an overtone display. This is a color contoured plot that depicts phase velocity as a function of frequency and signal amplitude. The overtone display serves as a guide in nominating the dispersion curve that is used by the inversion routine. However, prior to nominating the dispersion curve, the four overtones were merged into one in order to increase the signal to noise ratio and maximize the continuity of the display. The merged and enhanced overtone was then used as a guide in nominating the dispersion curve used in the inversion process. At the onset of the inversion routine the software created a 1D model comprising 10-layers. Starting values of depth, thickness, Vp, Vs and Poisson's ratio (α) were assigned to each layer. The program then proceeded to refine the starting model through an iterative procedure in order to develop a 1D model that provided the best fit to the dispersion curve. In so doing, it was necessary that either Vp or α remain fixed during the inversion process. In this case, we opted to have α remain fixed, at a value of 0.4, so that the final model would provide the best indication of both Vp and Vs as a function of depth. The value of 0.4 was used for α because it is typical of most near surface earth materials.

G5. Regional Hydraulic Geometry and Analogue Channel Assessment (Waterways Consulting, Inc., October 30, 2018)

TECHNICAL MEMORANDUM - REVISED for 90% DESIGN

Prepared by:	Waterways Consulting, Inc.
Date:	October 30, 2018
Re:	Permanente Creek Restoration – Regional Hydraulic Geometry and Analogue Channel Assessment

Introduction

Waterways Consulting, Inc. (Waterways) is developing engineering drawings to restore portions of Permanente Creek that flow through the Permanente Quarry (Quarry) property and have been impacted by past mining activities. The proposed approach at two locations (the Rock Pile Area and Material Removal Area[1]) focuses on restoring the channel form to an approximation of the pre-mining channel geometry and providing suitable aquatic habitat for local species, including resident rainbow trout. The Quarry is situated on lands owned by Lehigh Hanson Heidelberg Cement Group on the east side of the Santa Cruz Mountains to the west of Cupertino. Quarry operations over the past century have resulted in significant channelization, the installation of numerous culverts and sedimentation basins, and considerable sediment inputs to Permanente Creek. The altered channel form and high sediment loads resulted in the degradation of the instream aquatic habitat.

The proposed restoration will remove overburden sediment and several culverts, rebuild the affected channel reaches, and restore impacted riparian and aquatic habitats. Restoring Permanente Creek at the Rock Pile and Material Removal Areas requires a complete reconstruction of the streambed. Consequently, there is a need to estimate the appropriate channel morphology to support the restoration design, including active channel widths, depths and pool geometries and spacing.

Regional curves, relating channel dimensions to drainage area, exist for the San Francisco Bay region (Dunne and Leopold 1978) (Figure 1). However, these curves are regional in nature, incorporating data from a range of landscape settings and channel morphologies. For example, channel geometries of the low gradient bottomlands of the Santa Clara Valley will vary from bedrock-controlled streams in the Santa Cruz Mountains that are higher gradient and more influenced by hillslope processes. Given that much of the proposed restoration activities are in higher gradient, confined reaches of Permanente Creek, the appropriateness of the regional curves can be improved by focusing the data on sites with a similar geomorphic setting. Focusing the dataset on sites in the Santa Cruz Mountains could greatly improve the use of the hydraulic geometry curves to constrain expected channel morphologies in the impacted reaches of Permanente Creek. Furthermore, field-based measurements of channel geometry within less impacted reaches of Permanente Creek and in adjacent watersheds that exhibit similar characteristics to Permanente Creek could both provide a test for and improve the quality of the developed relationships.

[1] Although the analogue study was developed to support design efforts for the Rockpile and Material Removal Areas of the Permanente Restoration Project, the results are applicable to other locations within the project area including Culverts #7 and #8 within the Channel Widening Area.

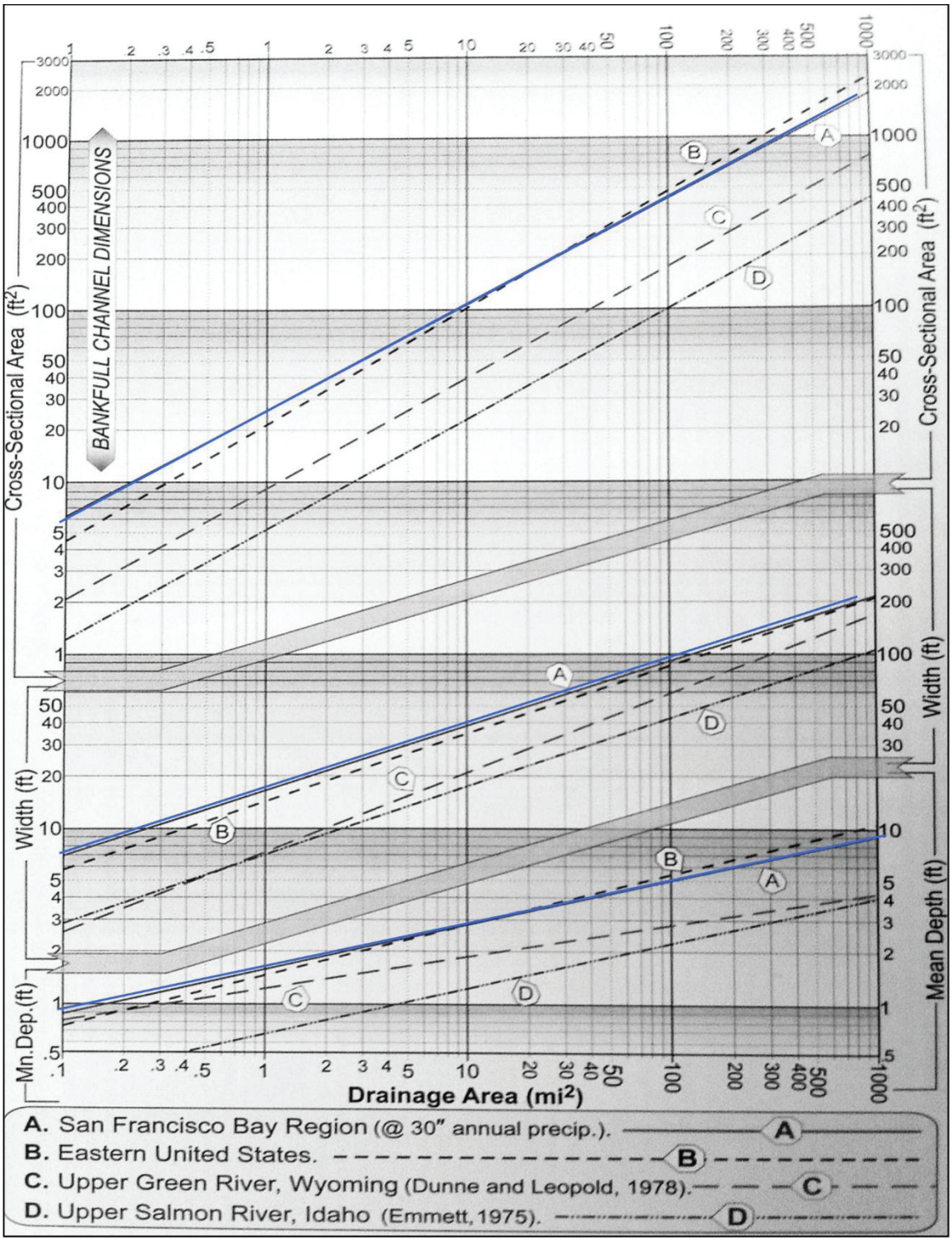


Figure 1. Regional hydraulic geometry curves produced by Dunne and Leopold (1978) relating drainage area to bankfull depth, width and cross-sectional area. The blue lines highlight the regional curves for the San Francisco Bay Area.

To create more site-specific curves, Waterways compiled data for the Santa Cruz Mountain sites that were included in the Dunne and Leopold (1978) curves for the San Francisco Bay region, surveyed two analogue stream channels close to the project area that were previously identified as having similar watershed and geomorphic characteristics as Permanente Creek (URS 2011)[2], and surveyed two segments of Reach 20 on Permanente Creek in what was considered a less impacted reach. These data were used to define reach-specific channel dimensions for the restoration effort. In addition, a longitudinal profile surveyed along portions of Permanente Creek where the channel morphology was determined to be more representative of natural conditions, was used to identify an appropriate size and spacing for pools to support the engineering design. This memorandum summarizes the findings of this work.

Study Area

Santa Cruz Mountains

The Santa Cruz Mountains have a complex geologic history, resulting in areas dominated by sandstone, limestone, igneous rocks (e.g., basalt), or metamorphic rocks (e.g., serpentine). The variable geologies result in different rates of erosion and the presence of different types of channel-forming sediment among streams that can be spatially close to each other. For example, Permanente Creek has abundant limestone that forms calcium carbonate precipitates that can bind rocks along the channel bed and banks. On the other hand, Stevens Creek is approximately one and one-half miles southeast of Permanente Creek and does not have limestone, and thus does not exhibit calcium carbonate precipitates.

Santa Cruz Mountain streams tend to be small headwater channels at the higher elevations and larger, alluvial streams at the lower elevations. The higher and mid-elevation streams generally flow through narrow valleys with steep hillslopes that restrict lateral channel movement. The steep hillslopes are susceptible to landslides and debris flows, especially following wildfire events. Entire reaches can be transformed during a debris flow and associated mudflow event. Debris flows can result in mobilization and deposition of sediment and debris across an entire valley bottom, leaving an aggraded valley consisting of an unsorted mix of materials. Subsequent high flows following a debris flow event reworks the aggraded material, with the active channel incising into the relatively uniform post-debris flow floodplain surface. Large roughness elements, including boulders and logs, become exposed as the channel incises into the debris flow surface, influencing the planform of the channel and providing local grade control for both the channel and floodplain. In higher gradient reaches, pools and riffles form in response to randomly spaced roughness elements. Along Permanente creek, debris flows prior to mining operations likely provided large wood and boulders that were incorporated into steep step-pool reaches and lower gradient riffle-pool reaches.

[2] The URS Plan was prepared to comply with the July 27, 1999 Cleanup and Abatement Order – 99-018 issued by the San Francisco Bay Regional Water Quality Control Board by preparation of a report that documented a field reconnaissance of Permanente Creek throughout the quarry facility identifying areas requiring stabilization, prioritizing stabilization activities at candidate sites, and preparing an implementation schedule.

WATERWAYS CONSULTING INC.
3004 SWIFT ST.
SANTA CRUZ, CA 95060
PH:(831)421-9291 // FAX:(888)819-6847
WWW.WATWAYS.COM

Map identifying the location of the surveyed reference reaches for Permanente Creek.

FIGURE

2

Field Sites

Waterways reviewed the URS Plan and studied published literature on the Santa Cruz Mountains to determine suitable reference reaches for Permanente Creek. We determined that a reach along Swiss Creek and a reach along Corte Madera Creek were the most appropriate reference reaches for Permanente Creek (Figure 2 and Table 1). The URS Plan described Corte Madera Creek and Swiss Creek as similar in drainage area, slope, and valley shape to Permanente Creek. Both creeks are in the Santa Cruz Mountains, relatively close to Cupertino, with precipitation regimes similar to the Permanente Creek watershed. Corte Madera Creek flows west and Swiss Creek flows east through confined, steep stream valleys, constrained on both sides by steep hillslopes prone to mass wasting and debris flow events. Both reference reaches are bedrock-controlled with a step-pool channel pattern formed by large boulders and other recently delivered colluvial deposits. Swiss Creek exhibited calcium carbonate precipitates within the active channel, similar to the calcium carbonate formations identified in Permanente Creek. In addition to the reference reaches in adjacent watersheds, a less impacted reach (Reach 20) within Permanente Creek was chosen to further support development of regional hydraulic geometries in support of the engineering design effort.

Table 1. Basin Characteristics for the Field Sites and Permanente Creek.

	Swiss Creek	Corte Madera Creek	Permanente Creek
Average annual precipitation (in)	33.8	38.6	34.2
Mean basin elevation (ft)	1,842	1,917	1,957
Dominant geology	limestone, sandstone	sandstone, shale	limestone, sandstone
Dominant hillslope process	landslide/debris flow	landslide/debris flow	landslide/debris flow
Average channel slope (%)	10.72	8.39	3.4 - 13.85
Drainage area (sq. miles)	0.8	1.4	2.7

Analysis Approach

To develop the regional hydraulic geometry relationships, information from the USGS streamflow gage database was compiled for streams in the Santa Cruz Mountains. The focus of this data mining effort was the 1.5-year[3] recurrence discharge because it approximates the channel forming, or bankfull, discharge (Dunne and Leopold, 1978). To evaluate the performance of the curve and provide data for smaller watersheds, which was missing from the USGS dataset, we collected field data from the two adjacent watersheds and within Reach 20 of Permanente Creek with a specific focus on measuring channel geometries at bankfull indicators that were identified in the field.

Hydraulic Geometry using existing USGS gage data

Waterways identified 33 USGS stream gages in the Santa Cruz Mountains, but only 14 of the 33 had sufficient peak flow records to be used in the hydraulic geometry analysis (Table 2). Ideally the gage sites would be limited to the eastern Santa Cruz Mountains near Cupertino and Santa Clara. However, since there are a limited number of gages with sufficient data, the 14 gages Waterways assessed are

[3] Previous iterations of this study focused efforts on the 2-year event. Results of that effort identified disparities between the gage-based analysis and the field-based analysis with the field-based analysis consistently under predicted bankfull widths and depths. This suggested that field-based bankfull indicators occurred at a discharge approximating the 1.5-year event rather than the 2-year event. These results, combined with comments from the reviewers prompted us to redo the analysis with a focus on the 1.5-year event rather than the 2-year event.

Table 2. USGS gage sites used to develop regional hydraulic geometry curves.

Site Name	Location	Period of Record	Drainage Area (sq. miles)	1.5-Year Flood Discharge (Bankfull) (cfs)	Estimated Bankfull Width (feet)	Estimated Bankfull Cross Sectional Area (sq. feet)	Estimated Bankfull Depth (feet)
Llagas Cr above Chesbro Reservoir	37.1483, -121.7672	1971-1982, 2004-2010	9.6	390	25.0	132.5	5.3
Aptos Creek near Aptos	37.0020, -121.9050	1972-1983	10.2	185	29.3	68.7	2.3
San Lorenzo River near Boulder Creek	37.2067, -122.1439	1969-1992, 1997	6.2	105	24.7	32.9	1.3
Bear Creek at Boulder Creek	37.1278, -122.1158	1978-1992, 1997	16.0	540	33.8	122.5	3.6
Boulder Creek at Boulder Creek	37.1267, -122.1217	1977-1992, 1997	11.3	680	47.4	305.2	6.4
Zayante Creek at Zayante	37.0861, -122.0458	1958-1992, 1997	11.1	480	28.0	103.0	3.7
San Lorenzo River at Big Trees	37.0444, -122.0714	1937-2017	106.0	3700	87.5	682.0	7.8
Carbonera Creek at Scotts Valley	37.0506, -122.0125	1985-2007	3.6	505	26.5	117.4	4.4
Scott Creek above Little Creek	37.0642, -122.2283	1937-1941, 1959-1973, 1982	25.1	600	43.5	145.0	3.3
Pescadero Creek near Pescadero	37.2608, -122.3278	1952-2017	45.9	1350	53.0	291.5	5.5
San Gregorio Creek at San Gregorio	37.3258, -122.3856	1955, 1970-2017	50.9	1900	61.5	402.5	6.5
Pilarcitos Creek at Half Moon Bay	37.4666, -122.4331	1967-2017	27.8	450	33.0	139.0	4.2
Redwood Creek at Redwood City	37.4494, -122.2325	1960-1997	1.8	170	13.0	41.5	3.2
San Franciscquito Creek at Stanford University	37.4233, -122.1883	1931-1941, 1951-2017	37.4	1000	45.5	198.5	4.4
Saratoga Creek at Saratoga	37.2544, -122.0383	1934-2017	9.2	255	25.6	40.2	1.6

located throughout the eastern and western Santa Cruz Mountains. Despite the slightly wider than ideal geographic range, our gage analysis improves upon the current regional analyses by focusing on a smaller area and limiting gage sites to the Santa Cruz Mountains.

Waterways compiled the existing information available at each of the selected gaging sites, including drainage area, discharge, field measurements of channel width and cross-sectional area, and local channel slope near the gage. We imported the discharge data into HEC-SSP (U.S. Army Corps of Engineers 2010) and developed flood frequency curves (USGS, Bulletin 17b, 1982) for each gage site to estimate the 1.5-year recurrence interval discharge. We then reviewed measurements of channel width and cross-sectional area at each gage site to find measurements that were taken during a high flow event that approximated the 1.5-year recurrence interval discharge. Four of the gaging sites did not have channel width and cross-sectional area data recorded during a 1.5-year event, so we extrapolated based on the available data. We then estimated bankfull depth at each gage site by dividing channel

cross-sectional area by channel width. Banfull width, bankfull depth, and the 1.5-year flood discharge were plotted separately against drainage area. One outlier was identified and removed from the study.

Analogue Site Assessment

Waterways surveyed a 200-foot reach of Corte Madera Creek, located downstream of the Alpine Road Trail culvert, a 171-foot reach of Swiss Creek, located approximately 500 feet upstream from the Peacock Court bridge, and two segments within Reach 20 of Permanente Creek totaling over 300 feet of channel. We chose reach locations that were beyond the influence of instream structures (e.g., culverts, bridges) and were representative of conditions within the reach. We used an auto-level to survey four channel cross section profiles at Corte Madera Creek, three channel cross section profiles at Swiss Creek, two sets of three channel cross-section profiles at Permanente Creek and a longitudinal profile at all four sites. Each channel cross section profile included the expanse of the valley floor and the identification of significant geomorphic features using field indicators, such as bankfull. In most cases, the field indicator used to estimate the bankfull width and depth was the base of mature trees.

Using the survey data, Waterways calculated the bankfull channel width and plotted each cross section to calculate their cross-sectional areas. We then divided each cross-sectional area by the surveyed bankfull width to determine average bankfull depth. We estimated drainage area for each field site using StreamStats (USGS 2012) and calculated channel slopes using the surveyed longitudinal profiles. Channel widths and hydraulic depths were determined for each cross-section and then averaged for each reach, or reach segment, to obtain a single channel width and depth for each creek at the estimated bankfull discharge. Two separate segments were surveyed in Reach 20 of Permanente Creek to identify differences in channel geometry based on differences in local channel slope with one segment having a local channel slope of 4.6% and the other a local channel slope of 8.2%.

Hydraulic Geometry Analysis

Waterway combined the USGS gage site data with the field survey data to determine trends in channel geometry as a function of drainage area. We developed relationships between drainage area and bankfull width, bankfull depth, and the 1.5-year recurrence interval discharge. Trend lines were fit to the data to provide a predictive tool to estimate these parameters at specific restoration sites, most specifically the Rock Pile and Material Removal Areas (Figures 3, 4, and 5). Using the equation for each trend line, we solved for the predicted channel width and depth for specific restoration areas within Permanente Creek based on a drainage area of 2.7 square miles (Culverts 7 and 8), 2.54 square miles (Rock Pile), and 2.02 square miles (Material Removal Area). Table 3 summarizes the results of this analysis.

Table 3. Channel Dimensions Calculated Using Hydraulic Geometry Relationships

Project Site	Drainage Area (mi^2)	Predicted Bankfull Width (ft)	Predicted Bankfull Depth (ft)	Cross Sectional Area (ft^2)
Culvert 7	2.70	17.9	2.3	31
Culvert 8	2.70	17.9	2.3	31
Rock Pile	2.54	17.5	2.3	29
Material Removal Area	2.02	16.0	2.1	25

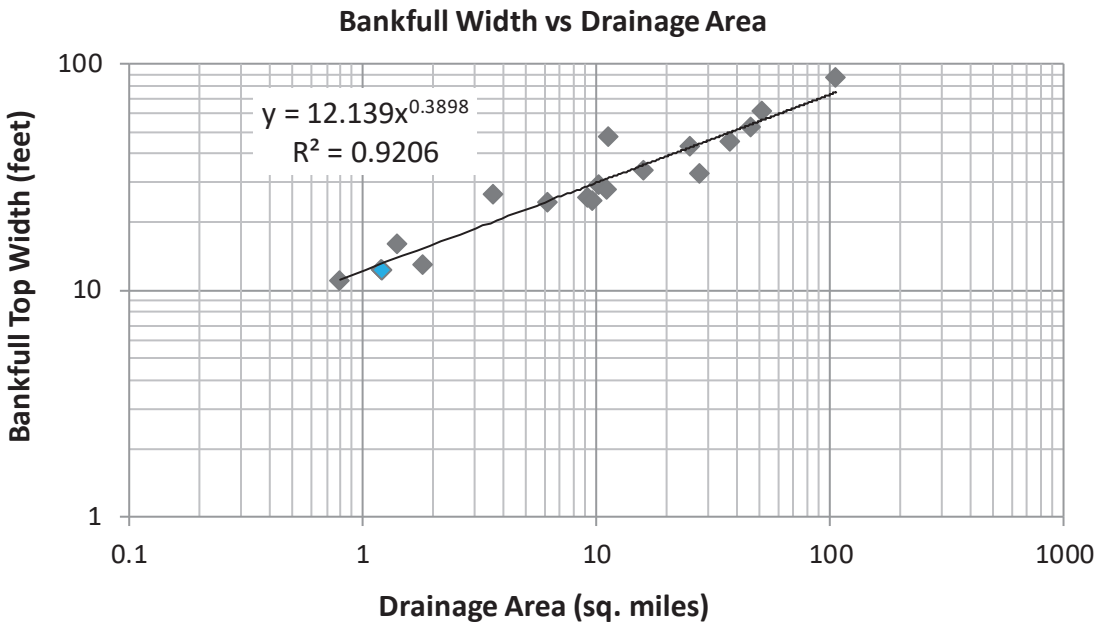


Figure 3. Bankfull Top Width as a Function of Drainage Area for the Santa Cruz Mountains. The blue marker represents the sites on Permanente Creek in Reach 20.

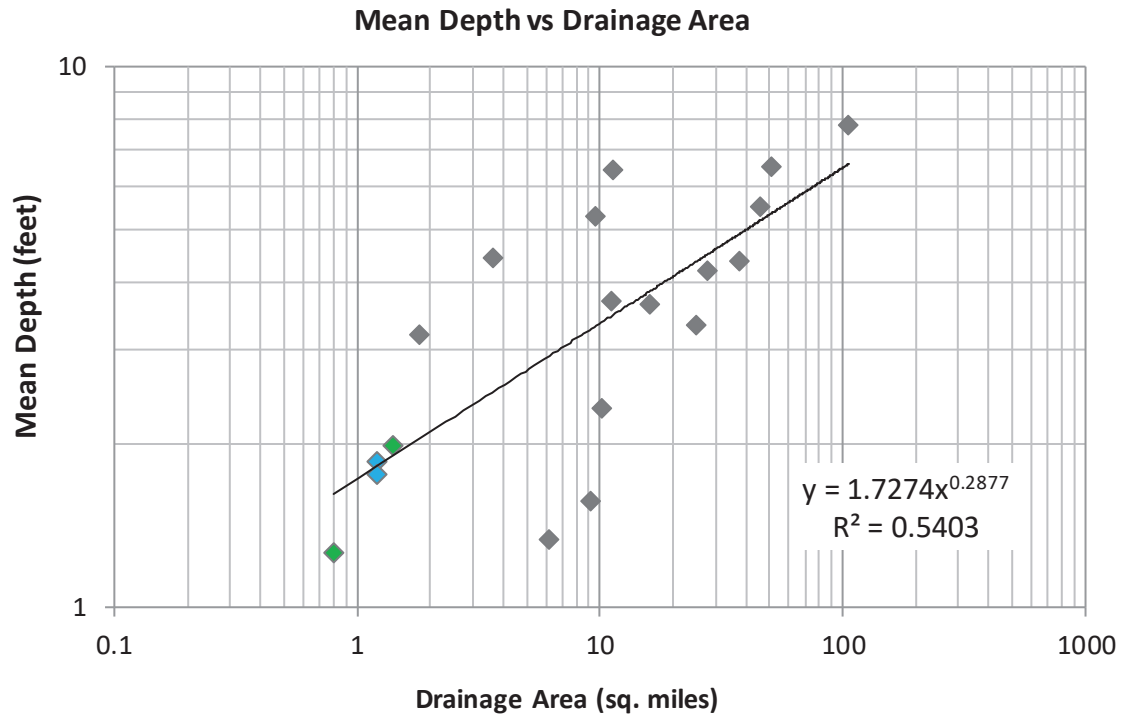


Figure 4. Bankfull Depth as a Function of Drainage Area for the Santa Cruz Mountains. The green data points are Swiss and Corte Madera Creeks. The blue data points are the sites on Permanente Creek.

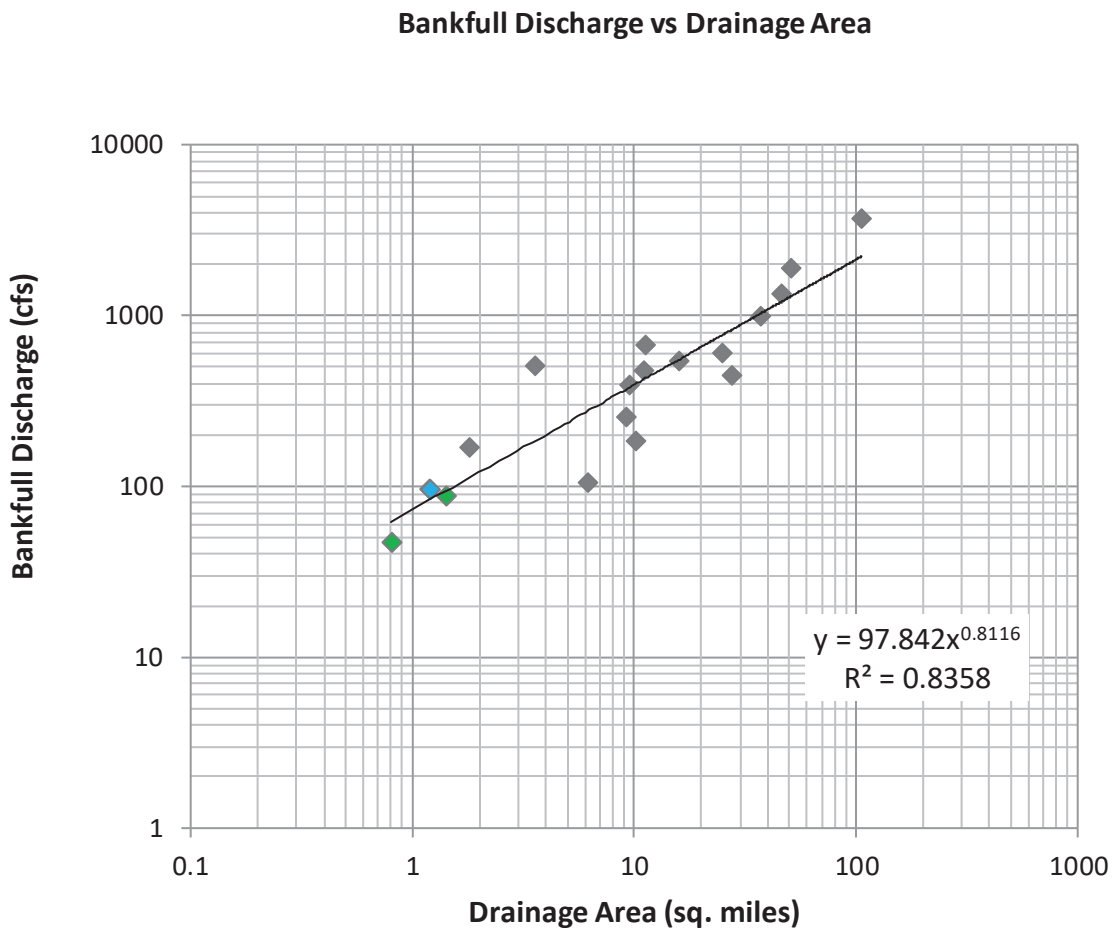


Figure 5. Bankfull Discharge as a Function of Drainage Area for the Santa Cruz Mountains. The green data points are Swiss and Corte Madera Creeks. The blue data points are the sites on Permanente Creek.

Pool Geometry

An important design parameter for reach-scale restoration of Permanente Creek is pool length and pool spacing. Despite the legacy of impacts to Permanente Creek, it was determined that several reaches (R14-R16 and R20-R21) continued to exhibit naturally formed pool and riffle geometries that encompass a range of channel slopes. These conditions provided an opportunity to measure pool and riffle geometries, locally, to support the design effort, rather than measuring those parameters in other adjacent watersheds which may lack specific characteristics found in Permanente Creek such as the prevalence of calcium carbonate precipitates. Given the inherent variability in pool geometries associated with the debris flow morphology of the channel, it was important to collect data along entire reaches and summarize the information to convey averages and ranges of natural conditions. To convey the range of natural variability, longitudinal profile data was collected along the entire length of the identified reaches within Permanente Creek to calculate pool length and spacing in relation to reach-

scale channel gradients (Table 4). These data were then used to calculate pool statistics for each site-specific restoration area.

Table 4. Statistics on Pool Length, Depth and Spacing (in feet) By Reach of Permanente Creek.

Reach #	Reach Avg Slope	Avg Pool Length (ft)	Median Pool Length (ft)	St. Dev Pool Length (ft)	Avg Pool Depth (ft)	Median Pool Depth (ft)	St. Dev Pool Depth (ft)	Avg Pool Spacing (ft)	Median Pool Spacing (ft)	St. Dev Pool Spacing (ft)
21	5.1%	13.6	11.6	6.3	0.6	0.6	0.3	211	150	212
20	5.2%	11.4	11.0	4.1	0.9	1.0	0.4	106	92	57
16	7.1%	15.4	14.4	6.1	0.8	0.8	0.4	76	65	69
15	11.6%	10.5	9.4	2.5	0.7	0.7	0.4	58	39	50
14	6.4%	8.8	8.0	3.8	0.6	0.6	0.3	31	19	27
	4-8% Reaches	**12.0**	**10.3**	**5.7**	**0.7**	**0.7**	**0.4**	**94**	**55**	**124**
	8-12% Reaches	**10.5**	**9.4**	**2.5**	**0.7**	**0.7**	**0.4**	**58**	**31**	**50**

Results/Discussion

Dunne and Leopold's (1978) regional curves provide a predictive tool to estimate bankfull channel dimensions for Permanente Creek. Use of the Dunne and Leopold regional curves for the entire Bay Area estimated a bankfull width for the Permanente project area of approximately 17 to 25 feet and a bankfull depth of approximately 1.5 to 2.0 feet. Because these curves are regional and include a significant number of gage locations that are in a geomorphic setting that are different from the project area, regional curves that are more specific to the Permanente Creek project area were developed. Utilizing the more focused data set, which includes the USGS sites within the Santa Cruz Mountains and the field-based assessments sites on Permanente, Corte Madera and Swiss Creek, the curves predicted a bankfull width of 17.9 feet for Culverts 7 and 8, 17.5 feet for the Rock Pile Area, and 16.0 feet for the Material Removal Area and a bankfull depth of approximately 2.3 feet for Culverts 7 and 8, 2.3 feet for the Rock Pile Area and 2.1 feet for the Material Removal Area prior to mining-related impacts (Table 3). As expected, the Dunne and Leopold (1978) curves describe a wider and flatter channel, most likely due to the inclusion of lower gradient, unconfined, alluvial channels in the analysis. Table 5 includes ranges of bankfull channel dimensions for the areas where the channel will be reconstructed to provide for some variability and flexibility during construction since large non-uniform materials will be used in channel construction.

Measured channel slopes for Corte Madera and Swiss Creek, 8.4% and 10.7% respectively, are in the range of the design slopes at the Rock Pile and Material Removal Areas along Permanente Creek. Field observations of a step-pool channel morphology at these channel gradients suggest that Permanente Creek likely had a step-pool channel pattern in the steeper reaches prior to mining. This is supported by

the observed conditions in the reaches of Permanente Creek that were identified as having pool and riffle geometry that were representative of natural conditions.

The pool analysis, utilizing the surveyed longitudinal profiles along the more intact reaches of Permanente Creek, suggest that there is an inverse relationship between pool length and spacing relative to channel gradient (Table 4). Furthermore, lower gradient reaches exhibit higher overall pool length and spacing variability than higher gradient reaches. This supports the idea that higher gradient reaches (>8% channel slope) are more characterized by a step-pool morphology, whereas lower gradient reaches (4% to 8% channel slope) exhibit more of a pool-riffle morphology. Pool depth was fairly consistent across all of the evaluated reaches with pools ranging between 0.5 and 2 feet, independent of channel slope. This is likely due to the fact that pool depth may be more a function of the presence of localized roughness elements, and the fact that there are limited opportunities to scour deeper pools due to the composition of the bed material and associated natural armoring.

Table 5. Proposed Channel Dimensions for Constructed Reaches

Project Site	Design Slope (%)	Design Slope Range (%)	Proposed Bankfull Width Min (ft)	Proposed Bankfull Width Max (ft)	Proposed Bankfull Depth Min (ft)	Proposed Bankfull Depth Max (ft)	Cross Sectional Area Min (ft^2)	Cross Sectional Area Max (ft^2)
Culvert 7	4.3%	4%-8%	16.5	20.5	2.1	2.5	28.2	34.2
Culvert 8	2.7%	<4%	18.0	22.0	1.9	2.3	28.2	34.2
Rock Pile Area	Varies	<4%	17.5	21.5	1.8	2.2	26.9	32.9
		4%-8%	16.0	20.0	2.0	2.4		
		>8%	15.5	18.5	2.4	2.8		
Material Removal Area	Varies	<4%	16.0	20.0	1.7	2.1	22.5	28.5
		4%-8%	14.5	18.5	1.9	2.3		
		>8%	14.0	17.0	2.3	2.7		

References

Dunne, T. and Leopold, L.B. 1978. Water in Environmental Planning. W.H. Freeman and Company, New York, pp. 615-618.

URS Corporation. 2011. Permanente Creek Long-Term Restoration Plan. *Prepared for Lehigh Southwest Cement Company, March 11, 2011.*

US Army Corps of Engineers. 2010. HEC-SSP Statistical Software Package, Version 2.0. U.S. Army Corps of Engineers Hydrologic Engineering Center, http://www.hec.usace.army.mil/software/hec-ssp/.

U.S. Geological Survey. 2012. The StreamStats program for California, online at http://water.usgs.gov/osw/streamstats/california.html

U.S. Geological Survey. 1982. Bulletin 17B, Guidelines for Determining Flood Flow Frequency. Interagency Advisory Committee on Water Data, Hydrology Subcommittee. Reston, Virginia. http://water.usgs.gov/osw/bulletin17b/dl_flow.pdf

G6. Stability Analysis – Draft (Stantec, August 26, 2022)

Stantec

Memo

To:	Carolina Addison Lehigh Permanente	From:	Paul Kos Denver
Project/File:	233001622	Date:	August 26, 2022

Reference: PCRP Stability Analysis- DRAFT

INTRODUCTION

Lehigh Southwest Cement Company (Lehigh), a subsidiary of Lehigh Hanson, Inc., engaged Stantec Consulting Services Inc. (Stantec) to provide professional engineering services for geotechnical analysis related to proposed grading associated with the Permanente Creek Restoration Project (PCRP) at the Permanente Facility in Cupertino, California. An element of the PCRP involves removing material from the creek corridor and adjacent slopes. The PCRP design and grading plans are presented in the associated report prepared by Waterways (90% Designs, dated August 26, 2022). The grading plans were provided to Stantec by Waterways, and Stantec performed geotechnical analyses of the proposed slopes in support of the environmental review and subsequent permit applications.

This PCRP Stability Analysis has been prepared to assist Lehigh with upcoming environmental review and subsequent permit applications to relevant regulatory agencies. This report documents the results of static and pseudo-static slope stability analyses of the reclamation surface. The report does not contain the creek restoration design details and shall be reviewed in conjunction with Waterways' 90% Designs.

BACKGROUND

The Permanente Facility is a limestone and aggregate mining operation, active since the late 1930's, in the unincorporated foothills of western Santa Clara County, approximately two miles west of the City of Cupertino, California. The Quarry occupies a portion of a 3,510-acre property (Permanente Property) owned by Hanson Permanente Cement, Inc. and operated by Lehigh.

The Permanente Property is situated in the rugged foothills along the eastern side of the Santa Cruz Mountains segment of the California Coast Ranges. This area of the Coast Ranges is characterized by moderately to steeply sloping hillsides ranging from approximately 500 to 2,000 feet (ft) above mean sea level (AMSL). The eastern side of the range is incised with eastern flowing drainages, including the Permanente Creek Drainage Basin, which flows through the central part of the Permanente Property, and flows through the Cities of Los Altos and Mountain View and into Mountain View Slough or Stevens Creek through the Stevens Creek Diversion Channel operated by the Santa Clara Valley Water District, which ultimately can reach the San Francisco Bay.

GEOLOGIC SETTING

The geology in the project area is complex due to the faulting and deformation associated with the Franciscan Complex. This geologic unit consists of faulted limestone and metabasalts (greenstone) and also contains basalt, diorite, shale, sandstone, chert, greywacke, and schist. Structure in the area includes numerous low- and high-angle faults. Low-angle faults separate limestone units from greenstone units and

tend to follow the limestone bedding planes and typically dip to the southeast at 10° to 40°. High-angle faults, including the regional Berrocal Fault, are typically oriented in the northwest-southeast direction and dip at greater than 60°. The geology has been mapped several times by different geologists, and numerous drilling programs have been conducted. The results of these previous studies on the geologic units, structure, and interpretation were included in previous submittals (Golder 2011 and Foruria 2004).

PREVIOUS GEOTECHNICAL EVALUATIONS

The geologic and geotechnical properties of the rocks present at the Permanente Quarry have been evaluated several times by several companies. Each investigation included drilling, laboratory testing, assessment of strength parameters for the various rock types encountered, and slope stability calculations. The rock strength parameters were based on laboratory data, rock mass rating (RMR) calculations, and back-analysis of landslide areas. The strength parameters for soil, greenstone overburden, and limestone have been consistent through multiple geotechnical analyses performed by multiple consultants, and these values are listed in Table 1. The strength parameters for greenstone vary significantly depending on the condition of the bedrock and particularly, the amount of weathering and shearing, and lower-bound values have historically been used for design purposes to be conservative. These lower-bound values are based on back-analysis of the Main Slide in the North Quarry. Laboratory data suggest the in-place greenstone may have significantly higher strength, particularly at depths greater than approximately 50 feet, where the bedrock has not been weathered. Site observations also suggest that greenstone strengths are often under-reported as several areas of the highwall are constructed in weathered greenstone, and these areas have maintained their integrity with 50-foot high benches with face angles of 60° to 70° (Golder 2011).

Table 1: Historic Rock Strength Summary

Material	Unit Weight (pcf)	Cohesion (psf)	Φ' (°)
Limestone	165	12,500	30
Greenstone	155-165	1,400-1,880	19-23
Fault	155	0	20
Slide Debris	135	0-700	20-23
Greenstone Overburden	125	0	35
Soil	120	200	30

GEOTECHNICAL STABILITY EVALUATION

The slope stability analyses were modeled using the software Slide2 Modeler version 9 by rocscience, released in 2020. The software used limit equilibrium on slices of potential failure surface to calculate factor of safety (FoS). The models were evaluated under static and pseudo-static conditions, with horizontal ground acceleration, for the designed ramp configuration provided by the site using the Spencer method. The minimum FoS for each model evaluation is included in this report. The two types of analysis have been summarized in Table 2. The minimum acceptable factors of safety for the analyses are 1.3 for static conditions and 1.0 for pseudo-static conditions based on mining industry standards. For the pseudo-static model conditions, a horizontal seismic coefficient of 0.15 times the force of gravity (g) was applied to the

static condition models to be consistent with previous studies and to follow recommendations for earthquakes with magnitudes up to 8.25 (Golder 2011). To evaluate the slope stabilities, cross-sections were analyzed for the reclamation surface.

Table 2: Stability Analyses

Analysis Type	Description	Minimum Acceptable Factor of Safety
Static Analysis	A limit equilibrium method of analysis which satisfies moment and force equilibrium to solve a slope stability problem. The output is a single FoS for the potential failure surface with the lowest FoS.	1.3
Pseudo-static Analysis	A limit equilibrium method of analysis which represents the effects of earthquake shaking by accelerations that create inertial forces. This is the simplest way to analyze the dynamic effects of earthquake loading of a soil or slope. The output is a single FoS for the potential failure surface with the lowest FoS.	1.0

Site specific geotechnical information is available for each rock type on the property, and strength parameters for the material have been established in previous geotechnical analyses (Golder 2011). These strength parameters are based on laboratory testing, back-calculation, and published values for soil properties. These strength parameters are listed in Table 3.

Table 3: Geotechnical Strength Parameters

Material	Unit Weight (pcf)	Cohesion (psf)	Phi' (Degrees)
Greenstone (Weathered)	165	1,800	27
Greenstone (Unweathered)	165	12,500	30
Limestone	165	12,500	30

As previously discussed, the greenstone strengths can vary significantly depending on the degree of weathering, and Stantec focused on evaluating the greenstone strengths as part of this geotechnical investigation. The greenstone strengths were re-evaluated based on RMR classifications. The historic greenstone strength (ϕ'=27° and cohesion=1,800 pounds per square foot [psf]) is suitable for areas that have been weathered and are near the surface. A stronger strength for greenstone is expected for bedrock at depths greater than 50 feet from the surface, which is "beyond" the surficial weathered zone. While this transition to competent bedrock has been demonstrated by drilling, Stantec has used the weathered greenstone strength values for all depths to be conservative. Similarly, there are likely areas with limestone

that would exhibit greater strengths, and these have also not been included in the geotechnical analyses to be conservative.

Stability analyses are focused on areas with greater excavation volumes, particularly the rock pile removal area (Section A) and the 1250 Pond area (Sections C and E); the cross-sections modeled align with Waterway's sections and Waterway's naming conventions have been retained for clarity between the reports. Stantec modelled multiple cross-sections in the Pond 1250 area to evaluate the stability under different slope configurations and excavation depths. The cross-sections extend to the top of the surrounding slopes to evaluate any impacts that the grading may have on the global stability. Stantec adjusted the limits of the analyses to evaluate both the global slope stability and the stability in the area immediately adjacent to the PCRP grading.

The configurations modeled as part of this analysis exceed the minimum acceptable factor of safety, as defined in Table 3. Generally, the elevated geotechnical stability results are from the shallow cut slopes associated with the PCRP grading plan. Results from the stability analyses are shown in Table 4. Printouts of the slope stability sections are attached.

Table 4: Geotechnical Stability Analyses Results

Analysis Area	Analysis method	Section A	Section C	Section E
Cut Slope	Static	1.8	3.0	2.3
	Pseudo-Static	1.7	2.8	2.2
Global Slope	Static	1.5	2.8	1.5
	Pseudo-Static	1.5	2.7	1.4

CLOSURE

This report provides the analysis and supporting information needed to demonstrate that Lehigh Southwest Cement Company's plan for the PCRP meets design and performance requirements under static and seismic conditions. The PCRP will be excavated so that stable slopes remain. As mutual protection to Lehigh, the public, and Stantec, this report was submitted for exclusive use by Lehigh Southwest Cement Company. Our report and recommendations should not be reproduced in whole or in part without the supporting Waterways 90% Design report and our express written permission, other than as required in relation to agency review and submittals. A draft of this report was reviewed by personnel from Lehigh Southwest Cement Company.

Regards,

STANTEC CONSULTING SERVICES INC.

Reference: PCRP Stability Analysis

Paul Kos P.E.
Senior Geological Engineer
Mobile: 303-570-9163
paul.kos@stantec.com

Attachment: Stability Model Reports

Stantec

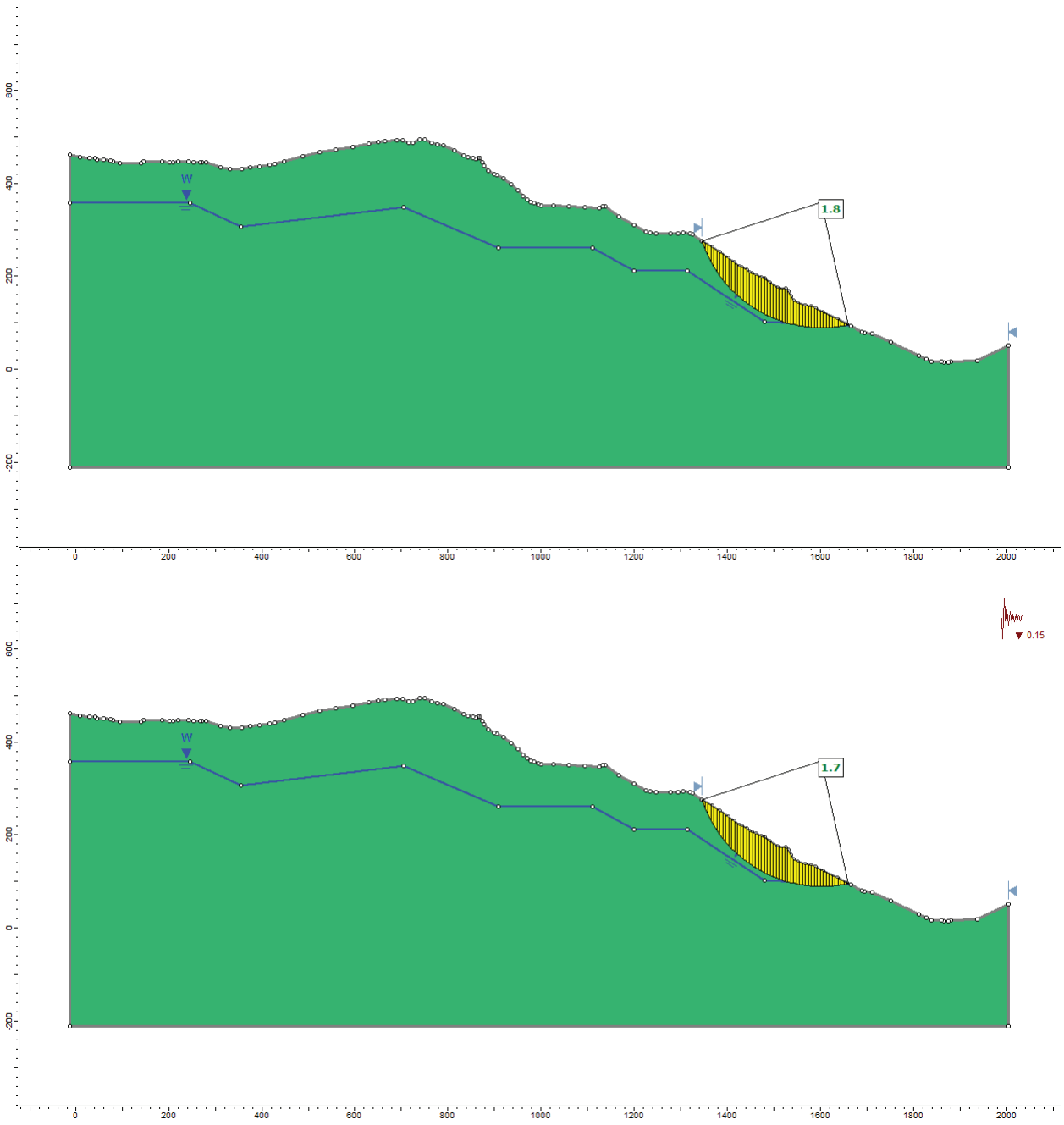
Memo

Attachment A

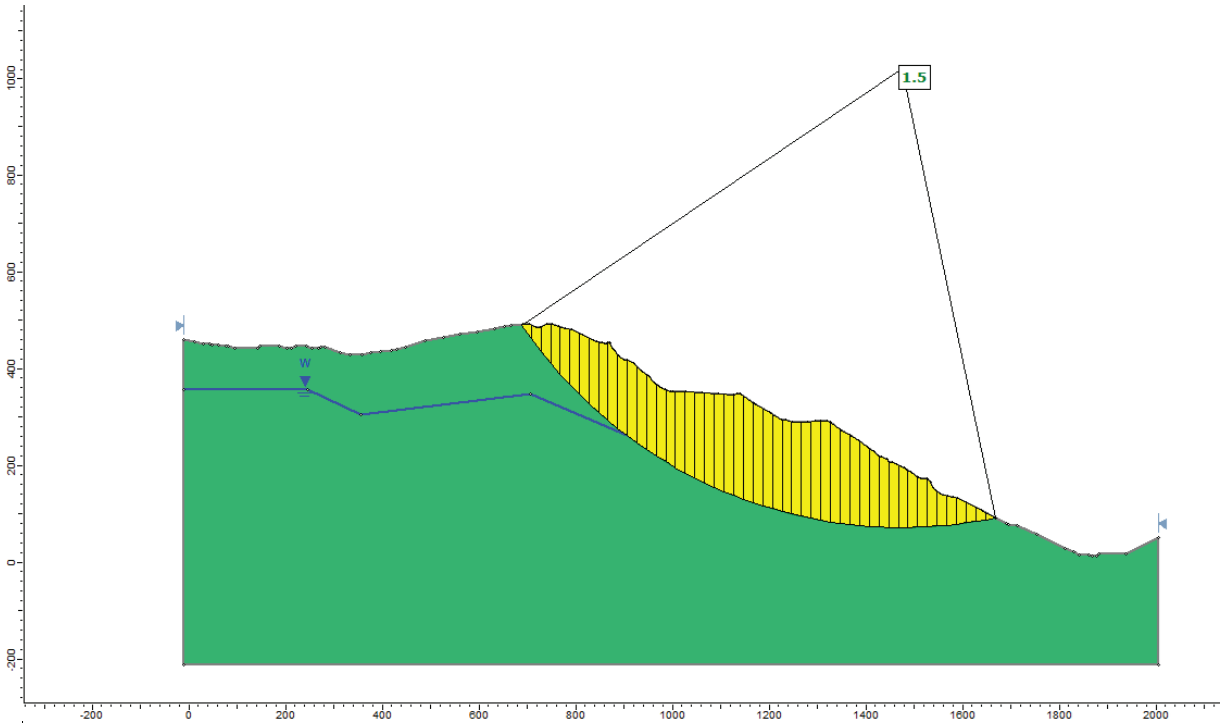
Stability Model Reports

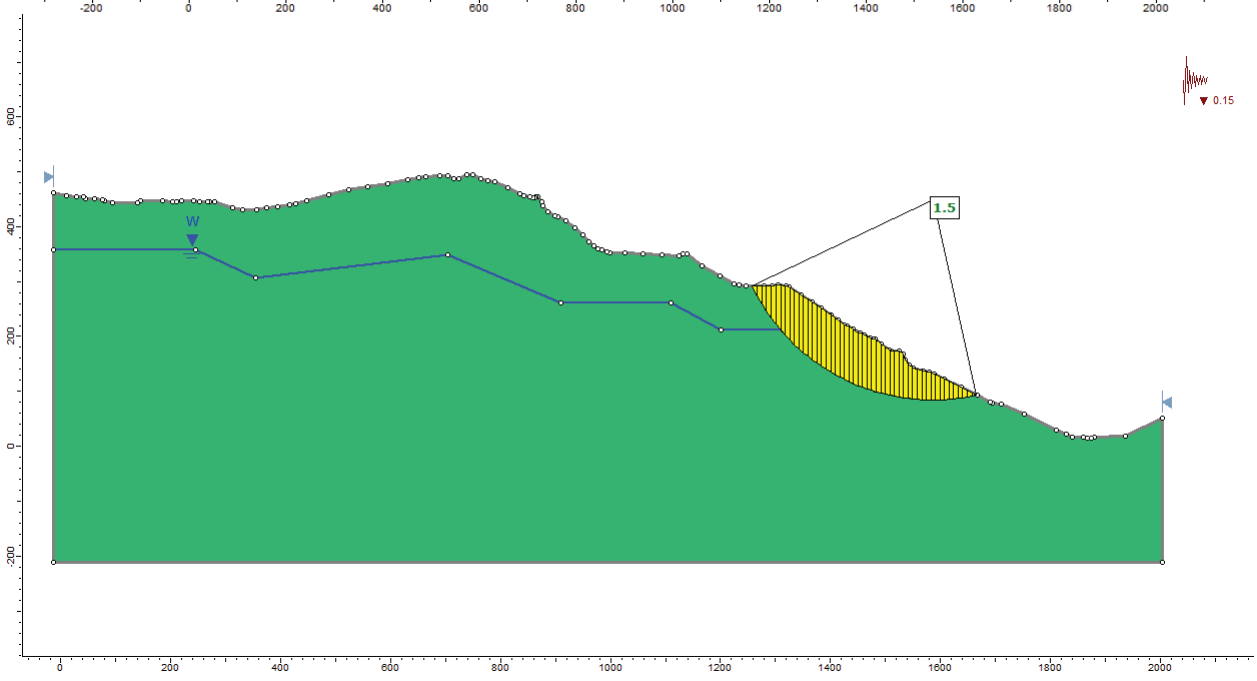
Design with community in mind

SECTION A (Rock Pile Removal Area)

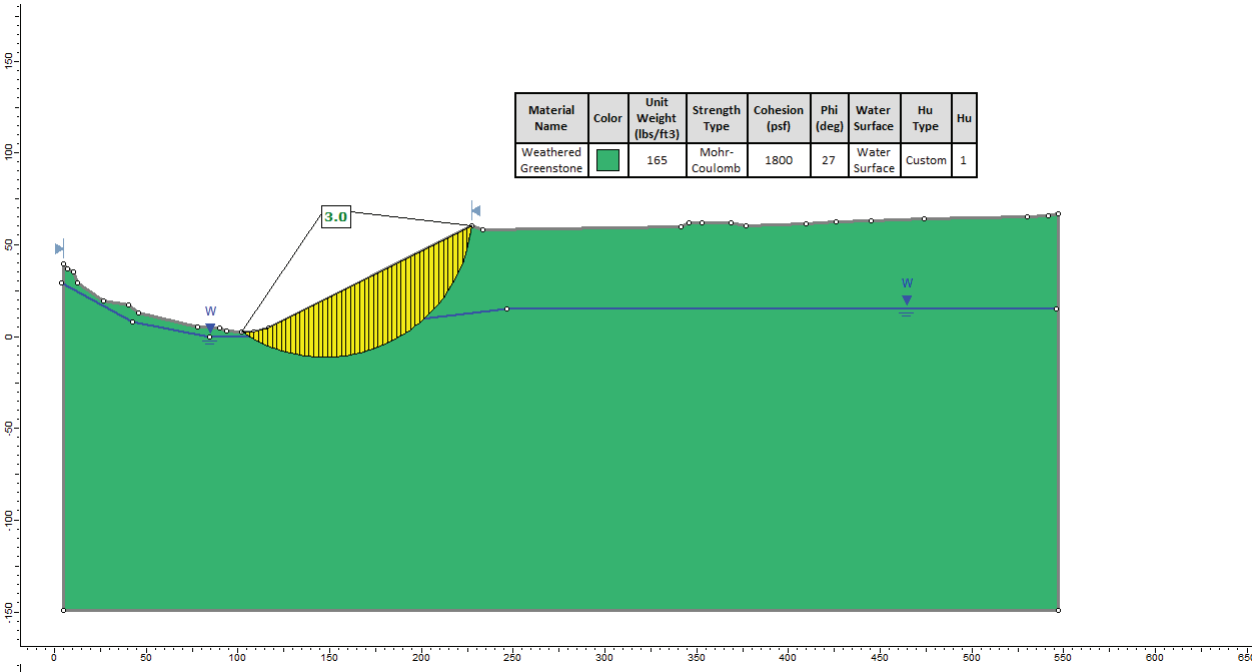


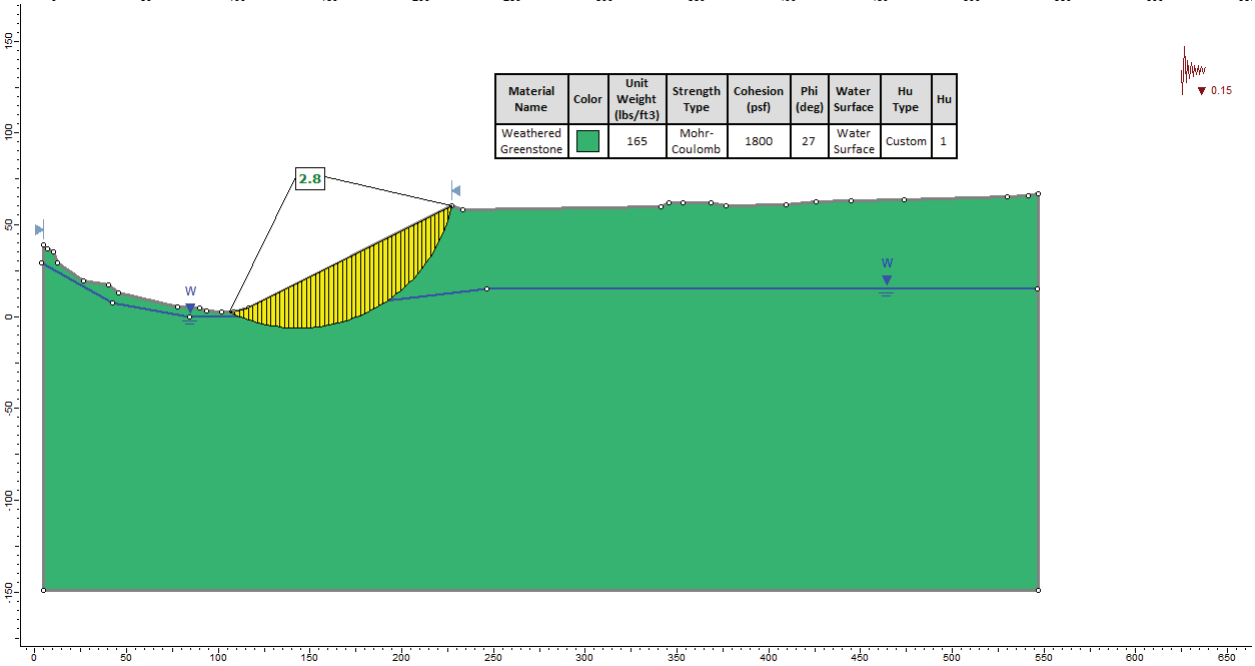
Design with community in mind

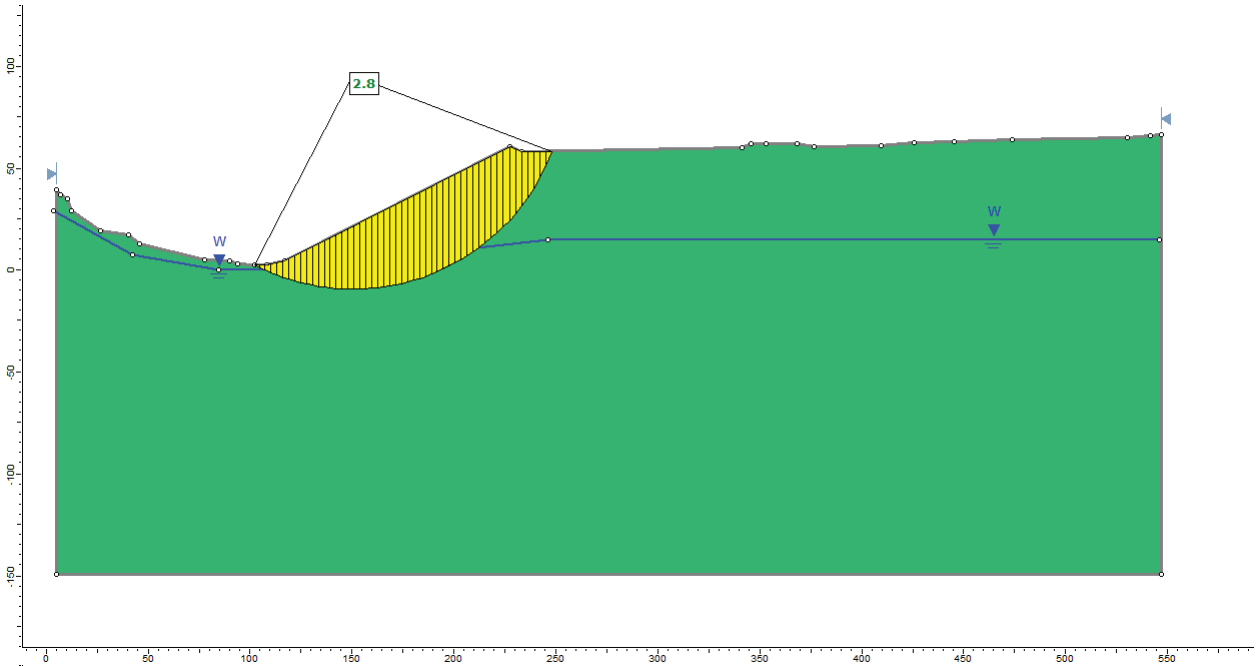

1.5
W
1000
800
600
400
200
0
-200
-200
0
200
400
600
800
1000
1200
1400
1600
1800
2000

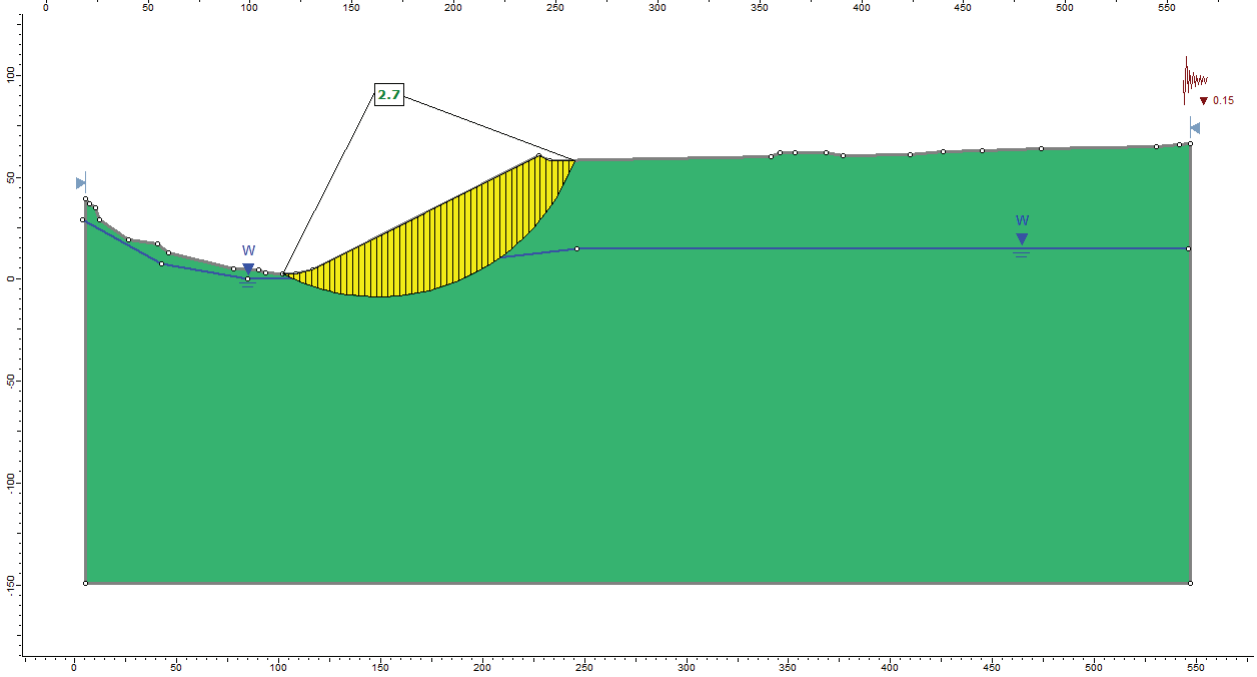

0.15
1.5
W
600
400
200
0
-200
0
200
400
600
800
1000
1200
1400
1600
1800
2000

SECTION C (Pond 1250 Area)

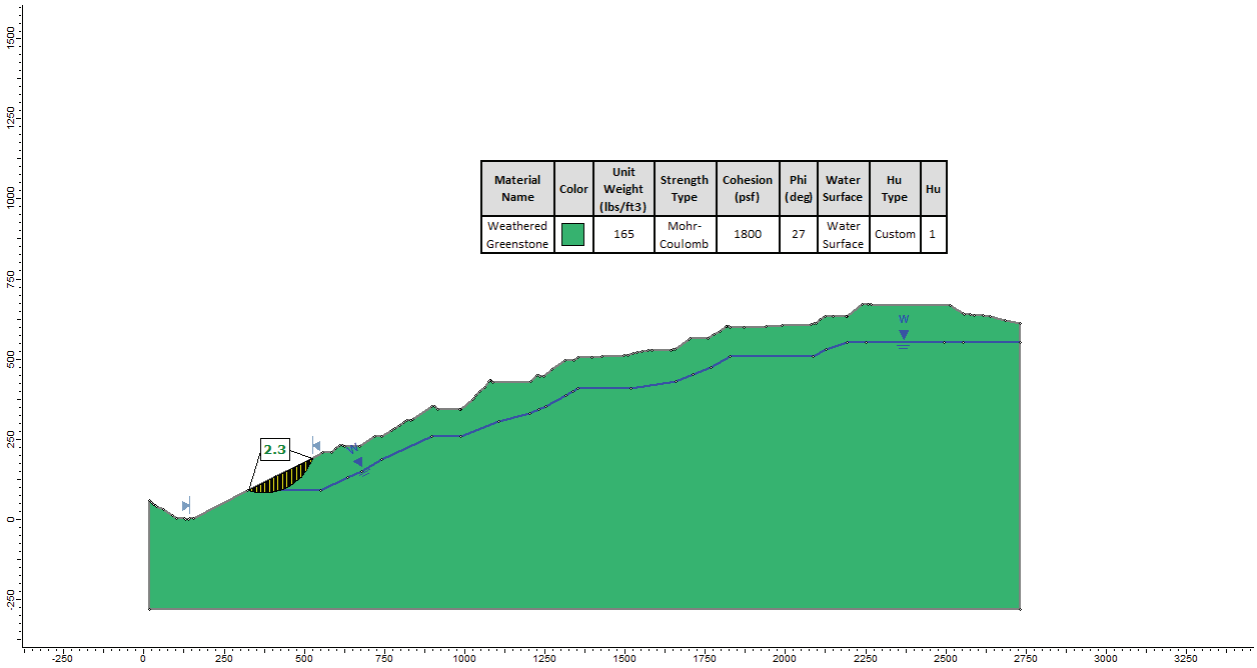


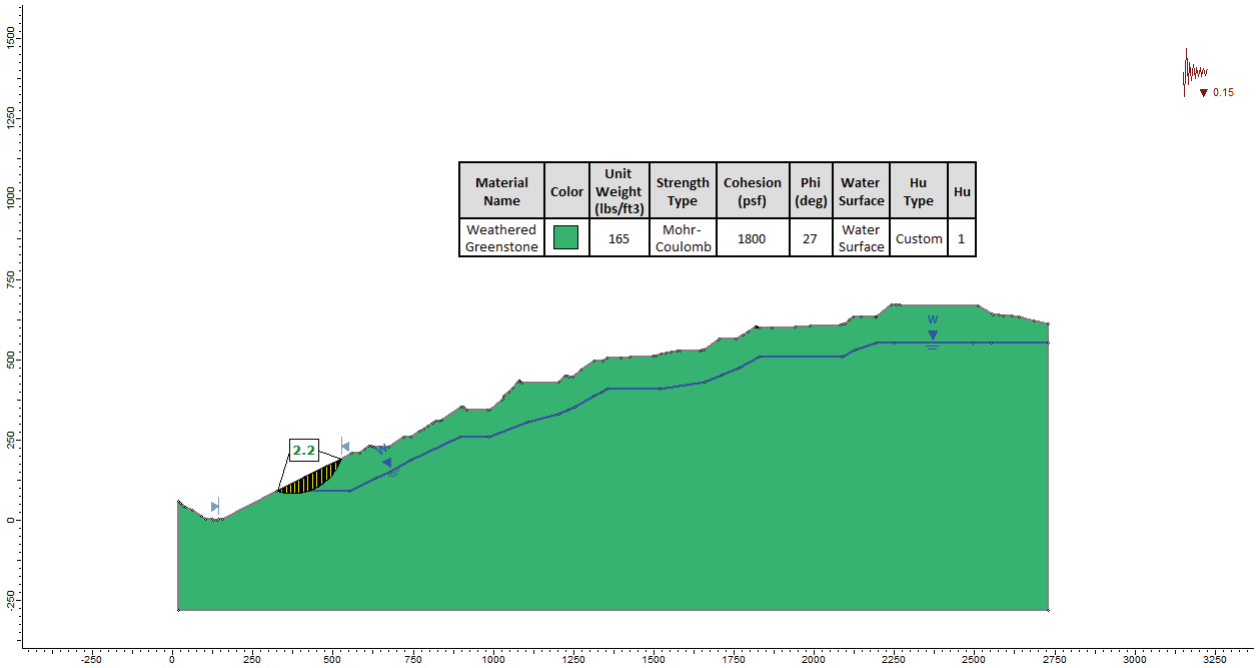


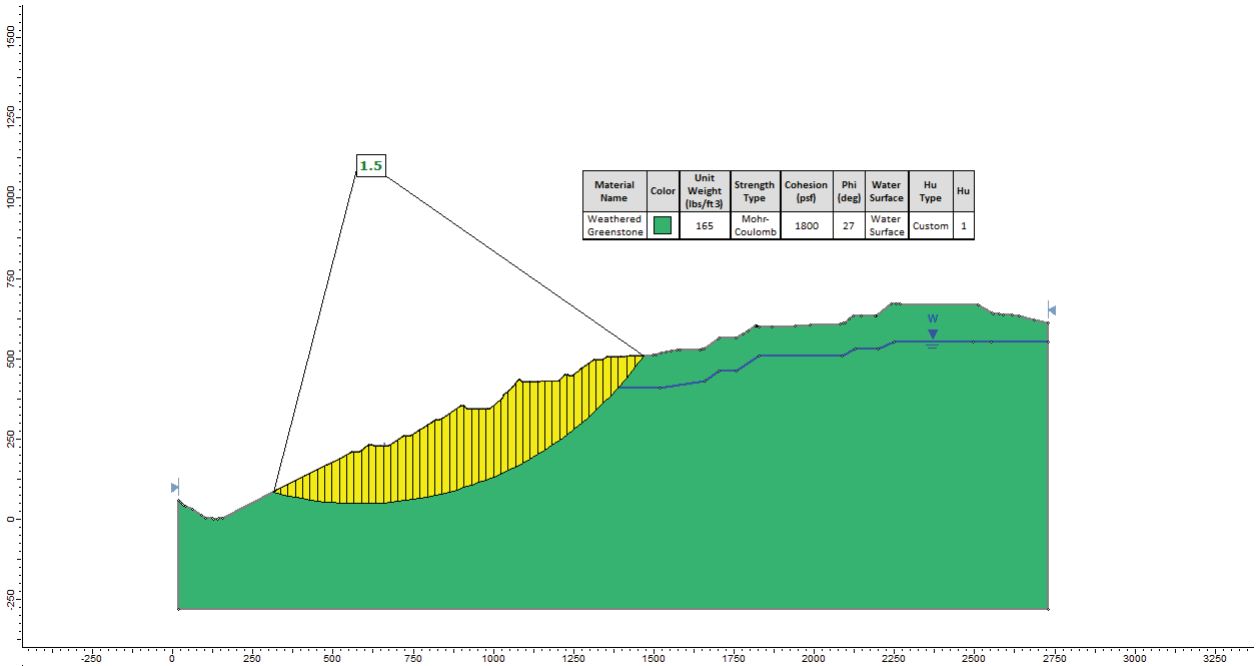

2.8
W
W
100
50
0
50
100
150
0
50
100
150
200
250
300
350
400
450
500
550

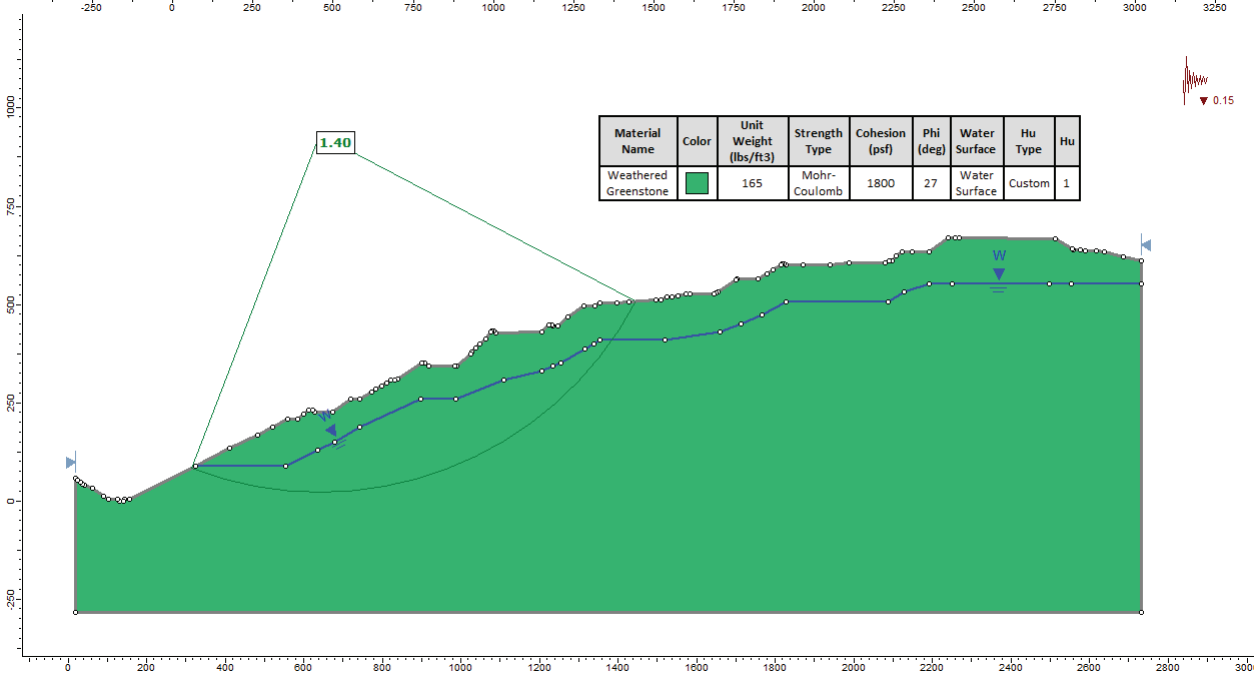

2.7
0.15
W
W
100
50
0
50
100
150
0
50
100
150
200
250
300
350
400
450
500
550

SECTION E (Pond 1250 Area)









Design with community in mind

Appendix H

2012 Conditions of County Approval

H1. Impacts and Mitigation Measures for the Final 2012 Permanente Quarry Reclamation Plan Amendment

APPENDIX H1
IMPACTS AND MITIGATION MEASURES FOR THE FINAL 2012 PERMANENTE QUARRY RECLAMATION PLAN AMENDMENT

This Appendix H1 is the same as Table ES-3 from the Draft 2012 EIR. Not all of the mitigation measures set forth below apply to the PCRP. Those that do apply are called out specifically in the Draft SEIR and are highlighted in light green below.

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
Aesthetics, Visual Quality, and Light and Glare			
4.1-1: Construction of the Project would have a substantially adverse effect on a scenic vista during an interim period.	Significant	None feasible	Significant and unavoidable
4.1-2: Monitoring and Maintenance of the Project would not have a substantially adverse long term effect on a scenic vista.	Less than significant	None required	Less than significant
4.1-3: Construction of the Project would substantially damage scenic resources within a state- or County-designated scenic highway or route during the period of time when active reclamation activities are occurring.	Significant	None feasible	Significant and unavoidable
4.1-4: Neither active reclamation activities nor monitoring and maintenance of the Project would result in long term substantial damage to scenic resources within a state- or County-designated scenic highway or route.	Less than significant	None required	Less than significant
4.1-5: The Project would alter and substantially degrade the existing visual character or quality of the Project Area during the period of time when active reclamation activities are occurring.	Significant	None feasible	Significant and unavoidable
4.1-6: The implementation of active reclamation activities would alter, but not permanently substantially degrade, the existing visual character or quality of the Project Area.	Less than significant	None required	Less than significant
4.1-7: Lighting required for the Project would not adversely affect daytime or nighttime views in the Project Area.	Significant	**Mitigation Measure 4.1-7:** No night lighting shall be allowed permitted on the east-facing slope of the EMSA or any other location within the EMSA that would be visible from public locations on the Santa Clara Valley floor including roadways.	Less than significant
4.1-8: The Project would not create new permanent sources of light or glare that would affect daytime or nighttime views in the area.	Less than significant	None required	Less than significant
6-1: Project construction activities could make a cumulatively considerable contribution a substantial adverse effect on a scenic vista and degradation of the existing visual character or quality of the Project Area.	Significant	None feasible	Significant and unavoidable
Agriculture and Forestry Resources			
(No impact)			

APPENDIX H1 (CONTINUED)
IMPACTS AND MITIGATION MEASURES FOR THE FINAL 2012 PERMANENTE QUARRY RECLAMATION PLAN AMENDMENT

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
Air Quality			
4.3-1: The Project would generate emissions of criteria air pollutants which could contribute to existing nonattainment conditions and further degrade air quality.	Less than significant	None required	Less than significant
4.3-2: Project traffic associated with operational and reclamation activities would generate localized CO emissions on roadways and at intersections in the Project vicinity.	Less than significant	None required	Less than significant
4.3-3: The Project would expose people to increased levels of toxic air contaminants, which could lead to an increase in the risk of cancer.	Significant	**Mitigation Measure 4.3-3a:** Within 90 days of Project approval, the Applicant shall submit to the County and the BAAQMD a comprehensive inventory of all Project-related off-road construction equipment expected to be used during any portion of the Project. The inventory shall include the horsepower rating, engine production year, and projected hours of use or fuel throughput for each piece of equipment. The inventory shall be updated and submitted annually throughout the duration of the Project. **Mitigation Measure 4.3-3b:** Within 90 days of Project approval, the Applicant shall provide a plan for approval by the County and the BAAQMD demonstrating that Project-related off-road equipment would achieve a Project (EMSA-specific) wide fleet-average 35 percent reduction in DPM emissions compared to the proposed fleet in the ALG report (ALG, 2011a) during Phase 1 of the Project. The plan shall be updated and submitted annually throughout the duration of the Project. Options for reducing emissions may include, but are not limited to: • Using newer model engines (e.g., engines that meet U.S. EPA interim/final Tier 4 engine standards); • Use of Retrofit Emission Control Devices that consist of diesel oxidation catalysts, diesel particulate filters, or similar retrofit equipment control technology verified by CARB (http://www.arb.ca.gov/diesel/verdev/verdev.htm); • Use of low-emissions diesel products or alternative fuels; • Use of alternative material handling options (e.g., conveyor system); or • Other options as may become commercially available and verifiable. ; or **4.3-3c:** The Applicant shall submit evidence establishing to the County's satisfaction that there are legally-binding restrictions precluding any occupancy of the caretaker's residence during the entirety of Phase 1 of the Project.	Less than significant

APPENDIX H1 (CONTINUED)
IMPACTS AND MITIGATION MEASURES FOR THE FINAL 2012 PERMANENTE QUARRY RECLAMATION PLAN AMENDMENT

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
4.3-4: The Project would expose people to increased levels of toxic air contaminants, which could increase acute and chronic health risks.	Less than significant	None required	Less than significant
4.3-5: The Project would increase emissions of PM2.5, which could adversely affect human health.	Significant	**Mitigation Measure 4.3-5:** Implement Mitigation Measures 4.3-3a and 4.3-3b (or, alternatively, implement Mitigation Measure 4.3-3c).	Less than Significant
Biological Resources			
4.4-1: Project activities could result in adverse effects on special-status and migratory birds.	Less than significant	None required	Less than significant
4.4-2: Project activities could result in adverse effects on special-status bats.	Significant	**Mitigation Measure 4.4-2a: Use of Buffers near Active Roosts.** During the November 1 to March 31 hibernation season, work shall not be conducted within 100 feet of woodland habitat that provides suitable bat roosting habitat. Bat presence is difficult to detect using emergence surveys during this period due to decreased flight and foraging behavior. If a qualified bat biologist determines that woodland areas do not provide suitable hibernating conditions for bats and they are unlikely to be present in the area, work may commence as planned. **Mitigation Measure 4.4-2b: Roosting Bats, Maternity Roosting Season.** Nighttime evening emergence surveys and/or internal searches within large tree cavities shall be conducted by a qualified biologist during the maternity season (April 1 to August 31) to determine presence/absence of bat maternity roosts within 100 feet of wooded Project boundaries. All active roosts identified during surveys shall be protected by a buffer to be determined by a qualified bat biologist. The buffer shall be determined by the type of bat observed, topography, slope, aspect, surrounding vegetation, sensitivity of roost, type of potential disturbance, etc. Each exclusion zone shall remain in place until the end of the maternity roosting season. If no active roosts are identified, then work may commence as planned. Survey results are valid for 30 days from the survey date. Should work commence later than 30 days from the survey date, surveys shall be repeated. Operations may continue for many years. Surveys do not need to be repeated annually unless additional clearing of potential roosting or hibernation habitat could occur outside of the non-roosting season. **Mitigation Measure 4.4-2c: Bat Roost Replacement.** All special-status bat roosts destroyed by the Project shall be replaced by the Applicant at a 1:1 ratio onsite with a roost suitable for the displaced species (e.g., bat houses for colonial roosters). The design of such replacement habitat shall be coordinated with CDFG. The new roost shall be in place prior to the time that the bats are expected to use the roost (e.g., prior to April 1 if the roost destroyed by the Project was used by a maternity colony), and shall be monitored periodically for 5 years to ensure proper roosting habitat characteristics (e.g., suitable temperature and no leaks). The roost shall be modified	Less than significant

APPENDIX H1 (CONTINUED)
IMPACTS AND MITIGATION MEASURES FOR THE FINAL 2012 PERMANENTE QUARRY RECLAMATION PLAN AMENDMENT

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		as necessary to provide a suitable roosting environment for the target bat species.	
4.4-3: Project activities could result in adverse effects on the San Francisco dusky-footed woodrat.	Less than significant	None required	Less than significant
4.4-4: Project activities could result adverse effects on special status aquatic organisms.	Less than significant	Implement **Mitigation Measure 4.10-2a: Interim Stormwater Control and Sediment Management.**	Less than significant
4.4-5: Project activities could result in selenium-burdened runoff reaching aquatic habitats and, thereby, in deleterious effects to aquatic organisms and their prey base.	Significant	**Mitigation Measure 4.4-5: Selenium-related Impacts to Aquatic Habitat.** Implement Mitigation Measures 4.10-2a: Interim Stormwater Control and Sediment Management; 4.10-2b: EMSA Interim Stormwater Monitoring Plan; Mitigation Measure 4.10-2c: Monitoring and Determination of BMP Effectiveness for the EMSA; Mitigation Measure 4.10-2d: Monitoring and Determination of BMP Effectiveness for the WMSA and Quarry Pit; and Mitigation Measure 4.10-2e: Design, Pilot Testing, and Implementation of Selenium Treatment Facility or Alternative for the EMSA and/or the WMSA and Quarry Pit.	Significant and unavoidable
4.4-6: Project activities could result in the loss or degradation of riparian habitat associated with Permanente Creek.	Less than significant	None required	Less than significant
4.4-7: Project activities could result in the loss of native oak woodland as defined by Oak Woodlands Conservation Law.	Significant	**Mitigation Measure 4.4-7: Sudden Oak Death Minimization Measures.** To reduce the possibility of spreading Sudden Oak Death to oak woodlands in the Study Area, the Applicant shall implement the following measures: • Prior to any reclamation work within the Project Area, equipment shall be sanitized, including shoes, pruning gear, trucks, and heavy equipment such as earthmoving, tree trimming, chipping, or mowing equipment. Except for trucks, this equipment shall remain onsite for the duration of Project activities and shall not be transferred between this and other worksites, as doing so increases the potential of transferring infected spores to or from another site. • After the completion of work activities, any accumulation of plant debris (especially leaves), soil, and mud shall be washed off of equipment or otherwise removed onsite, and air filters shall be blown out. • All contractors shall have sanitation kits onsite for cleaning equipment. Sanitation kits should contain chlorine bleach (10/90 mixture bleach to water) or Clorox Clean-Up or Lysol, scrub brush, metal scraper, boot brush, and plastic gloves. • All organic material imported for mixing with Quarry pit backfill shall have been composted at a facility that meets the standards of Title 14 California Code of Regulations, Division 7, Chapter 3.1; alternative sources of organic material may be used if approved by the County of Santa Clara Agricultural Commissioner as being as effective as the composting process to sanitize	Less than significant

APPENDIX H1 (CONTINUED)
IMPACTS AND MITIGATION MEASURES FOR THE FINAL 2012 PERMANENTE QUARRY RECLAMATION PLAN AMENDMENT

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		SOD-infected materials. • All other imported fill material, soil amendments, gravel, etc. required for construction and/or restoration activities to be placed within the upper 12 inches of the ground surface shall be free of vegetation or plant material.	
4.4-8: Project activities could result in substantial adverse effects on wetlands and jurisdictional waters associated with Permanente Creek through direct removal, filling, hydrological interruption, or other means.	Significant	**4.4-8a: Wetland Identification and Avoidance.** A qualified wetland biologist shall physically delineate all federal and state waters and wetland features mentioned above and identified in the 2008 wetland delineation (WRA, 2008). This shall occur before any PCRA activities begin, and when feasible, reclamation activities shall completely avoid these areas. Silt fence shall be installed between jurisdictional waters or wetlands and areas sprayed with hydroseed to prevent filling of wetlands with tackifier or other hydroseed material. Use of hand-seeding or working with hand tools may be required to avoid equipment impacting wetlands. **4.4-8b: Wetland Mitigation Plan.** If avoidance of jurisdictional waters or wetlands is not feasible, the following measures shall be implemented: A qualified wetland biologist shall prepare a Mitigation and Monitoring Plan (MMP) for impacts to wetlands and waters under state or federal jurisdiction. The MMP shall outline the anticipated mitigation obligations for temporary and permanent impacts to waters of the state and/or U.S., including wetlands, resulting from PCRA activities. The MMP shall include: • Baseline information; • Anticipated habitat enhancements to be achieved through compensatory actions, including whether mitigation will occur within the Project Area along Permanente Creek or at an offsite location, as well as mitigation site location and hydrology; • When possible, a preference for mitigation within the Permanente Quarry property, for impacts to both jurisdictional waters and wetlands; • Performance and success criteria for habitat enhancement of Permanente Creek or other waterways to compensate for impacts to Other Waters, including: – A replanting plan for appropriate native riparian woody vegetation, including but not limited to arroyo willow, white alder, California wild rose, and snowberry, bigleaf maple, western creek dogwood, and Oregon ash; – An 80% overall revegetation planting success for all mitigation areas over a ten-year period;	Less than significant

APPENDIX H1 (CONTINUED)
IMPACTS AND MITIGATION MEASURES FOR THE FINAL 2012 PERMANENTE QUARRY RECLAMATION PLAN AMENDMENT

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		– A minimum overall mitigation ratio of 1.1:1 acres for permanent impacts and 1:1 acres for temporary impacts; – Plantings that are self-reliant, exhibit average or better health and vigor and have observable growth in stems and leaves at least two years prior to the end of the ten-year monitoring period; – Visual inspection of all revegetation sites during each growing season, with qualitative and quantitative measures of plant cover and performance; – Observations of total percent plant cover in the planting area, natural recruitment of native species, and establishment of new non-native species; and – Annual monitoring reports submitted to CDFG and RWQCB documenting revegetation conditions, including recommendations to adapt maintenance and replacement of failed plantings. • Performance and success criteria for wetland creation or enhancement including, but not limited to, the following: – At least 70 percent survival of installed plants for each of the first three years following planting. – Performance criteria for vegetation percent cover in Years 1-4 as follows: at least 10 percent cover of installed plants in Year 1; at least 20 percent cover in Year 2; at least 30 percent cover in Year 3; at least 40 percent cover in Year 4. – Performance criteria for hydrology in Years 1-5 as follows: Fourteen or more consecutive days of flooding, ponding, or a water table 12 inches or less below the soil surface during the growing season at a minimum frequency of three of the five monitoring years; OR establishment of a prevalence of wetland obligate plant species. – Invasive plant species that threaten the success of created or enhanced wetlands shall not be allowed to contribute relative cover greater than 35 percent in year 1, 20 percent in years 2 and 3, 15 percent in year 4, and 10 percent in year 5.	
Cultural and Paleontological Resources			
4.5-1: Project activities could cause an adverse change in the significance	Significant	**Mitigation Measure 4.5-1a:** The Applicant shall document the physical characteristics	Significant and

APPENDIX H1 (CONTINUED)
IMPACTS AND MITIGATION MEASURES FOR THE FINAL 2012 PERMANENTE QUARRY RECLAMATION PLAN AMENDMENT

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
of an historical resource pursuant to §15064.5 of the CEQA Guidelines and the County's Historic Preservation Ordinance.		and their historic context of the contributing features of the Kaiser Permanente Quarry Mining District, including archival photo-documentation, mapping, and recording of historical and engineering information including measured drawings about the property according to the standards of the Historic American Building Survey/Historic American Engineer Record/Historic American Landscapes Survey (HABS/HAER/HALS), to be placed in a local public archive such as the Archives of the County of Santa Clara; **Mitigation Measure 4.5-1b:** The Applicant shall salvage and/or relocate a representative portion of the Permanente Quarry Conveyor System and the remains of the early 1940s crusher, which constitute character-defining features that otherwise would be lost as a part of implementation of the Project; and **Mitigation Measure 4.5-1c:** The Applicant shall prepare public information programs to educate the general public on the historic nature of the potential Kaiser Permanente Quarry Mining District, including but not limited to exhibits at the Quarry office, publications available at the Quarry office, and an online presentation available on the Applicant's website (www.lehighpermanente.com).	unavoidable
4.5-2: Project activities could cause an adverse change in the significance of an archaeological resource as defined in §15064.5 of the CEQA Guidelines.	Significant	**Mitigation Measure 4.5-2:** If cultural resources are encountered during Project implementation, the Applicant shall notify the County and all activity within 100 feet of the find shall halt until it can be evaluated by a qualified archaeologist and a Native American representative. Prehistoric archaeological materials might include obsidian and chert flaked-stone tools (e.g., projectile points, knives, scrapers) or toolmaking debris; culturally darkened soil ("midden") containing heat-affected rocks, artifacts, or shellfish remains; and stone milling equipment (e.g., mortars, pestles, handstones, or milling slabs); and battered stone tools, such as hammerstones and pitted stones. Historic-period materials might include stone, concrete, or adobe footings and walls; filled wells or privies; and deposits of metal, glass, and/or ceramic refuse. If the archaeologist and Native American representative determine that the resources may be significant and cannot be avoided, they shall notify the County and an appropriate treatment plan for the resources shall be developed by the Applicant in consultation with the County and the archaeologist. Measures in the treatment plan could include preservation in place (capping) and/or data recovery. The archaeologist shall consult with Native American representatives in determining appropriate treatment for prehistoric or Native American cultural resources. Ground disturbance shall not resume within 100 feet of the find until an agreement has been reached as to the appropriate treatment of the find.	Less than significant
4.5-3: Project activities could directly or indirectly destroy a unique paleontological resource or site.	Significant	**Mitigation Measure 4.5-3:** If a paleontological resource is encountered during implementation of the RPA, the Applicant shall notify the County and all activity within 100 feet of the find shall halt until it can be evaluated by a qualified paleontologist as defined by the Society of Vertebrate Paleontology Guidelines (SVP, 1995). The paleontologist shall evaluate the resource and determine its significance. If significant, the paleontologist shall notify the County and the Applicant, in consultation with the	Less than significant

APPENDIX H1 (CONTINUED)
IMPACTS AND MITIGATION MEASURES FOR THE FINAL 2012 PERMANENTE QUARRY RECLAMATION PLAN AMENDMENT

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		County and the paleontologist, shall prepare a treatment plan such that the fossil would be recovered and scientific information preserved. The paleontologist shall implement the treatment plan in consultation with the County and Applicant prior to allowing work in the 100-foot radius to resume.	
4.5-4: Project activities could disturb human remains, including those interred outside of formal cemeteries.	Significant	**Mitigation Measure 4.5-4:** In the event that human skeletal remains are encountered, the Applicant is required by Health and Safety Code Section 7050.5, Public Resources Code Section 5097.98, Title 14 California Code of Regulations Section 15064.5(e), and County Ordinance No. B6-18 to immediately notify the County Coroner. Upon determination by the County Coroner that the remains are Native American, the coroner shall contact the California Native American Heritage Commission, pursuant to subdivision (c) of §7050.5 of the Health and Safety Code and the County Coordinator of Indian affairs. No further disturbance of the site shall be made except as authorized by the County Coordinator of Indian Affairs in accordance with the provisions of state law and the County Ordinance. If artifacts are found on the site, a qualified archaeologist shall be contacted along with the County Planning Office. No further disturbance of the artifacts shall be made except as authorized by the County Planning Office.	Less than significant
Energy Conservation			
4.6-1: The Project would include means for avoiding or reducing wasteful and/or unnecessary consumption of energy.	Less than significant	None required	Less than significant
Geology, Soils, and Seismicity			
4.7-1: Rock and soil slopes constructed as part of the proposed reclamation of the EMSA, Quarry pit, and WMSA could fail under static or seismic forces if not properly engineered and constructed.	Significant	**Mitigation Measure 4.7-1: Avoidance and containment of shallow slumps and/or fall-back of overburden material.** In all areas requiring the use of excavators for grading within the PCRA (e.g., access road in-sloping, installation/repair of sedimentation basins, and removal of slide debris), the Applicant and/or its contractor shall begin excavations from the top of slope and proceed downward. The Applicant and/or its contractor shall not undercut sloped materials unless no other option is feasible as determined by a registered geotechnical engineer (e.g., excessively sloped or otherwise inaccessible terrain). In all areas of the PCRA where excavations would occur in sloped materials, the Applicant and/or its contractor shall install barriers immediately downslope of the activity. Downslope barriers shall be designed and installed in a manner that would be adequate to prevent overburden and/or native materials from falling, sloughing or sliding further downslope, or into Permanente Creek. Such measures may consist of temporary interlocking soldier piles, wooden shoring systems, wire mesh or other containment measures(s), and the Applicant and/or its contractor shall not be permitted to conduct excavation or grading activities downgradient of the barrier, or prior to its installation. The ultimate location, design and installation method of such measures shall be prepared and certified, or reviewed and	Less than significant

APPENDIX H1 (CONTINUED)
IMPACTS AND MITIGATION MEASURES FOR THE FINAL 2012 PERMANENTE QUARRY RECLAMATION PLAN AMENDMENT

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		approved by a California State registered geotechnical engineer.	
4.7-2: In the event of a major earthquake in the region, seismic ground shaking could result in injury to site workers, damage to Quarry equipment and structures, or trigger slope failures. In addition, a large earthquake on the San Andreas Fault could result in minor ground deformation along traces of the Berrocal or Monte Vista Fault Zones.	Less than significant	None required	Less than significant
4.7.3: Earthmoving and other ground disturbance associated with the phased reclamation of the site could temporarily promote accelerated erosion and soil loss.	Less than significant	None required	Less than significant
Greenhouse Gas Emissions			
4.8-1: The Project could result in an increase in greenhouse gas emissions and contribute to climate change.	Significant	**Mitigation Measure 4.8-1a: Develop Annual GHG Inventory.** The Applicant shall become a reporting member of The Climate Registry. Beginning with the first year of the Project and continuing for the duration of the Project, the Applicant shall conduct an annual inventory of GHG emissions and shall report those emissions to The Climate Registry. The annual inventory shall be conducted according to The Climate Registry protocols and third-party verified by a verification body accredited through The Climate Registry. **Mitigation Measure 4.8-1b: Greenhouse Gas Emissions Reduction Plan.** The Applicant shall prepare, submit for County and BAAQMD approval, make available to the public, and implement a Greenhouse Gas Emissions Reduction Plan (GHG Plan) containing quantifiable strategies to ensure that the Project-related incremental increase of GHG emissions does not exceed 1,100 MT CO_2e per year. The GHG Plan shall include, but not be limited to, the following measures: 1. Replacement of on-road and off-road vehicles and construction equipment with lower GHG-emitting engines, such as electric or hybrid. 2. Use of the Overland Conveyor System, powered by electric motors, to move more than 75 percent of the waste rock from the West Materials Storage Area (WMSA) to reclaim the Quarry pit. If the Applicant is unable to reduce the Project-related incremental increase of GHG emissions to below 1,100 MT CO_2e per year using the above measures, the Applicant shall offset all remaining Project incremental emissions above that threshold. Any offset of Project emissions shall be demonstrated to be real, permanent, verifiable, enforceable, and additional. To the maximum extent feasible, as determined by the County in coordination with the BAAQMD, offsets shall be implemented locally. Offsets may include but are not limited to, the following (in order of preference): 1. Onsite offset of Project emissions, for example through development of a renewable energy generation facility or a carbon sequestration project (such	Less than significant

APPENDIX H1 (CONTINUED)
IMPACTS AND MITIGATION MEASURES FOR THE FINAL 2012 PERMANENTE QUARRY RECLAMATION PLAN AMENDMENT

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		as a forestry or wetlands project for which inventory and reporting protocols have been adopted). If the Applicant develops an offset project, it must be registered with the Climate Action Reserve or otherwise approved by the BAAQMD in order to be used to offset Project emissions. The number of offset credits produced would then be included in the annual inventory, and the net (emissions minus offsets) calculated. 2. Funding of local projects, subject to review and approval by the BAAQMD, that would result in real, permanent, verifiable, enforceable, and additional reduction in GHG emissions. If the BAAQMD or County of Santa Clara develops a GHG mitigation fund, the Applicant may instead pay into this fund to offset Project incremental GHG emissions in excess of the significance threshold. 3. Purchase of carbon credits to offset Project incremental emissions to below the significance threshold. Carbon offset credits must be verified and registered with The Climate Registry, the Climate Action Reserve, or other source that is approved by the California Air Resources Board as being consistent with the policies and guidelines of the California Global Warming Solution Act of 2006 (AB 32), or available through a County- or BAAQMD-approved local GHG mitigation bank or fund.	
4.8-2: The Project could conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHG.	Less than significant	None required	Less than significant
Hazards and Hazardous Materials			
4.9-1: The Project could create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials.	Less than significant	None required	Less than significant
4.9-2: The Project could create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment.	Less than significant	None required	Less than significant
4.9-3: Sedimentation and detention basins planned for erosion and flood control at the Project site could provide breeding grounds for vectors.	Less than significant	None required	Less than significant

APPENDIX H1 (CONTINUED)
IMPACTS AND MITIGATION MEASURES FOR THE FINAL 2012 PERMANENTE QUARRY RECLAMATION PLAN AMENDMENT

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
Hydrology and Water Quality			
4.10-1: Post-reclamation conditions in the East Materials Storage Area (EMSA), West Materials Storage Area (WMSA), and Quarry pit would increase selenium concentrations in Permanente Creek to levels exceeding baseline conditions and RWQCB Basin Plan objectives.	Significant	**Mitigation Measure 4.10-1a: Professional Geologist Verification of Non-Limestone-Containing Material Use.** A California-certified Professional Geologist shall be onsite during reclamation to verify that non-limestone run-of-mine rock is used as cover on the EMSA and WMSA. In addition, the Geologist shall observe and document activities associated with placing the final overburden on the Quarry pit (i.e., ensuring that organic material is mixed to specifications). Using visual and field testing methods, with occasional bulk sampling and laboratory analysis, the geologist shall observe and document the type of rock placed over the limestone-containing material during reclamation activities. The geologist shall inspect and document whether limestone is present at the source area (Quarry pit and WMSA), whether limestone rock is transported from the source area to segregation stockpiles, and whether limestone is present within the lifts of the proposed 1-foot layer of run-of-mine cover rock (in the EMSA, WMSA, and Quarry pit). Inspection involves observing the excavation, hauling, stockpiling, and placement of the non-limestone cover material, performing a visual assessment of the rock, and conducting random spot sampling and field testing of suspect rock fragments. If observation, field testing, or laboratory analysis indicates that significant amounts of limestone are intermixed with the supposed non-limestone cover material, the geologist shall document its presence, temporarily halt fill operations, and notify the County Planning Office and field superintendent. Once notified, the Applicant shall remove the limestone-containing materials and then perform verification field sampling in addition to laboratory verification.	Less than significant
4.10-1 (cont.)		Mitigation Measure 4.10-1b: Verification Water Quality Monitoring. The Applicant shall implement the following water monitoring and verification program within 90 days of Project approval and continue the program throughout the backfilling and reclamation phases and for 5 years following completion of reclamation. As part of this program, the Applicant shall: • Collect quarterly Quarry pit water samples and analyze for general water chemistry and dissolved and total metals, including selenium. • Perform quarterly electrical conductivity and pH measurements of the Quarry water. • Measure and record daily volumes of any water that is pumped from the pit area. • Conduct annual seep surveys in March or April of each year within the Quarry pit. Any seeps identified shall be sampled for general water chemistry and minerals and dissolved metals, and the seep flow rate shall	

APPENDIX H1 (CONTINUED)
IMPACTS AND MITIGATION MEASURES FOR THE FINAL 2012 PERMANENTE QUARRY RECLAMATION PLAN AMENDMENT

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		be estimated. • Perform routine testing of each of the various rock types that comprise the overburden to further characterize bulk and leachable concentrations of key metal constituents (selenium in particular). Such testing shall be performed until the average concentrations and the variability within a rock type is no longer changing significantly as new data are gathered. • Sample and test runoff from the EMSA and WMSA throughout and following reclamation to confirm the concepts and closure plans (i.e., that cover with non-limestone material and revegetation results in runoff water quality that meets Basin Plan Water Quality Objectives and all other applicable water quality standards). Stormwater runoff monitoring and sampling shall be conducted following the placement and final grade of the 1-food-run-od-mine non-limestone cover material to ensure that surface water discharging from this cover does not contain selenium at concentrations exceeding the Basin Plan Water Quality Objectives. Three rounds of representative surface water samples shall be collected and analyzed to verify rock cover performance prior to the placement of the vegetative growth layer. • The data obtained through this mitigation measure shall be used to reevaluate the water balance components such as runoff and groundwater inflow and the water quality associated with these within the last five years of active mining. Based on the results of any refined water balance and water quality projections, the Applicant shall also review and refine the water management procedures. • Reclamation of the Quarry Pit, EMSA, and WMSA areas shall not be considered complete until 5 years of water quality testing as described above demonstrate, to the satisfaction of the Director of Planning and Development, that selenium in surface water runoff and any point source discharges has been reduced below all applicable water quality standards, including Basin Plan Objectives.	
4.10-2: Interim reclamation activities within the Project Area would contribute concentrations of selenium, Total Dissolved Solids (TDS), and sediment in Permanente Creek.	Significant	**Mitigation Measure 4.10-2a: Interim Stormwater Control and Sediment Management.** To minimize the discharge of sedimentation and metal constituents, particularly selenium, to watercourses, the Applicant shall implement the following stormwater and sediment management controls in addition to general BMPs required by the SWPPP in active and inactive reclamation areas throughout Phases 1, 2 and 3 of the Project. The Applicant shall: • Segregate limestone materials from the non-limestone materials (breccia, graywacke, chert, and greenstone) by way of operational phasing to ensure that non-limestone materials are placed beneath and are covered by non-	Significant and unavoidable

APPENDIX H1 (CONTINUED)
IMPACTS AND MITIGATION MEASURES FOR THE FINAL 2012 PERMANENTE QUARRY RECLAMATION PLAN AMENDMENT

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		limestone materials. A California Professional Geologist shall oversee stockpiling, segregation, and placement of non-limestone materials. • Stabilize inactive areas, such as temporary stockpiles or dormant excavations that drain directly or indirectly to Permanente Creek using an appropriate combination of BMPs to cover the exposed rock material, intercept runoff, reduce its flow velocity, release runoff as sheet flow, and provide a sediment control mechanism (such as silt fencing, fiber rolls, or hydroseeded vegetation). Standard soil stabilization BMPs include geotextiles, mats, erosion control blankets, vegetation, silt fence surrounding the stockpile perimeter, and fiber rolls at the base and on side slopes. • Temporarily stabilize active, disturbed reclamation areas undergoing fill placement before and during qualifying rain events expected to produce site runoff. Stabilization methods include combined BMPs that protect materials from rain, manage runoff, and reduce erosion. Reclamation activities involving grading, hauling, and placement of backfill materials cannot take place during periods of rain. • In areas such as the WMSA where fill slopes are steep and composed of loose material, controls shall be in place to prevent material from sloughing off into the PCRA and Permanente Creek. These controls shall include debris/silt fencing placed on outer edge of grading and excavation operations back-sloping excavations to prevent grade slope towards the creek, operations buffer areas that require the use of smaller grading equipment, temporary berms along the outer extent of operations closest to the creek, operator training regarding the prevention of triggering debris slides. • Cover active haul roads with non-limestone materials where exposed limestone surfaces are present. Roads that undergo dust control by watering must have fiber rolls or equivalent runoff protection installed along the road side to reduce runoff and avoid drainage to Permanente Creek. • Divert all runoff generated from disturbed active and inactive reclamation areas to temporary basins, the Quarry pit, or temporary vegetated infiltration basins and kept away from drainage pathways entering Permanent Creek. To the extent possible, drainage of the non-limestone materials shall be diverted directly to sediment control facilities and natural surface drainages. • Install up-gradient berms where limestone fines or stockpiles are placed, to protect against stormwater run-on, and install ditches and down-gradient berms to promote infiltration rather than run-off. • Replace the limestone rock and materials that are currently used in the	

APPENDIX H1 (CONTINUED)
IMPACTS AND MITIGATION MEASURES FOR THE FINAL 2012 PERMANENTE QUARRY RECLAMATION PLAN AMENDMENT

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		existing BMP ditches and cover or otherwise separate runoff from limestone rock in the existing sediment pond embankments. • Cover large limestone surfaces that would remain exposed during the rainy season with interim covers composed of non-limestone rock types. • Inspect and maintain BMPs after each qualifying rain event to ensure their integrity. • Reconstruct or reline all existing stormwater conveyances and check dam structures that are constructed or lined with limestone rock using non-limestone material (greenstone, breccias, greywacke, metabasalt), available at the Quarry. • Regularly inspect all stormwater and erosion controls, especially before and following qualifying rain events. Inspections shall be documented and periodically reported. Any violations shall be reported and corrected immediately. • Provide adequate erosion control training to all equipment operators, site superintendants, and managers to ensure that stormwater and erosion controls are maintained and remain effective. • Use only jute netting or other suitable replacement for erosion control in the PCRA; no plastic monofilament shall be used for erosion control or other purposes, as California Red legged Frogs and other wildlife may become entangles in it. • Ensure that all stormwater, erosion, and sediment control BMPs installed, inspected, maintained, and repaired under the direction of either a California certified engineer, geologist or landscape architect, an American Institute of Hydrology registered professional hydrologist, or a certified erosion control specialist. **Mitigation Measure 4.10-2b: EMSA Interim Stormwater Monitoring Plan.** The Applicant shall develop a stormwater sampling plan that would supplement preexisting surface water monitoring required by General Industrial Storm Water and Sand and Gravel NPDES Permit and be designed specifically to monitor surface water during reclamation activities in active and inactive excavation and backfill areas. The purpose of this plan is to evaluate performance of temporary BMPs and completed reclamation phases at the EMSA and to identify areas that are sources of selenium (measured on total recoverable basis), sediment, or high TDS. At a minimum, the plan shall require the Applicant to inspect BMPs and collect water samples for analysis of TDS and metals, including selenium, within 24 hours after a qualifying rain event and sample non-stormwater discharges when they occur. If elevated selenium, sediment, or TDS is	

APPENDIX H1 (CONTINUED)
IMPACTS AND MITIGATION MEASURES FOR THE FINAL 2012 PERMANENTE QUARRY RECLAMATION PLAN AMENDMENT

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		identified through sample analysis, the Applicant shall identify the source and apply any new or modified standard BMPs available. BMPs that show sign of failure or inadequate performance shall be repaired or replaced with a more suitable alternative. Following implementation, the Applicant shall re-test surface water to determine the effectiveness of such modifications, and determine whether additional BMPs are necessary. **Mitigation Measure 4.10-2c: Monitoring and Determination of BMP Effectiveness for the EMSA.** • Within 30 days of Reclamation Plan Amendment approval, sampling and testing shall occur within 24 hours after a qualifying rain event. If no qualifying rain event occurs within 30 days of Reclamation Plan approval, then testing shall begin at the first qualifying event. Testing shall be conducted in accordance with the Stormwater Sampling Plan developed and approved in accordance with Mitigation Measure 4.10- 2b. • If test results for two consecutive years show that stormwater discharging from the EMSA into Permanente Creek exceeds total recoverable selenium of 5 µg/L, or other applicable discharge requirement as determined by the RWQCB, then the County shall schedule a public hearing before the Planning Commission to determine whether the Applicant is complying with the stormwater discharge requirements. For purposes of triggering Planning Commission review, the sampling shall occur at locations where water discharges to Permanente Creek. • If the Planning Commission determines that the Applicant is not complying with discharge requirements, then the Applicant shall install a treatment system (or alternative) as described under Mitigation Measure 4.10-2e. **Mitigation Measure 4.10-2d: Monitoring and Determination of BMP Effectiveness for the WMSA and Quarry Pit.** • Within 30 days of the start of reclamation activities for Phase 2, the Applicant shall conduct monthly water sampling and testing results as described in Mitigation Measure 4.10-1b. • If test results for two consecutive years show that selenium levels are higher than base levels, then the County shall schedule a public hearing before the Planning Commission to determine whether the reclamation activities are causing an increase in total selenium above the base levels. “Base levels” shall be defined as water testing results for an average for two years immediately prior to start of Phase 2 reclamation for discharge into Permanente Creek from the WMSA and Quarry pit. For purposes of triggering Planning Commission review, the sampling shall occur at locations	

APPENDIX H1 (CONTINUED)
IMPACTS AND MITIGATION MEASURES FOR THE FINAL 2012 PERMANENTE QUARRY RECLAMATION PLAN AMENDMENT

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		where water discharges to Permanente Creek. • If the Planning Commission finds that reclamation activities are causing an increase in selenium over base levels, then the Applicant shall install a treatment system (or alternative) as described under Mitigation Measure 4.10-2e. **Mitigation Measure 4.10-2e: Design, Pilot Testing, and Implementation of Selenium Treatment Facility or Alternative for the EMSA and/or the WMSA and Quarry Pit.** • Within 30 days of Reclamation Plan Amendment approval, the Applicant shall begin designing a treatment facility (or alternative) and pilot system for discharge into Permanente Creek. The treatment shall be designed to achieve the Basin Plan Water Quality Objective for selenium (total recoverable selenium of 5 µg/L) for discharge from the EMSA, and/or to achieve the "base level" standard for the WMSA and Quarry pit as defined under Mitigation Measure 4.10-2d. • The Applicant shall complete design, pilot testing, and feasibility analysis for a treatment facility within 24 months of Reclamation Plan Amendment approval or by such other time as may be prescribed by the RWQCB. • The Planning Commission shall hold a public hearing no later than 30 months after Reclamation Plan Amendment approval to determine feasibility of the treatment facility (or alternative). The Planning Commission may defer the public hearing if the Regional Water Quality Control Board determines that additional time is necessary to complete the design, pilot testing, and feasibility analysis, • If the Planning Commission determines that a treatment facility is feasible, the Planning Commission shall also establish a timeline for implementing the treatment facility. • Construction, installation, and operation of a treatment facility (or alternative) shall be required if discharge requirements are not met as described under Mitigation Measures 4.10-2c and 4.10-2d, based on a determination of the Planning Commission, and if it has been determined feasible by the Planning Commission following a public hearing.	
4.10-3: The Permanente Creek Reclamation Area (PCRA) reclamation activities would contribute concentrations of selenium, Total Dissolved Solids (TDS), and sediment in Permanente Creek.	Less than significant	None required	Less than significant
4.10-4: The Project would alter the existing drainage pattern of the site,	Significant	**Mitigation Measure 4.10-4: Construction of Onsite Detention Facility.** The	Less than

APPENDIX H1 (CONTINUED)
IMPACTS AND MITIGATION MEASURES FOR THE FINAL 2012 PERMANENTE QUARRY RECLAMATION PLAN AMENDMENT

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
which could result increased storm water runoff rates and on- or offsite flooding.		Applicant shall design and construct detention facilities that would 1) manage increased runoff caused by the reclaimed Quarry pit, 2) reduce excessive discharges to Permanente Creek, and 3) develop the capacity to detain and release the 100-year flow using onsite detention basins while optimizing groundwater infiltration. The final drainage design shall ensure that offsite, downstream flows would not cause an increased flooding potential or lead to hydromodification effects. In addition to the detention facilities for the Quarry pit, the Applicant shall ensure that the desiltation ponds proposed in other smaller project areas such as the EMSA, are engineered to function as detention basins and manage 100-year peak flow to the extent practical. The Applicant shall also consider a broader watershed approach and consult with SCVWD on ways to detain peak flows offsite in relation areas of existing flooding and to the current SCVWD flood control improvement project. Design considerations for onsite detention basins shall include the following performance standards. The basin shall be designed to: • Maintain turbidity of receiving water outflows within discharge limitations for Permanente Creek, as set forth by the San Francisco Bay Regional Water Quality Control Board Basin Plan or other more stringent, site-specific limitations set forth by the RWQCB. • Effectively drain between storm events within the period of time specified by the Santa Clara County 2007 Drainage Manual. • Enhance the settlement of fine sediment while limiting the potential for sediment- laden water to be discharged to Permanente Creek. • Incorporate appropriate sediment traps (i.e., low areas that promote sediment settlement) in areas away from outflow structures to limit discharge of sediment at high flow periods. • Control surface water inflows to the detention facility using energy reduction features (i.e., rip-rap aprons, vegetated swales) to reduce inflow velocity and agitation of sediment within the basin. • Infiltrate surface water to the extent practicable while accounting for and protecting the local groundwater condition and water quality In addition to the detention facilities for the Quarry pit, the Applicant shall ensure that the desiltation ponds proposed in other smaller project areas such as the EMSA, are engineered to function as detention basins and manage 100-year peak flow to the extent practical. The Applicant shall also consider a broader watershed approach and consult with SCVWD on ways to detain peak flows offsite in relation areas of existing flooding and to the current SCVWD flood control improvement project.	Significant
4.10-5: Groundwater discharge from the Quarry pit after backfilling and	Less than	None required	Less than

APPENDIX H1 (CONTINUED)
IMPACTS AND MITIGATION MEASURES FOR THE FINAL 2012 PERMANENTE QUARRY RECLAMATION PLAN AMENDMENT

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
reclamation is complete would adversely alter surface water flows to Permanente Creek.	significant		significant
4.10-6: The Project would alter the existing drainage pattern of the site, which could result in increased stormwater ponding, accumulation of selenium, and flooding.	Significant	**Mitigation Measure 4.10-6: Stormwater Control to Avoid Ponded Water and Selenium Accumulation.** The Applicant shall incorporate drainage features into the final drainage design for the Quarry pit area to eliminate the potential for surface ponding on the floor of the Quarry pit once it has reached its final elevation (990 amsl). The drainage design for the finished Quarry pit fill shall include engineered elements (e.g., conveyance channels, infiltration galleries) that facilitate groundwater recharge and percolation from limestone areas to groundwater in the Quarry backfill with the objective of accommodating high groundwater elevation without creating surface water bodies that may contain elevated levels of selenium. These measures shall be incorporated into the design of the additional basin proposed for the floor of the Quarry pit once the floor is raised to its final elevation.	Less than significant
Land Use and Planning			
4.11-1: The Project would be incompatible with adjacent land uses.	Less than significant	None required	Less than significant
Mineral Resources			
4.12-1: The planned backfill of the Quarry pit would hinder further extraction of cement-grade limestone and aggregate resources from the Quarry pit, thereby resulting in the loss of availability of a mineral resource of state, regional, and local significance.	Less than significant	None required	Less than significant
Noise			
4.13-1: Operations associated with reclamation during Phase 1 would exceed County noise standards and increase ambient noise levels at noise-sensitive uses in the vicinity.	Significant	**Mitigation Measure 4.13-1a:** The Applicant shall prohibit all heavy equipment operations in the northeasterly 11.5 acres of the EMSA (as shown in Figure 4.13-8) during nighttime hours (i.e., between 10:00 p.m. to 7:00 a.m.). **Mitigation Measure 4.13-1b:** The Applicant shall either: (1) limit all operations in the EMSA within 1,600 feet of the caretaker's residence (as shown in Figure 4.13-8) to no more than one 8-hour shift per day, or (2) submit evidence establishing to the County's satisfaction that there are legally-binding restrictions precluding any occupancy of the caretaker's residence during the entirety of Phase 1 of the Project.	Less than significant
4.13-2: Operations associated with reclamation during Phase 2 would increase ambient noise levels at noise-sensitive uses in the vicinity.	Less than significant	None required	Less than significant

APPENDIX H1 (CONTINUED)
IMPACTS AND MITIGATION MEASURES FOR THE FINAL 2012 PERMANENTE QUARRY RECLAMATION PLAN AMENDMENT

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
4.13-3: Operations associated with reclamation Phase 3 may be audible at noise-sensitive uses in the vicinity.	Less than significant	None required	Less than significant
4.13-4: Operations within the Permanente Creek Reclamation Area may be audible at noise-sensitive uses in the vicinity.	Less than significant	None required	Less than significant
Population and Housing			
(No impact)			
Public Services			
(No impact)			
Recreation			
4.16-1: The Project would be near a public park and trail and could affect existing or future recreational opportunities.	Less than significant	None required	Less than significant
Transportation/Traffic			
4.17-1: The Project would cause increases in traffic volumes on area roadways, but would not conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system.	Less than significant	None required	Less than significant
4.17-2: Traffic generated by Project activities could affect traffic safety of pedestrians and bicyclists.	Less than significant	None required	Less than significant
4.17-3: The Project would provide safe access, and would not obstruct access to nearby uses or fail to provide for future street right-of-way.	Less than significant	None required	Less than significant
Transportation/Traffic (cont.)			
4.17-4: Traffic generated by the Project would contribute to pavement wear-and-tear on area roadways.	Less than significant	None required	Less than significant
Utilities and Service Systems			
4.18-1: The Project would require and result in the construction of new storm water drainage facilities, the construction of which could cause environmental effects.	Less than significant	None required	Less than significant
4.18-2: The Project may not be able to be served by a landfill with	Less than	None required	Less than

APPENDIX H1 (CONTINUED)
IMPACTS AND MITIGATION MEASURES FOR THE FINAL 2012 PERMANENTE QUARRY RECLAMATION PLAN AMENDMENT

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
sufficient permitted capacity to accommodate the Project's solid waste disposal needs.	significant		significant

H2. 2012 Conditions of County Approval

FINAL CONDITIONS OF APPROVAL

Approved by Planning Commission, June 7, 2012 and modified by the Board of Supervisors on June 26, 2012

(ATTACHMENT TO THE RESOLUTION, EXHIBIT 1)

MEETING DATE: June 7, 2012

FILE NUMBER 2250-13-66-10P-10EIR (M1)

NAME (Mine Operator): Hanson Permanente Cement, Inc. (Lehigh Southwest Cement)

PROJECT DESCRIPTION:

Reclamation Plan Amendment (RPA) for Lehigh Permanente Quarry, located at 24001 Stevens Creek Boulevard, in unincorporated Santa Clara County. The RPA amends and supersedes the previously approved 1985 Permanente Quarry Reclamation Plan for a 20-year period to satisfy the reclamation requirements of the Surface Mining and Reclamation Act of 1975. The RPA encompasses 1,238.7 acres within the Mine Operator's 3,510-acre ownership. The reclamation activities will be implemented in three phases over an estimated 20-year period. Phase I is approximately nine years, and involves reclamation activities in the EMSA and continuation of existing mining activities in the WMSA and Quarry Pit. Phase II is approximately five years, and includes reclamation activities within the WMSA and Quarry Pit. During Phase II, the WMSA overburden stockpile will be moved via a conveyor system to use as backfill of the Quarry Pit. The EMSA will be reclaimed during Phase II or sooner. Phase III is approximately 5 years, and involves removing the equipment, buildings and unnecessary roads from the Project area. Reclamation activities in the Permanente Creek Reclamation Area will occur during all three phases described above.

The conditions of approval of the RPA are not intended by the Planning Commission to prevent or interfere with more stringent requirements that have or may be imposed by the RWQCB or any other agency or court. Nothing in these conditions alters or has any limiting effect on the jurisdiction of any other agency, including the Regional Water Quality Control Board and the California Air Resources Board.

APPLICATION APPROVED SUBJECT TO CONDITIONS STATED BELOW BASED ON PLANS AS SUBMITTED.

GENERAL REQUIREMENTS:

1. The conditions of approval contained herein shall supersede and replace all previous conditions of approval from the 1985 Reclamation Plan approval.

2. All development, operations, and reclamation that occur under this RPA shall be consistent with the approved plans, unless modified per these conditions. The approved plans include maps, drawings, tables, and a narrative description within the RPA prepared by EnviroMINE Incorporated, including Attachments A through J, dated December 13, 2011 and received by the County on December 15, 2011. Plans also include engineered drawings prepared by Chang Consultants, dated December 12, 2011 (appended to the RPA), and Reclamation Water Quality prepared by Strategic Engineering & Science, Inc., dated December 2011 (RPA, Attachment G), and replacement Sheet 7 of 13 for Basin 40A by Chang Consultants, received by the County on March 13, 2012.

3. Within 60 days of approval of the RPA, Mine Operator shall submit six (6) copies plus one electronic copy of a "Final" RPA, incorporating changes required per the conditions of approval for the RPA, Mitigation Monitoring and Reporting Program, and Final Environmental Impact Report.

4. Within 60 days following approval of the RPA, the Mine Operator shall submit to the Planning Manager or the Manager's designee (hereinafter referred to as Planning Manager), legal descriptions for all affected parcels of real property. Pursuant to Section 2772.7 of the Public Resources Code, specifically referred to as SMARA, the County will record a Notice of Reclamation Plan Approval with the County Recorder's Office covering those parcels affected by the approved RPA. The notice shall read: *"Mining Operations conducted on the hereinafter described real property are subject to a RPA approval by the County of Santa Clara Planning Commission. A copy of said approved RPA is on file with the Department of Planning and Development, located the Santa Clara County Government Center, East Wing, 7th Floor, 70 W. Hedding Street, San Jose, CA 95110."* The Mine Operator shall be responsible for all the reasonable costs associated with recording said notice.

5. If reclamation is not complete on or before June 30, 2032, the Mine Operator shall file an application for an amendment to the reclamation plan prior to that date.

6. The proposed end use following reclamation is hillside open space.

7. The Mine Operator shall be responsible for paying all reasonable costs associated with work by the Department of Planning and Development, or with work conducted under the supervision of the Department of Planning and Development, in conjunction with, or in any way related to the conditions of approval identified in this RPA, the mitigations contained in the Mitigation Monitoring and Reporting Program, and the annual SMARA inspections and annual review of financial assurance cost estimates. This includes but is not limited to costs for staff time, attorney's fees, consultant fees, and direct costs associated with report production and distribution.

8. An Annual Report shall be prepared by the County each year that summarizes compliance with the RPA and conditions of approval, Mitigation Monitoring and

Reporting Program, and annual SMARA inspections and review of financial assurance cost estimates.

a. Annual Report shall be presented to the Planning Commission at a public meeting by December of each year, starting in 2013.

b. Mine Operator shall provide a reasonable amount of funding to the Department of Planning and Development for all aspects of report preparation, including but not limited to reimbursement for staff time, consultant fees, attorney's fees, and direct costs associated with report production and distribution.

c. Mine Operator shall provide by October 1 of each year, the information requested by the Planning Manager that is needed for the preparation of the Annual Report.

d. The County will include information provided by the Regional Water Quality Control Board related to the Water Board's determination regarding the Mine Operator's compliance with water quality standards, including waste load allocation and other permitting requirements, and the effectiveness of best management practices (BMPs) on the site.

9. If at any time the Planning Manager determines that the Quarry is not in compliance with the RPA, Mitigation Monitoring and Reporting Program, or any condition of approval, and as such is in violation of the RPA, the Director may take any and all actions necessary to ensure compliance with the Plan in accordance with applicable laws and regulations.

10. Copies of the RPA Mitigation Monitoring and Reporting Program, approved plans, conditions of approval shall be maintained at the premises of the Permanente Quarry, 24001 Stevens Creek Boulevard, at all times: one copy of all the documents shall be stored in the administration building at this location and one copy of all the documents shall be stored in the mine operations office.

11. By October 1 of each year, starting in 2012, the Mine Operator shall provide to the Planning Manager a report summarizing the date of the annual training, topics reviewed, and list of all employees attending the training. The Mine Operator shall annually train all mining staff, including outside vendors, contractors, or consultants who are responsible for implementation of any part of the mine operations or reclamation at Permanente Quarry, on the requirements and provisions of the RPA, the conditions of approval, and the MMRP.

12. Within 60 days following approval of the RPA, the Mine Operator shall submit to the Planning Manager a copy of its Storm Water Pollution Prevention Plan (SWPPP) of the approved RPA, which is hereby appended to the RPA by reference. The Mine Operator is responsible for providing the Department of Planning and Development with any and all updates to the SWPPP.

13. All mitigation measures contained within the Mitigation Monitoring and Reporting Program (MMRP) prepared for the project are adopted as conditions of approval and noted as such. The language contained within the MMRP shall be the guiding language for implementation of the condition or measure unless as modified within these conditions of approval.

14. By August 1st of each year, or as required by the Santa Clara County SMARA Inspection Program, the Mine Operator shall submit annually Financial Assurance Cost Estimates (FACE) to the Planning Manager for review and approval, which shall serve as the basis for the amount of financial assurances required of the Mine Operator, account for disturbed and those lands to be disturbed in the following year by the surface mining operations, inflation, and reclamation of lands accomplished in accordance with the approved RPA. Cost estimates shall utilize the most up to date cost figures for the San Francisco Bay Area and shall include appropriate costs for all materials to be utilized, labor rates, and equipment rates utilized in calculating the FACE. Upon approval of the FACE by the County and review by the State Office of Mine Reclamation (OMR), the Mine Operator shall post an acceptable Financial Assurance mechanism with the Department of Planning and Development prior to commencing any disturbance in areas not previously disturbed by the mining operation.

OTHER AGENCIES/JURISDICTIONS

15. Copies of all violations or abatement notices, requests for reports or information related to this RPA and its authorized uses by federal, state, or local jurisdictions/agencies, or subsequent modification of another agency's permit or submission of an application for any permit to another agency shall be provided to the Planning Manager within 10 business days of the County's request.

SEVERABILITY

16. If any of the RPA conditions of approval, or RPA approval, are held to be invalid, that holding shall not invalidate any of the remaining conditions or limitations set forth.

17. If any condition(s) of approval is invalidated by a court of law, and said invalidation would change the findings and/or mitigation measures associated with the approval of this RPA, the amendment may be reviewed, at the discretion of the Planning Commission, and substitute feasible condition(s)/mitigation measures may be imposed to adequately address the subject matter of the invalidated condition(s).

DUTY TO DEFEND AND INDEMNIFY

18. As a condition of RPA approval, including adjustment, modification or renewal, the Mine Operator agrees to:

    a. Defend, at the Mine Operator's sole expense, any action brought against the County by a third party challenging either its decision to approve the RPA or the manner in which the County is interpreting or enforcing the conditions of the RPA; and

    b. Indemnify the County against any settlements, awards, or judgments, including attorney's fees, arising out of or resulting from any such action.

19. Upon demand from the County, the Mine Operator shall reimburse the County for any court costs and or attorney's fees which the County may be required by a court to pay as a result of any such action the Mine Operator defended or which it had control of the defense. The County may, at its sole discretion, participate in the defense of any such action, but such participation shall not relieve the Mine Operator of its obligations under this condition.

20. The Mine Operator agrees to defend, indemnify and hold harmless the County, its agents, officers and employees, from any claim, action or proceeding against the County, to challenge any portions of the EIR certification, reclamation plan process or approval. In addition to damages, indemnification includes reimbursing the County for staff and consultant cost, and attorney's fees (including claims for private Attorney General fees).

21. Neither the approval of the RPA or compliance with conditions of approval shall relieve the Mine Operator from any responsibility otherwise imposed by law for damage to persons or property, nor shall the issuance of any RPA or related permit serve to impose any liability upon the County of Santa Clara, its officers, employees or agents for injury or damage to persons or property.

RECLAMATION REQUIREMENTS

22. Within 60 days of RPA approval, the RPA limit of disturbed area surrounding the northern and eastern edges of the EMSA, the northern and western edges of the WMSA, and the perimeter of the Rock Plant area shall be clearly demarcated in the field and shall remain in place until final reclamation has been completed. On an annual basis, demarcation shall be modified to encompass the RPA boundaries nearest the areas subject to surface mining and reclamation, as shown on aerials submitted per Condition #23. Demarcated areas shall be located and marked in the field by a licensed land surveyor or registered civil engineer authorized to practice land surveying. Demarcation shall use orange construction fencing or other brightly colored material acceptable to the Planning Manager.

23. At the same time as the proposed Annual Report each year, the operator shall submit to the Planning Manager a surveyed coordinate list file obtained by Global Positioning System (GPS), prepared by a licensed land surveyor or registered civil engineer authorized to practice land surveying, to be reviewed and approved by

the County Surveyor, identifying the limits of reclamation, with aerial photographs of the RPA area, annotated to illustrate (a) where surface mining and reclamation activity occurred within the prior 24 months and (b) areas where mining and reclamation activities will occur in the next 24 months. Existing topographic data shall be included with the aerial photographs, and the operator shall provide projected topographic data demonstrate how the topography will look two years later. The aerial photographs must be flown and taken biennually between June 1 and June 30 starting with June 2013. If requested by the Planning Manager or Planning Commission the materials shall be in a readable scale.

24. Reclamation of finished slopes and benches shall commence at the earliest feasible date once the slopes and benches are established, as set forth in the RPA.

25. Rockfills, where used, should be spread in lifts not exceeding five-feet in thickness by tracked equipment, and compacted by track-walking or wheel-rolling using heavy dozers (Caterpillar D-9 or larger) and/or fully loaded rubber-tired hauling equipment, respectively. A minimum of three passes should be performed for each lift.

26. Within 60 days of RPA approval, Mine Operator shall submit a site plan identifying area(s) where topsoil, dirt, soil amendments shall be retained and used in the reclamation and re-vegetation process. Soil stored for reclamation purposes shall be clearly identified and marked in the field.

27. The Mine Operator shall safeguard stockpiles of topsoil or overburden to be used for reclamation from wind and erosion by using controls including, but not limited to, hydroseeding, erosion control mats, and coir wattles (aka "straw wattles").

28. The Mine Operator shall use soil amendments, in accordance with the RPA, to improve the effectiveness of the soils used for re-vegetation of final slopes. Re-vegetation shall satisfy the criteria identified in the RPA. Reporting of the test plots for the re-vegetation criteria identified in the RPA shall be submitted to the County as part of the Mine Operator's annual report. Re-vegetation shall include only plant materials identified in the re-vegetation palette contained in the approved RPA. The Mine Operator shall follow the "test plot" program in the RPA to determine the appropriateness and success rates of the proposed re-vegetation palette identified in the RPA. Reporting on the test plot program shall be part of the Mine Operator's annual report submitted by the County and shall be prepared by a qualified biologist.

29. Re-vegetation of all reclaimed slopes within the RPA Boundary shall meet the minimum success criteria listed in the approved RPA before any completed phase of reclamation may be deemed reclaimed by the County and Office of Mine Reclamation (OMR).

30. The Planning Manager shall have authority to administratively review and approve minor revisions to the re-vegetation palette contained in the approved RPA. Status report shall be given to the Planning Commission after any revisions and presented at the next available Planning Commission meeting.

31. Equipment, structures, nonessential roads, as identified in the RPA, shall be removed from the project area prior to that area being deemed reclaimed by the County and OMR.

32. Construction or demolition waste or any other foreign materials are prohibited from being stored in overburden or used in reclamation. Overburden shall be compacted, tested, and documented to demonstrate it will support post-mining uses. Regarding compaction, testing, and documentation of the overburden, documentation shall be submitted to the Planning Manager within 30 days of completion.

33. Stilling basins shall be maintained in good conditions and cleaned of silt and debris as necessary. A report shall be submitted to the Planning Manager as part of the Annual Report, fully depicting total quantities of silt removed from the basins (reported in cubic yards or tons) and where such silt is placed on the site or off the site.

34. The Mine Operator shall comply with the conditions of permits and plans required by and issued from the Regional Water Quality Control Board (RWQCB), including but not limited to approval of the Permanente Creek Restoration Plan and water discharge permits. The Mine Operator shall provide copies of all permits to the Planning Manager within 10 business days of issuance by RWQCB.

35. Reclamation shall be deemed complete by the County and State Office of Mine Reclamation (OMR) once reclamation has been performed to the terms of the approved RPA, and required monitoring and inspections have demonstrated compliance with the reclamation performance standards and mitigation measures as prescribed in the Mitigation, Monitoring and Reporting Program, including compliance with all pertinent permits or other requirements for reclamation issued by non-Santa Clara County public agencies, including but not limited to the RWQCB and the State Department of Fish and Game.

36. The Mine Operator shall comply with the conditions of permits required by and issued from the Bay Area Air Quality Management District (BAAQMD). Upon request by the County, the Mine Operator shall provide copies of all permits, and amendments to the Planning Manager within 10 business days of the request.

37. The Mine Operator shall obtain and comply with all applicable permits required by the Santa Clara County Hazardous Materials Division of the Department of Environmental Health. The Mine Operator shall provide copies of all permits to the Planning Manager within 10 business days of issuance.

Permanente Creek Restoration Area (PCRA)

38. Within 30 days of final RPA approval, submit to the Planning Manager a detailed schedule describing the implementation actions to control sedimentation, remove limestone boulders, and stabilize slopes within the Permanente Creek Restoration Area in the Summer and Fall of 2012, consistent with the RPA.

39. **Limestone Boulder Removal**. By October 15, 2012, per the RPA, identified limestone boulders in the PCRA shall be removed. In addition, any limestone boulders identified in the future shall be removed. Submit to the Planning Manager by August 1, 2012, a report and map summarizing the field inspection and identification of all limestone boulders in the PCRA. Submit to the Planning Manager by December 15, 2012, a report and summarizing the actions to remove all limestone boulders in the PRCA, consistent with the "Best Management Practice for Removal of Limestone Boulders from Permanente Creek" (Attachment J to the RPA).

40. **Permanente Creek Restoration**. Prior to the start of Permanente Creek restoration activities in Phase III for PCRA subareas 3, 4, 5 and 7, as identified in the RPA, the Mine Operator shall submit to the Planning Manager a Permanente Creek Restoration Plan. The Restoration Plan shall include the elements of the Permanente Creek Long Term Restoration Plan (URS, March 11, 2011) to the extent set forth in the RPA. The Restoration Plan shall include, at minimum, engineered drawings for creek restoration, a riparian re-vegetation plan, hydrology / hydro-geomorphology studies supporting concepts to be used in creek restoration, and a long term monitoring and reporting program. The Creek Restoration Plan shall be reviewed and approved by the County prior to implementation. The Mine Operator shall obtain all necessary permits and approvals from all applicable local, state, and federal authorities, including without limitation the Regional Water Quality Control Board, Department of Fish and Game, and U.S. Army Corps of Engineers to implement the work.

41. Prior to the start of any grading or any grading activity that affects jurisdictional resources of the California Department of Fish and Game, Regional Water Quality Control Board, or U.S. Army Corps of Engineers, the Mine Operator must provide to the Planning Manager proof of permits / clearances (or documentation that a permit is not needed).

ENVIRONMENTAL CONDITIONS AND EIR MITIGATION MEASURES

Light and Glare:

42. No night lighting shall be allowed or permitted on the east-facing slope of the EMSA or any other location within the EMSA that would be visible from public locations on the Santa Clara Valley floor including roadways. *(Implements Mitigation Measure 4.1-7)*

Air Quality – Health Hazards Risk:

43. Within 90 days of final RPA approval, the Mine Operator shall submit to the County and BAAQMD a comprehensive inventory of all RPA-related off-road construction equipment expected to be used during any portion of the RPA period. The inventory shall include the horsepower rating, engine production year, and projected hours of use or fuel throughout for each piece of equipment. The inventory shall be updated and submitted annually to the Planning with the Annual Report, throughout the duration of the RPA. *(Implements Mitigation Measure 4.3-3a)*.

44. Within 90 days of final RPA approval, the Mine Operator shall provide a plan for approval by the Planning Manager and BAAQMD demonstrating that off-road equipment to be used for Reclamation of the EMSA would achieve an average 35 percent reduction in Diesel Particulate Matter (DPM) emissions compared to the proposed fleet described in the ALG report (Ashworth Leininger Group, December 13, 2011) during RPA Phase I. The plan shall be updated and submitted annually to the Planning Manager, with the Annual Report each year throughout the duration of the RPA. Options for reducing emissions may include, but are not limited to:

    a. Using newer model engines (e.g. engines that meet US EPA interim/final Tier 4 engine standards).

    b. Use of Retrofit Emission Control Devices that consist of diesel oxidation catalysts, diesel particulate filters, or similar retrofit equipment control technology verified by CARB (www.arb.ca.gov/diesel/verdev/verdev.htm)

    c. Use of low emissions diesel products or alternative fuels;

    d. Use of alternative material handling options (e.g. conveyor system); or other options as may become commercially available and verifiable. *(Implements Mitigation Measure 4.3-3b).*

45. In lieu of Condition No. 43 and No. 44 (Mitigation Measures 4.3-3a and 4.3-3b), the Mine Operator may submit within 90 days of the RPA approval evidence establishing to the Planning Manager's satisfaction that there are legally binding restrictions precluding any occupancy of the caretaker's residence located at 2961 Stevens Creek Boulevard, Cupertino (APN 342-63-003) during the entirety of Phase I of the Project. *(Implements Mitigation Measure 4.3-3c)*

Biological Resources- Avian Species

46. **Avian Species - Preconstruction Surveys.** Ground disturbance into undisturbed areas and vegetation (tree and shrub) removal should occur between September 1 and January 30, outside of the breeding season for most bird species. If ground disturbance or tree and shrub removal occurs between February 1 and June 15, preconstruction surveys will be performed within 14 days prior to such activities to determine the presence and location of nesting bird species. If ground disturbance or removal of vegetation occurs between June 16 and August 31, pre-construction surveys will be performed within 30 days prior to such activities.

Thirty (30) days prior to the start of any ground disturbance into undisturbed areas or vegetation removal, the Mine Operator shall submit to the Planning Manager a copy of a contract with a qualified ornithologist to conduct pre-activity surveys.

The pre-construction surveys shall be submitted to the Planning Manager no later than five (5) business days prior to the start of such activities. If the tree removal or vegetation clearing shall occur during the non-nesting season, submit documentation both before and after tree removal / vegetation clearing confirmation completion of work within this time frame.

47. **Avian Species - Use of Buffers for to Avoid Nests**. If preconstruction surveys determine that active nests are found close enough to the land clearing and tree removal area to be disturbed by these activities, the ornithologist, in consultation with CDFG, will determine the extent of a construction-free buffer zone (typically 250 feet) to be established around the nest to prevent nest abandonment and direct mortality during construction.

Biological Resources- Bat Species

48. **Bat Species - Non-Roosting Season**. Removal of potential bat roost habitat (buildings, large trees, snags, vertical rock faces with interstitial crevices) or construction activities within 250 feet of potential bat roost habitat should occur in September and October to avoid impacts to bat maternity or hibernation roosts. *(Implements Mitigation Measure 4.4-2a).*

49. **Bat Species – Maternity Roosting Season.** If removal of potential bat roost habitat cannot occur during September and October, bat roost surveys will be conducted to determine if bats are occupying roosts.

    Nighttime evening emergence surveys and/or internal searches within large tree cavities shall be conducted by a qualified biologist during the maternity season (April 1 to August 31) to determine presence/absence of bat maternity roosts within 100 feet of wooded Project boundaries. All active roosts identified during surveys shall be protected by a minimum buffer determined by a qualified bat biologist, in consultation with California Department of Fish and Game (CDFG). The buffer shall be determined by the type of bat observed, topography, slope aspect, surrounding vegetation, sensitivity of roost, type of potential disturbance. Each exclusion zone shall remain in place until the end of the maternity roosting season. If no active roosts are identified, then work may commence as planned. Survey results are valid for 30 days from the survey date. Should work commence later than 30 days from the survey date surveys shall be repeated. Operations may continue for many years. Surveys do not need to be repeated annually unless additional clearing of potential roosting or hibernation habitat could occur outside of the non-roosting season.

    Thirty days prior to the removal of potential bat roost habitat, the Mine Operator shall submit to the Planning Manager a copy of a contract with a qualified

biologist to conduct pre-activity surveys. The pre-construction surveys shall be submitted to the Planning Manager no later than five (5) business days prior to the removal of any potential habitat. *(Implements Mitigation Measure 4.4-2b)*.

50. **Special Status Bat Species- Hibernation Season**. During the November 1 to March 31 hibernation season, work shall not be conducted within 100 feet of any woodland habitat (as identified in the Draft EIR Figures 4.4-1 through 4.4-4), unless a qualified bat biologist determines that woodland areas do not provide suitable hibernating conditions for bats and they are unlikely to be present in the area.

    Submit a report by a qualified bat biologist to the Planning Manager verifying the absence of suitable habitat as described above if work is proposed within 100 feet of woodland habitat between November 1 and March 31. *(Implements Mitigation Measure 4.4-2a)*

51. **Special Status Bat Species - Maternity Season Emergence.** Any trees felled during vegetation removal will not be chipped or otherwise disturbed for a period of 48 hours to allow any undetected bats potentially occupying these trees to escape. *(Implements Mitigation Measure 4.4-2b).*

52. **Bat Roost Replacement.** All special-status bat roosts destroyed by the Project shall be replaced by the Mine Operator at a 1:1 ratio onsite with a roost suitable for the displaced species (e.g., bat houses for colonial roosters). The design of such replacement habitat shall be in consultation with CDFG. The new roost shall be in place prior to the time that the bats are expected to use the roost (e.g., prior to April 1 if the roost destroyed by the Project was used by a maternity colony), and shall be monitored periodically for 5 years to ensure proper roosting habitat characteristics (e.g., suitable temperature and no leaks). The roost shall be modified as necessary to provide a suitable roosting environment for the target bat species. *(Implements Mitigation Measure 4.4-2c)*

Biological Resources- Dusky Footed Woodrat

53. **San Francisco Dusky Footed Woodrat.** Within 30 days prior to initial ground disturbance in woodland or scrub/chaparral communities, (as identified in the Draft EIR Figures 4.4-1 through 4.4-4), conduct pre-construction surveys for active woodrat stick nests that could be directly impacted. Surveys should take place in all suitable habitat types within the Project Area. Any stick nests within active work areas will be flagged and dismantled under the supervision of a biologist. If young are encountered during the dismantling process, the material shall be placed back on the nest and remain unmolested for three (3) weeks in order to give the young enough time to mature and leave of their own accord. After that period, the nest dismantling process may begin again. Nest material shall be moved to suitable adjacent areas (oak woodland, scrub, or chaparral) that will not be disturbed. If construction does not occur within 30 days of the pre-construction survey, surveys shall be repeated.

Sixty (60) days prior to initial ground disturbance within woodland or scrub / chaparral communities, the Mine Operator shall submit to the Planning Manager a copy of a contract with a qualified biologist to conduct pre-activity surveys. The pre-construction surveys shall be submitted to the Planning Manager no later than five business days prior to the start of initial ground disturbance.

54. To reduce indirect impacts on San Francisco dusky-footed woodrat by attracting urban-adapted predators, trash and food waste shall be disposed of in proper waste receptacles and emptied on a regular basis. Additionally, quarry personnel, contractors, and visitors shall not feed wildlife within the Permanente Property and appropriate site signage and employee education shall facilitate this condition.

Biological Resources- Invasive Plants, Sudden Oak Death

55. **Introduction of Invasive Plants or Pathogens**. If regulated or restricted plant materials are to be transported between the Project Area and a location in a non-infested county or state, the spread of the Sudden Oak Death pathogen shall be avoided by obtaining the necessary certificates of transport pursuant to the regulations described in the Biological Resources Assessment prepared for the Lehigh Permanente Quarry by WRA Environmental Consultants, dated December 2011.

56. **Sudden Oak Death.** To reduce the possibility of spreading Sudden Oak Death to oak woodlands in the Study Area, the Mine Operator shall implement the following measures:

    a. Prior to any reclamation work within the Project Area, equipment shall be sanitized, including shoes, pruning equipment, trucks, and heavy equipment such as earthmoving, tree trimming, chipping, or mowing equipment. Except for trucks, this equipment shall remain onsite for the duration of Project activities and shall not be transferred between this and other worksites, as doing so increases the potential of transferring infected spores to or from another site.

    b. After the completion of work activities, any accumulation of plant debris (especially leaves), soil, and mud shall be washed off of equipment or otherwise removed onsite, and air filters shall be blown out.

    c. All contractors shall have sanitation kits onsite for cleaning equipment. Sanitation kits should contain chlorine bleach (10/90 mixture bleach to water) or Clorox Clean-Up or Lysol, scrub brush, metal scraper, boot brush, and plastic gloves.

    d. All organic material imported for mixing with Quarry pit backfill shall have been composted at a facility that meets the standards of Title 14 California Code of Regulations, Division 7, Chapter 3.1; alternative sources of organic material may be used if approved by the County of

Santa Clara Agricultural Commissioner as being as effective as the composting process to sanitize SOD-infected materials.

e. All other imported fill material, soil amendments, gravel, etc. required for construction and/or restoration activities to be placed within the upper 12 inches of the ground surface shall be free of vegetation or plant material. *(Implements Mitigation Measure 4.4-7)*

Biological Resources- Wetlands

57. **Wetland Identification and Avoidance.** A qualified wetland biologist shall physically delineate all federal and state waters and wetland features identified in the 2008 wetland delineation (WRA, 2008) before any Permanente Creek Reclamation Area (PCRA) activities begin, and when feasible, reclamation activities shall avoid filling these areas unless authorized by the appropriate permitting agencies. Silt fence or other appropriate barriers and buffer zones shall be installed between jurisdictional waters or wetlands and areas sprayed with hydroseed to prevent filling of wetlands with tackifier or other hydroseed material; alternatively, the use of hand-seeding or working with hand tools may be utilized to avoid filling wetlands. *(Implements Mitigation Measure 4.4-8a)*

    Prior to the start of PCRA activities, the wetland biologist shall submit a report to the Planning Manager showing the wetland areas delineated and the installation of all fencing and barriers (photos and map).

    This condition shall not apply to Phase III Permanente Creek Restoration Activities in subareas 3, 4, 5 and 7, as identified in the RPA. Such Activities are expected to require an independent review and permitting process, as described in the RPA.

58. **Wetland Mitigation Plan.** If filling of jurisdictional waters or wetlands is not feasible, the following measures shall be implemented:

    a. A qualified wetland biologist shall prepare a wetland Mitigation and Monitoring Plan (MMP) for impacts to wetlands and waters under state or federal jurisdiction. The MMP shall be submitted for review and approval by the Planning Manager, and as required by law by the Regional Water Quality Control Board and US Army Corps of Engineers. The MMP shall outline any anticipated mitigation obligations for temporary and permanent impacts to waters of the state and/or U.S., including wetlands, resulting from PCRA activities. The MMP shall include:

        i. Baseline information;

        ii. Anticipated habitat enhancements to be achieved through compensatory actions, including whether mitigation will occur within the Project Area along Permanente Creek or at an offsite location, as well as including mitigation site location and hydrology;

iii. When possible, a preference for mitigation within the Permanente Quarry property, for impacts to both jurisdictional waters and wetlands;

iv. Performance and success criteria for habitat enhancement of Permanente Creek or other waterways to compensate for impacts to Other Waters, including:

1. A replanting plan for appropriate native riparian woody vegetation, including but not limited to arroyo willow, white alder, California wild rose, and snowberry, bigleaf maple, western creek dogwood, and Oregon ash;

2. An 80% overall re-vegetation planting success for all mitigation areas over a ten-year period;

3. A minimum overall mitigation ratio of 1.1:1 acres for permanent impacts and 1:1 acres for temporary impacts;

4. Plantings that are self-reliant, exhibit average or better health and vigor and have observable growth in stems and leaves at least two years prior to the end of the ten-year monitoring period;

5. Visual inspection of all re-vegetation sites during each growing season, with qualitative and quantitative measures of plant cover and performance;

6. Observations of total percent plant cover in the planting area, natural recruitment of native species, and establishment of new non-native species; and

7. Annual monitoring reports submitted to CDFG and RWQCB documenting re-vegetation conditions, including recommendations to adapt maintenance and replacement of failed plantings.

b. Performance and success criteria for wetland creation or enhancement including, but not limited to, the following:

i. At least 70 percent survival of installed plants for each of the first three years following planting.

ii. Performance criteria for vegetation percent cover in Years 1-4 as follows:

1. at least 10 percent cover of installed plants in Year 1;

2. at least 20 percent cover in Year 2;

3. at least 30 percent cover in Year 3;

4. at least 40 percent cover in Year 4.

c. A performance criteria for hydrology in Years 1-5 as follows:

i. Fourteen or more consecutive days of flooding, ponding, or a water table 12 inches or less below the soil surface during the growing season at a minimum frequency of three of the five monitoring years; OR establishment of a prevalence of wetland obligate plant species.

ii. Invasive plant species that threaten the success of created or enhanced wetlands should shall not be allowed to contribute relative cover greater than 35 percent in year 1, 20 percent in years 2 and 3, 15 percent in year 4, and 10 percent in year 5.

d. MMP monitoring reports shall be submitted to the Planning Manager and responsible permitting agencies. *(Implements Mitigation Measure 4.4-8b)*

Biological Resources- California Red Legged Frog (CRLF)

59. To minimize disturbance to dispersing or foraging CRLF, all grading activity within PCRA subareas 4 through 7 shall be conducted during the dry season, generally between May 1 and October 15, or before the onset of the rainy season, whichever occurs first, unless exclusion fencing is utilized. Construction that commences in the dry season may continue into the rainy season if exclusion fencing is placed around the construction zone to keep the frog from entering the construction area.

60. Pre-construction surveys for CRLF shall be conducted prior to construction activities within PCRA subareas 4 through 7. If CRLF are observed in the construction area or access areas, they shall be removed from the area by a USFWS permitted biologist and temporarily relocated to nearby suitable aquatic habitat.

61. Because dusk and dawn are often the times when CRLF are most actively foraging, all restoration activities within PCRA subareas 4 through 7 shall cease one half hour before sunset and shall not begin prior to one half hour after sunrise. Additionally, restoration activities shall not occur during rain events, as CRLF are most likely to disperse during periods of precipitation.

Cultural Resources

62. The Mine Operator shall document the physical characteristics and their historic context of the contributing features of the Kaiser Permanente Quarry Mining District, including archival photo-documentation, mapping, and recording of historical and engineering information including measured drawings about the property according to the standards of the Historic American Building Survey/Historic American Engineer Record/Historic American Landscapes Survey (HABS/HAER/HALS), to be placed in a local public archive such as the Archives of the County of Santa Clara.

Verification of documentation as described above shall be submitted to the Planning Manager within sixty (60) days prior to removal of the Permanente Quarry Conveyor System as described under Condition #63. *(Implements Mitigation Measure 4.5-1a)*

63. Prior to any of the following: modification, relocation, removal, or demolition of the Permanente Quarry Conveyor System, the Mine Operator shall salvage and/or relocate a representative portion of the Permanente Quarry Conveyor System and the remains of the early 1940s crusher, which constitute character-defining features that otherwise would be lost as a part of implementation of the Project.

    Verification of salvage / relocation as described above shall be submitted to the Planning Manager within thirty (30) days prior to start of mining / reclamation activities in the existing Conveyor System and 1940's crusher area. Conveyor is located west of the EMSA and southeast of the Quarry Pit, the crusher is located south of the Quarry Pit adjacent to Permanente Creek (reference Historic Resource Evaluation, Permanente Quarry Facility Comprehensive Reclamation Plan Project – Lehigh Southwest Cement Company, prepared by Archives and Architecture, LLC, October 2011). *(Implements Mitigation Measure 4.5-1b)*

64. At least sixty (60) days prior to commencement of any work as described above Condition #63, the Mine Operator shall prepare public information programs to educate the general public on the historic nature of the potential Kaiser Permanente Quarry Mining District, including but not limited to exhibits at the Quarry office, publications available at the Quarry office, and an online presentation available on the their website (currently, www.lehighpermanente.com). Verification of documentation as described shall be submitted to the Planning Manager. *(Implements Mitigation Measure 4.5-1c)*

65. If cultural resources are encountered during Project implementation the Mine Operator shall notify the Planning Manager and all activity within 100 feet of the find shall stop until the cultural resource is evaluated by a qualified archaeologist and a Native American representative. Prehistoric archaeological materials might include obsidian and chert flaked-stone tools (e.g., projectile points, knives, scrapers) or toolmaking debris; culturally darkened soil ("midden") containing heat-affected rocks, artifacts, or shellfish remains; and stone milling equipment (e.g., mortars, pestles, handstones, or milling slabs); and battered stone tools, such as hammerstones and pitted stones. Historic-period materials might include stone, concrete, or adobe footings and walls; filled wells or privies; and deposits of metal, glass, and/or ceramic refuse.

    If the archaeologist and Native American representative determine that the resources may be significant and cannot be avoided, they shall notify the Planning Manager and an appropriate treatment plan for the resources shall be developed by the Mine Operator in consultation with the Planning Manager, and the archaeologist. Measures in the treatment plan could include preservation in place (capping) and/or data recovery. The archaeologist shall consult with Native

American representatives in determining appropriate treatment for prehistoric or Native American cultural resources. Ground disturbance shall not resume within 100 feet of the find until an agreement has been reached as to the appropriate treatment of the find. *(Implements Mitigation Measure 4.5-2)*

66. If a paleontological resource is encountered during implementation of the RPA the Mine Operator shall notify the Planning Manager, and all activity within 100 feet of the find shall stop until it can be evaluated by a qualified paleontologist as defined by the Society of Vertebrate Paleontology Guidelines (SVP, 1995). The paleontologist shall evaluate the resource and determine its significance. If significant, the paleontologist shall notify the Planning Manager. The Mine Operator, in consultation with the County and the paleontologist, shall prepare a treatment plan such that the fossil would be recovered and scientific information preserved. The paleontologist shall implement the treatment plan in consultation with the Planning Manager and Mine Operator, prior to allowing work in the 100-foot radius to resume. *(Implements Mitigation Measure 4.5-3)*

67. In the event that human skeletal remains are encountered, the Mine Operator is required by Health and Safety Code Section 7050.5, Public Resources Code Section 5097.98, Title 14 California Code of Regulations Section 15064.5(e), and County Ordinance No. B6-18 to immediately notify the County Coroner. Upon determination by the County Coroner that the remains are Native American, the coroner shall contact the California Native American Heritage Commission, pursuant to subdivision (c) of §7050.5 of the Health and Safety Code and the County Coordinator of Indian affairs. No further disturbance of the site shall be made except as authorized by the County Coordinator of Indian Affairs in accordance with the provisions of state law and the County Ordinance. If artifacts are found on the site, a qualified archaeologist shall be contacted along with the Planning Manager. No further disturbance of the artifacts shall be made except as authorized by the Planning Manager. *(Implements Mitigation Measure 4.5-4)*

Geological and Soils

68. **Avoidance and containment of shallow slumps and/or fall-back of overburden material.** In all areas requiring the use of excavators for grading within the Permanente Creek Reclamation Area (PCRA) (e.g., access road in-sloping, installation/repair of sedimentation basins, and removal of slide debris), the Mine Operator and/or its contractor shall begin excavations from the top of slope and proceed downward. The Mine Operator and/or its contractor shall not undercut sloped materials unless no other option is feasible as determined by a registered geotechnical engineer (e.g., excessively sloped or otherwise inaccessible terrain). In all areas of the PCRA where excavations would occur in sloped materials, the Mine Operator and/or its contractor shall install barriers immediately downslope of the activity. Downslope barriers shall be designed and installed in a manner that would be adequate to prevent overburden and/or native materials from falling, sloughing or sliding further downslope, or into Permanente Creek. Such measures may consist of temporary interlocking soldier piles,

wooden shoring systems, wire mesh or other containment measures(s). The Mine Operator and/or its contractor shall not be permitted to conduct excavation or grading activities downgradient of the barrier, or prior to its installation. The ultimate location, design and installation method of such measures shall be prepared and certified, or reviewed and approved by a California State registered civil geotechnical engineer.

Thirty days (30) prior to the start of all excavation / grading activities as described above, submit to Planning Manager a plan showing the installation of all downslope barriers as described above. *(Implements Mitigation Measure 4.7-1)*

69. Within thirty (30) days following approval of the RPA, submit a Geotechnical Engineer's Plan Review letter that confirms the RPA, as modified by other conditions of approval, conforms with the recommendations presented in Golder's Report (RPA Appendix C, dated November 2011). In regards to the EMSA, specifically, the letter must verify that the plans indicate where the native slope is steeper than 2.5H:1V, the topsoil and colluvium will be over-excavated within the area extending inward 100 feet from the toe of the outer slope.

70. The geotechnical design recommendations provided by Golder Associates (RPA Appendix C, November 2011) are being implemented as part of the ongoing stockpiling activities within the EMSA and as a condition of approval Project. The measures are identified below:

    a. Foundation preparation should be completed prior to fill placement of the outer 50 feet beneath the EMSA fill. Foundation preparation should consist of over-excavation of outer 50 feet of topsoil, organic materials (trees, brush, grasses), fine-grained colluvium with a Plastic Index greater than 25, or other unsuitable soils until firm bedrock, granular soils, or clay soils with a Plastic Index less than 25 are exposed. If the exposed foundation surface is inclined at 5H:1V or steeper, the over-excavation distance from the outer slope should be extended from 50 feet to 100 feet. Furthermore, the fill placed on slopes of 5H:1V or steeper should be benched into the slope with individual bench heights of at least 2 feet and up to approximately 5 feet.

    b. A qualified California Registered Professional Geologist, Certified Engineering Geologist, or a California Registered Civil Engineer with geotechnical experience should inspect the foundation preparation to ensure all unsuitable materials are removed prior to placement of the outer 50 to 100 feet of EMSA fill.

    c. If seepage or wet zones are observed in the foundation, suitable drainage provisions should be incorporated into the foundation prior to fill placement. Suitable drainage provisions include the placement of a blanket of free-draining sand or gravel over the seepage/wet zone in conjunction with a perforated, polyvinyl (PVC) or high-density polyethylene (HDPE) drain pipe that drains positively toward and daylights at the slope face.

The sand or gravel drainage material should be fully covered with a minimum 8-oz/square yard, non-woven, geotextile filter to provide separation from the EMSA materials.

d. The fine waste materials shall be placed in lifts not to exceed 8-feet, and offset a minimum of 30 feet from the final slope face. Each lift of fine waste should be allowed to dry before being covered by overburden material. Each lift shall be overlain by a minimum 25-foot thick lift of overburden.

e. Any modification to the EMSA fill geometry including increases to the maximum overall slope inclination, maximum inter-bench slope inclination, slope height, or footprint shall require an additional or revised slope stability analysis.

Greenhouse Gas Emissions (GHG)

71. **Develop Annual GHG Inventory.** The Mine Operator shall become a reporting member of The Climate Registry. Beginning with the first year of the Project and continuing for the duration of the Project, the Mine Operator shall conduct an annual inventory of GHG emissions and shall report those emissions to The Climate Registry. The annual inventory shall be conducted according to The Climate Registry protocols and third-party verified by a verification body accredited through The Climate Registry.

    Within 90 days of approval of the RPA, the Mine Operator shall submit documentation verifying registration with The Climate Registry to the Planning Manager. Copies of annual reporting to Climate Registry shall be submitted to the Planning Manager by October 1 of each year. *(Implements Mitigation Measure 4.8-1a)*

72. **Greenhouse Gas Emissions Reduction Plan.** The Mine Operator shall prepare, submit for County and BAAQMD approval, make available to the public, and implement a Greenhouse Gas Emissions Reduction Plan (GHG Plan) containing quantifiable strategies to ensure that the Project-related incremental increase of GHG emissions does not exceed 1,100 MT Co2e per year. The GHG Plan shall include, but not be limited to, the following measures:

    a. Replacement of on-road and off-road vehicles and construction equipment with lower GHG-emitting engines, such as electric or hybrid.

    b. Use of the Overland Conveyor System, powered by electric motors, to move more than 75 percent of the waste rock from the WMSA to reclaim the Quarry pit.

    The Greenhouse Gas Emissions Reduction Plan shall be submitted to the Planning Manager within 90 days of final RPA Approval. *(Implements Mitigation Measure 4.8-1b)*

73. **Greenhouse Gas Offsets.** If the Mine Operator is unable to reduce the Project-related incremental increase of GHG emissions to below 1,100 MT Co2e per year per Condition #72, the Mine Operator shall offset all remaining Project incremental emissions above that threshold. Any offset of emissions related to the RPA shall be demonstrated to be real, permanent, verifiable, and enforceable. To the maximum extent feasible, as determined by the County in coordination with the BAAQMD, offsets shall be implemented locally. Offsets may include but are not limited to, the following (in order of preference):

    a. Onsite offset of Project emissions, for example through development of a renewable energy generation facility or a carbon sequestration project (such as a forestry or wetlands project for which inventory and reporting protocols have been adopted). If the Mine Operator develops an offset project, it must be registered with the Climate Action Reserve or otherwise approved by the BAAQMD in order to be used to offset Project emissions. The number of offset credits produced would then be included in the annual inventory, and the net (emissions minus offsets) calculated.

    b. Funding of local projects, subject to review and approval by the BAAQMD, that would result in real, permanent, verifiable, enforceable, and additional reduction in GHG emissions. If the BAAQMD or County of Santa Clara develops a GHG mitigation fund, the Mine Operator may instead pay into this fund to offset Project incremental GHG emissions in excess of the significance threshold.

    c. Purchase of carbon credits to offset Project incremental emissions to below the significance threshold. Carbon offset credits must be verified and registered with The Climate Registry, the Climate Action Reserve, or other source that is approved by the California Air Resources Board as being consistent with the policies and guidelines of the California Global Warming Solution Act of 2006 (AB 32), or available through a County- or BAAQMD-approved local GHG mitigation bank or fund.

    Documentation verifying that offsets have been accomplished, if required, must be submitted for review and approval to the Planning Manager and BAAQMD within 90 days of final RPA Approval. *(Implements Mitigation Measure 4.8-1b)*

Hydrology and Water Quality:

74. **Certified Geologist Verification of Non-Limestone-Containing Material Use.** A California Certified Engineering Geologist shall be onsite during reclamation to verify that non-limestone run-of-mine rock is used as cover on the EMSA and WMSA. In addition, the Geologist shall observe and document activities associated with placing the final overburden on the Quarry Pit (i.e., ensuring that organic material is mixed to specifications). Using visual and field testing methods, with occasional bulk sampling and laboratory analysis, the geologist shall observe and document the type of rock placed over the limestone-containing material during reclamation activities. The geologist shall inspect and document whether limestone is present at the source area (Quarry Pit and WMSA), whether

limestone rock is transported from the source area to segregation stockpiles, and whether limestone is present within the lifts of the proposed 1-foot layer of run-of-mine cover rock (in the EMSA, WMSA, and Quarry Pit). Inspection involves observing the excavation, hauling, stockpiling, and placement of the non-limestone cover material, performing a visual assessment of the rock, and conducting random spot sampling and field testing of suspect rock fragments. If observation, field-testing, or laboratory analysis indicates that significant amounts of limestone are intermixed with the supposed non-limestone cover material, the geologist shall document its presence, temporarily halt fill operations, and notify the Planning Manager and field superintendent. Once notified, the Mine Operator shall remove the limestone-containing materials and then perform verification field sampling in addition to laboratory verification. *(Implements Mitigation Measure 4.10-1a)*

Within ninety (90) days of final RPA Approval, the Mine Operator shall submit to the Planning Manager a copy of a contract or an employee resume employed by the Mine Operation that is a California-certified Engineering Geologist responsible to conduct monitoring as described above. Quarterly reports shall be submitted from the Geologist to the Planning Manager describing effectiveness of mitigation and monitoring during final reclamation as described above.

75. The County reserves the right to retain, if it deems necessary, at the expense of the Mine Operator, a third-party California-certified Engineering Geologist, to provide independent oversight or monitoring to implement Condition #74.

76. **Verification and Water Quality Monitoring**. Within ninety (90) days of RPA approval, the Mine Operator shall begin and continue throughout the backfilling and reclamation phases and for 5 years following completion of reclamation and for 5 years following the start of groundwater discharge from the Quarry Pit into Permanente Creek as described on page 4.10-39 of the Final Environmental Impact Report, a Verification and Water Quality Monitoring Program. The Mine Operator shall implement the following:

    a. Collect quarterly Quarry pit water samples and analyze for general water chemistry and dissolved and total metals, including selenium.

    b. Perform quarterly electrical conductivity and pH measurements of the Quarry water.

    c. Measure and record daily volume of any water that is pumped from the pit area.

    d. Conduct annual seep surveys in March or April of each year within the Quarry pit. Any seeps identified shall be sampled for general water chemistry and minerals and dissolved metals, and the seep flow rate shall be estimated.

    e. Perform routine testing of each of the various rock types that comprise the overburden to further characterize bulk and leachable concentrations of key metal constituents (selenium in particular). Such testing shall be

performed until the average concentrations and the variability within a rock type is no longer changing significantly as new data are gathered.

f. Sample and test runoff from the EMSA and WMSA throughout and following reclamation to confirm the concepts and closure plans (i.e., that cover with non-limestone material and re-vegetation results in runoff water quality that meets Basin Plan Benchmarks and all other applicable water quality standards, including, but not limited to, a site specific NPDES permit for the Quarry and a TMDL for selenium in Permanente Creek. Stormwater runoff monitoring and sampling shall be conducted following the placement and final grading of the 1-foot run-of-mine non-limestone cover material to ensure that surface water discharging from this cover does not contain selenium at concentrations exceeding Basin Plan Benchmark values. Three rounds of representative surface water samples shall be collected and analyzed to verify rock cover performance prior to the placement of the vegetative growth layer.

g. Sample and test groundwater discharge from the Quarry Pit into Permanente Creek following reclamation as described on page 4.10-39 of the Final Environmental Impact Report to confirm that water quality in discharge meets Basin Plan Benchmarks and all other applicable water quality standards.

h. The data obtained through this mitigation measure shall be used to reevaluate the water balance components such as runoff and groundwater inflow and the water quality associated with these within the last five years of active mining. Based on the results of any refined water balance and water quality projections, the Mine Operator shall also review and refine the water management procedures. *(Implements Mitigation Measures 4.4-5 and 4.10-1b.)*

All testing data shall be submitted to the Planning Office with the Annual Report by October 1 of each year.

77. Reclamation of the Quarry Pit, EMSA, and WMSA areas shall not be considered complete until 5 years of water quality testing as described above demonstrate to the satisfaction of the Planning Manager that selenium in surface water runoff and any point source discharges has been reduced below all applicable water quality standards, including Basin Plan Benchmarks.

78. Within 90 days of RPA approval, the Mine Operator shall implement the following stormwater and sediment management controls in addition to general BMPs required by the SWPPP in active and inactive reclamation areas throughout Phase I, II, and III of the RPA. The Mine Operator shall:

    a. Segregate limestone materials from the non-limestone materials (breccia, graywacke, chert, and greenstone) by way of operational phasing to ensure that non-limestone materials are placed beneath and are covered by non-

limestone materials. A California Professional Geologist shall oversee stockpiling, segregation, and placement of non-limestone materials.

b. Stabilize inactive areas, such as temporary stockpiles or dormant excavations that drain directly or indirectly to Permanente Creek using an appropriate combination of BMPs to cover the exposed rock material, intercept runoff, reduce its flow velocity, release runoff as sheet flow, and provide a sediment control mechanism (such as silt fencing, fiber rolls, or hydroseeded vegetation). Standard soil stabilization BMPs include geotextiles, mats, erosion control blankets, vegetation, silt fence surrounding the stockpile perimeter, and fiber rolls at the base and on side slopes.

c. Temporarily stabilize active, disturbed reclamation areas undergoing fill placement before and during qualifying rain events expected to produce site runoff. Stabilization methods include combined BMPs that protect materials from rain, manage runoff, and reduce erosion. Reclamation activities involving grading, hauling, and placement of backfill materials cannot take place during periods of rain.

d. In areas such as the WMSA where fill slopes are steep and composed of loose material, controls shall be in place to prevent material from sloughing off into the PCRA and Permanente Creek. These controls shall include debris/silt fencing placed on outer edge of grading and excavation operations back-sloping excavations to prevent grade slope towards the creek, operations buffer areas that require the use of smaller grading equipment, temporary berms along the outer extent of operations closest to the creek, Mine Operator training regarding the prevention of triggering debris slides.

e. Cover active haul roads with non-limestone materials where exposed limestone surfaces are present. Roads that undergo dust control by watering must have fiber rolls or equivalent runoff protection installed along the road side to reduce runoff and avoid drainage to Permanente Creek.

f. Divert all runoff generated from disturbed active and inactive reclamation areas to temporary basins, the Quarry pit, or temporary vegetated infiltration basins and kept away from drainage pathways entering Permanent Creek. To the extent possible, drainage of the non-limestone materials shall be diverted directly to sediment control facilities and natural surface drainages.

g. Install up-gradient berms where limestone fines or stockpiles are placed, to protect against stormwater run-on, and install ditches and down-gradient berms to promote infiltration rather than run-off.

h. Replace the limestone rock and materials that are currently used in the existing BMP ditches and cover or otherwise separate runoff from limestone rock in the existing sediment pond embankments.

i. Cover large limestone surfaces that would remain exposed during the rainy season with interim covers composed of non-limestone rock types.

j. Inspect and maintain BMPs after each qualifying rain event to ensure their integrity.

k. Reconstruct or reline all existing stormwater conveyances and check dam structures that are constructed or lined with limestone rock using non-limestone material (greenstone, breccias, greywacke, metabasalt), available at the Quarry.

l. Regularly inspect all stormwater and erosion controls, especially before and following qualifying rain events. Inspections shall be documented and periodically reported. Any violations shall be corrected immediately.

m. Provide adequate erosion control training to all equipment and mine operators, site superintendants, and managers to ensure that stormwater and erosion controls are maintained and remain effective.

n. Use only jute netting or other suitable replacement for erosion control in the PCRA; no plastic monofilament shall be used for erosion control or other purposes, as California Red Legged Frogs and other wildlife may become entangled in it.

o. Ensure that all stormwater, erosion, and sediment control BMPs are installed, inspected, maintained, and repaired under the direction of either a California certified engineer, geologist, or landscape architect, a registered professional hydrologist, or a certified erosion control specialist.

Implementation of the Best Management Practices described above shall begin within 30 days of final RPA Approval. Prior to October 1, 2012, the Operator shall provide a report, with photos, documenting and demonstrating that the aforementioned BMP's are being implemented in all areas as described above. Prior to October 15 of each year, a County Inspector shall verify installation of the aforementioned BMP's. Inspection of BMP's by a County Inspector shall occur monthly between October 15 and April 15 for each year when interim reclamation activities occur. *(Implements Mitigation Measures 4.4-5 and 4.10-2a)*

79. **Interim Stormwater Monitoring Plan.** Prior to the start of reclamation activities, the Mine Operator shall develop a Stormwater Monitoring Plan for sampling and testing stormwater, that would supplement preexisting surface water monitoring required by General Industrial Storm Water and Sand and Gravel NPDES Permit and any other applicable permits designed to specifically monitor surface water during reclamation activities in active and inactive excavation and backfill areas, and locations where water discharges to Permanente Creek. The purpose of this plan is to evaluate performance of temporary BMPs and completed reclamation phases and to identify areas that are sources of selenium (measured on recoverable basis), sediment, or high TDS. At a minimum, the plan shall require the Mine Operator to inspect BMPs and collect water samples for analysis of TDS and metals, including selenium, within 24 hours after a

qualifying rain event and sample non-stormwater discharges when they occur. If elevated selenium, sediment, or TDS is identified through sample analysis, the Mine Operator shall identify the source and apply any new or modified standard BMPs available. BMPs that show sign of failure or inadequate performance shall be repaired or replaced with a more suitable alternative. Following implementation, the Mine Operator shall retest surface water to determine the effectiveness of such modifications, and determine whether additional BMPs are necessary. *(Implements Mitigation Measures 4.4-5 and 4.10-2b)*

For Phase I, submit the Stormwater Monitoring Plan for Phase I to the Planning Manager for review and approval prior to October 1, 2012.

For Phase II and III, submit a Monitoring Plan to the Planning Manager for review and approval sixty (60) days prior to the start of Phase II.

Stormwater testing results shall be submitted to Planning Manager on a monthly basis between October 15 and April 15 of each year. If a qualifying rain event did not occur during any month during this period (and stormwater testing was not conducted), notification shall be submitted to the Planning Manager in lieu of testing results.

80. **Monitoring and Determination of BMP Effectiveness for the EMSA**:

    a. Within 30 days of RPA approval, sampling and testing shall occur within 24 hours after a qualifying rain event. If no qualifying rain event occurs within 30 days of RPA approval, then testing shall begin at the first qualifying rain event. Testing shall be conducted in accordance with the Interim Stormwater Monitoring Plan developed and approved in accordance with Condition #79.

    b. If test results for two consecutive years show that stormwater discharging from the EMSA into Permanente Creek exceeds total recoverable selenium of Basin Plan Water Quality Objective, currently 5 μg/L (micrograms per liter), or other applicable discharge requirement as determined by the RWQCB, then the County shall schedule a public hearing before the Planning Commission to determine whether the Mine Operator is complying with stormwater discharge requirements. For purposes of triggering Planning Commission review, the sampling shall occur at locations where water discharges to Permanente Creek.

    c. If the Planning Commission determines that the Mine Operator is not complying with discharge requirements, then the operator shall install a treatment system (or alternative) as described in Condition #82. *(Implements Mitigation Measures 4.4-5 and 4.10-2c)*

81. **Monitoring and Determination of BMP Effectiveness for the WMSA and Quarry Pit**

a. Within 30 days of the start of reclamation activities for Phase II, the Mine Operator shall conduct monthly water sampling and testing results in compliance with the Interim Stormwater Monitoring Plan, as described under Condition #79.

b. If test results for two consecutive years show that selenium levels are higher than base levels, then the County shall schedule a public hearing before the Planning Commission to determine whether the reclamation activities are causing an increase in total selenium above the base levels. "Base levels" shall be defined as water testing results for an average for two years immediately prior to start of Phase II reclamation for discharge into Permanente Creek from the WMSA and Quarry Pit. For purposes of triggering Planning Commission review, the sampling shall occur at locations where water discharges to Permanente Creek.

c. If the Planning Commission finds that reclamation activities are causing an increase in selenium over base levels, then the Mine Operator shall install a treatment system (or alternative) as described under Condition #82. *(Implements Mitigation Measures 4.4-5 and 4.10-2d.)*

82. **Design, Pilot Testing, and Implementation of Selenium Treatment Facility or Alternative for the EMSA and/or WMSA and Quarry Pit.**

a. Within 30 days of RPA approval, the Mine Operator shall begin designing a treatment facility (or alternative) and pilot system for discharge into Permanente Creek. The treatment shall be designed to achieve the Basin Plan Water Quality Objective for selenium (total recoverable selenium of 5 μg/L) for discharge from the EMSA as defined in Condition #80, and/or to achieve the "base level" standard for the WMSA and Quarry Pit as defined in Condition #81 *(reference to Mitigation Measures 4.10-2d)*.

b. The Mine Operator shall complete design, pilot testing, and feasibility analysis for a treatment facility within 24 months of RPA approval or by such other time as may be prescribed by the RWQCB.

c. The Planning Commission shall hold a public hearing no later than 30 months after RPA approval to determine feasibility of the treatment facility (or alternative). The Planning Commission may defer the public hearing if the RWQCB determines that additional time is necessary to complete the design, pilot testing, and feasibility analysis. If the Planning Commission determines that a treatment facility is feasible, the Planning Commission shall also establish a timeline for implementing the treatment facility.

d. Construction, installation, and operation of a treatment facility (or alternative) shall be required if discharge requirements are not met as described under Conditions # 80 and # 81 based on a determination of the Planning Commission, and if it has been determined feasible by the Planning Commission following a public hearing. *(Implements Mitigation Measures 4.4-5 and 4.10-2e.)*

Downstream Flood Protection

83. **Construction of Onsite Detention Facility.** The Mine Operator shall design and construct detention facilities that would 1) manage increased runoff caused by the reclaimed Quarry pit, 2) reduce excessive discharges to Permanente Creek, and 3) develop the capacity to detain and release the 100-year flow using onsite detention pond basins while optimizing groundwater infiltration. The final drainage design shall ensure that offsite, downstream flows would not cause an increased flooding potential or lead to hydro-modification effects. Design considerations for onsite detention basins shall include the following performance standards:

    a. Maintain turbidity of receiving water outflows within discharge limitations for Permanente Creek, as set forth by the San Francisco Bay Regional Water Quality Control Board Basin Plan or other more stringent, site-specific limitations set forth by the RWQCB.

    b. Effectively drain between storm events within the period of time specified by the Santa Clara County 2007 Drainage Manual.

    c. Enhance the settlement of fine sediment while limiting the potential for sediment-laden water to be discharged to Permanente Creek.

    d. Incorporate appropriate sediment traps (i.e., low areas that promote sediment settlement) in areas away from outflow structures to limit discharge of sediment at high flow periods.

    e. Control surface water inflows to the detention facility using energy reduction features (i.e., rip-rap aprons, vegetated swales) to reduce inflow velocity and agitation of sediment within the basin.

    f. Infiltrate surface water, to the extent practicable and consistent with the water-quality recommendations for the backfill material as described in the RPA, while accounting for and protecting the local groundwater condition and water quality.

    g. In addition to the detention facilities for the Quarry pit, the Mine Operator shall ensure that the desiltation ponds proposed in other smaller project areas such as the EMSA, are engineered to function as detention basins and attenuate stormwater flows to the extent practical. The Mine Operator shall also consider a broader watershed approach and consult with Santa Clara Valley Water District (SCVWD) on ways to detain peak flows offsite in relation to areas of existing flooding and to the current SCVWD flood control improvement project. *(Implements Mitigation Measure 4.10-4)*

84. **Stormwater Control to Avoid Ponded Water and Selenium Accumulation**. The Mine Operator shall incorporate drainage features into the final drainage design for the Quarry pit area to eliminate the potential for surface ponding on the floor of the Quarry pit once it has reached its final elevation (990 amsl). The drainage design for the finished Quarry pit fill shall include engineered elements (e.g., conveyance channels, infiltration galleries) that facilitate groundwater

recharge and percolation from limestone area to groundwater in the Quarry backfill with the objective of accommodating high groundwater elevation without creating surface water bodies that may contain elevated levels of selenium. These measures shall be incorporated into the design of the proposed basin for the floor of the Quarry pit once the floor is raised to its final elevation. (*Implements Mitigation Measure 4.10-6*)

Prior to the start of Phase III, submit final drainage design demonstrating compliance with the standards described above.

85. Any body of water created during the operation of the quarry, both during excavation and processing the material, shall be maintained to provide for mosquito control and to prevent creation of any health hazards or public nuisance.

86. Sixty (60) days following RPA approval, the Mine Operator shall provide to the Planning Manager revised plans that show redesigned rip-rap energy dissipaters per the Association of Bay Area Governments (ABAG) standard for the 25 year storm for all discharge points on the reclamation plans.

Noise

87. The Mine Operator shall prohibit all heavy equipment operations in the northeasterly 11.5 acres of the EMSA (as shown in Draft EIR, Figure 4.13-8) during nighttime hours (i.e., between 10:00 p.m. to 7:00 a.m.). *(Implements Mitigation Measure 4.13-1a)*

88. The Mine Operator shall either: (1) limit all operations in the EMSA within 1,600 feet of the caretaker's residence (as shown in Figure 4.13-8) to no more than one 8-hour shift per day, or (2) submit evidence establishing to the County's satisfaction that there are legally-binding restrictions precluding any occupancy of the caretaker's residence during the entirety of Phase 1 of the RPA. *(Implements Mitigation Measure 4.13-1b)*

EMSA Equipment

89. Within thirty (30) days of the RPA Approval, the Mine Operator shall post a sign inside all mine equipment operating in the EMSA area with the text from Condition #42 (Light and Glare) and Conditions # 87 and # 88 (Noise). The sign shall be posted prominently within view of the vehicle operator. Within 30 days of the RPA approval, the Mine Operator shall submit to the Planning Manager photo documentation demonstrating compliance of this.

90.