SANTA CLARA COUNTY, CALIFORNIA

PERMANENTE QUARRY

AMENDED RECLAMATION PLAN

CA MINE ID 91-43-0004

MAY | 2019

This reclamation plan amendment is a comprehensive update that supersedes and replaces the prior approved 2012 reclamation plan.

Lead Agency:
Santa Clara County
Department of Planning and Development

Operator:
Lehigh Southwest Cement Company

Lehigh Hanson
HEIDELBERGCEMENT Group

SANTA CLARA COUNTY, CALIFORNIA

PERMANENTE QUARRY

AMENDED RECLAMATION PLAN

CA MINE ID 91-43-0004

MAY | 2019

This reclamation plan amendment is a comprehensive update that supersedes and replaces the prior approved 2012 reclamation plan.

Lead Agency:
Santa Clara County
Department of Planning and Development
70 West Hedding Street, East Wing, 7th Floor, San Jose, CA 95110

Operator:
Lehigh Southwest Cement Company
24001 Stevens Creek Blvd., Cupertino, CA 95104

TABLE OF CONTENTS

APPENDICES

1. SUMMARY

Table 1, "Reclamation Plan Requirements Summary," provides the key reclamation details in a format that corresponds to the State Mining and Geology Board's form (MRRC-1) for surface mining inspections. At the end of this document is Appendix A, "Index of Required Content," which provides the location in this document for specific requirements, practices, and standards for reclamation.

TABLE 1
RECLAMATION PLAN REQUIREMENTS SUMMARY

Requirements	Description	Reclamation Plan Section
GENERAL INFORMATION		
Mineral Products	Cement-grade limestone and construction aggregate	3.1
Production Amount (Annual/Gross)	Average of 3.8 MT annually; over 60 MT of cement-grade limestone, construction aggregates, and overburden under this plan	3.1
End Date of Operations	December 31, 2060 (for reclamation planning purposes)	3.2
Permit Number and End Date	No use permit; all operations on vested property	2.9
End Use	Reclaimed to open space	2.6
BOUNDARIES		
Property Acreage	3,510 acres	2.4
Permit Acreage	Operations under this plan occur on vested properties encompassing approximately 2,040 acres; reclamation boundary encompasses 1,312 acres	2.4
Reclamation Acreage (Surface Disturbance)	Current and planned reclamation surfaces encompass 631 acres	2.4
Setbacks	Per Section 2.20.030 of County zoning ordinance: 30-foot setback from property line for structures.	Sheet 2
SLOPES—GRADING		
Fill Slopes:		
WMSA: Graded to 3H:1V or flatter **EMSA:** 2.6H:1V, interbench slopes of 2H:1V; benches 25' wide, at 40' vertical intervals **North Quarry:** 2% slope (backfilled surface)		3.8.2 and Appendix G
Compaction is not required for end use, but is typically employed in practice by the loading imposed by the heavy hauling equipment and heavy tracked vehicles. North Quarry backfill compaction to be achieved with 2 to 5 passes with truck or dozer.		3.8.3, 3.8.4 and Appendix G
Cut Slopes:		
North Highwall Reserve: 26.5° to 38°, benches 50' tall/25–50' wide; 1.28H:1V (38°) below 1,250' msl, with a 0.75H:1V face angle **Rock Plant Reserve:** 26.5° to 38°, benches 50' tall/25–50' wide		3.8.2
EROSION		
Best Management Practices	Temporary BMPs will be installed on-site postreclamation until the vegetation is established. The BMPs include desiltation basins, which have been sized based on the SCVURPPP and SWRCB guidelines. As a result, the site meets SMARA's current standards (CCR, Title 14, Section 3706) for erosion and sediment control.	3.9 and Appendix I
Grading	After reclamation is complete, most surface runoff from the North Quarry, WMSA, EMSA, and Permanente Creek Reclamation Area will generally return to premining conditions, returning flows to Permanente Creek.	3.9.2
Vegetation	Self-sustaining native vegetation communities and visual integration of reclaimed lands with surrounding open space areas; interim erosion control planting; hydroseeding of the finished slopes with native grasses, herbaceous plants and shrubs; tree and shrub planting on contoured benches and riparian drainages	4.3, 4.4, 4.5, 4.6, 4.7 and Appendix F
PONDS		
Design—Function	Settling ponds for stormwater detention and sediment control.	3.9 and Appendix F

Requirements	Description	Reclamation Plan Section
Capacity (area/depth/volume)	The majority of the postreclamation flows will be conveyed to Permanente Creek. Temporary desiltation basins will capture storm runoff from the combined North Quarry/WMSA and the Rock Plant Reserve. The basins, as well as other interim erosion control measures, will be used until the vegetation establishes. The desiltation basins have been sized according to criteria from the SWRCB and SCVURPPP.	3.9 and Appendix I
Maintenance	Maintenance measures are reported to the RWQCB and specified in a SWPPP, which is updated annually.	3.9 and Appendix F
STREAM AND WETLAND PROTECTION		
Buffers (distance to channel)	Setback from Permanente Creek varies, as fill placed there predated any requirements.	1.3.7
Berms (distance/length/height)	NA	NA
Best Management Practices	SMARA water quality goals and performance standards are regulated under the SWRCB via WDRs, and therefore, the WQOs will meet or exceed SMARA requirements and will be in place beyond closure under SMARA. Erosion and sedimentation will be controlled during operations, reclamation and closure to minimize off-site siltation. Temporary BMPs will be installed on-site postreclamation until the vegetation is established. The BMPs include desiltation basins, which have been sized based on the Santa Clara Valley Urban Runoff Pollution Prevention Program (SCVURPPP) and SWRCB guidelines. As a result, the site meets SMARA's current standards (CCR, Title 14, Section 3706) for erosion and sediment control. The BMPs will be updated as needed, based on the results of monitoring and maintenance, to meet water quality standards reported to the RWQCB.	3.10.3
Drainage	Basins: Basins sized at a minimum to meet a 20-year/1-hour storm event per SMARA Section 3706(d) and sited to release flows into existing drainages feeding the creek. During the interim, prereclamation phase, runoff will be captured and treated at the treatment system.	3.9.2 and Appendix I
Grading and Slopes	SMARA water quality goals and performance standards are regulated under the SWRCB via WDRs, and therefore, the WQOs will meet or exceed SMARA requirements and will be in place beyond closure under SMARA.	3.8.3 and Appendix G
Stockpiles	The EMSA and WMSA are used to store overburden material and will ultimately be revegetated.	3.8.3 and Appendix G
Stream Diversions	NA	NA
SENSITIVE WILDLIFE AND PLANT PROTECTION		
Species	Potentially suitable foraging and/or nesting habitat for several special-status birds is present throughout oak woodland/forest, scrub, and chaparral communities, including white-tailed kite, olive-sided flycatcher, and yellow warbler; white-tailed kite is the only species with potential to nest. All of these species, except white-tailed kite, are California species of special concern; white-tailed kite is a fully protected species. Habitats within the study area have the potential to support roosting special-status bat species, including western red bat and pallid bat. San Francisco dusky-footed woodrats are known to nest in vegetated areas of the Permanente property and have potential to nest or otherwise occur in oak/woodland forest, scrub, and chaparral habitats. California red-legged frogs (CRLFs) were first discovered on the Permanente property in September 1997. The results of the surveys show that CRLF consistently occupy limited areas of lower Permanente Creek and appear to be present in Monte Bello Creek. Protocol surveys	

Requirements	Description	Reclamation Plan Section
	conducted in 2007 concluded that CRLF were present in Ponds 14, 21, and 22 along the creek. No CRLF were found in any other sedimentation basin on the Permanente property. Upstream of the occupied ponds, aquatic breeding habitat is generally not present on the Permanente property because of lack of deep slack-water pools and upland habitat within the active quarry. CRLF are unlikely to occur in the active quarry or in heavily disturbed portions of the Permanente property because of a lack of cover, exposure to predation, and frequent vehicle traffic.	
Protection Measures	This reclamation plan specifies protective measures for species of concern, including: preconstruction surveys, avoidance in nesting season, and during hibernation.	3.10 and Appendix J
SOIL/OVERBURDEN STOCKPILE MANAGEMENT		
Topsoil:		
Location	Limited on-site soil and growth medium is available as majority of surfaces were developed long before SMARA. Long-term storage sites are mapped. Temporary storage would occur for new reserve areas to be developed. Imported soil may be blended with on-site materials to maximize success.	3.6
Slope Stability	35–39°	3.6
Best Management Practices	Topsoil stockpiles will be clearly marked in the field for identification and minimally compacted. Topsoil should not be moved or handled when wet.	3.6
Overburden and Backfill :		
Location	WMSA, EMSA, North Quarry	3.8
Slope Stability	WMSA Factor of safety: static: 1.67–2.41; pseudo-static: 1.16–1.52 EMSA: Factor of safety: static-1.67–2.41; pseudo-static: 1.16–1.52 North Quarry backfill: Factor of safety: static-3.4; pseudo-static: 28.5	3.8
Best Management Practices	Overburden material is deposited by end-dumping to 35–39° in a series of lifts and phases. Materials are then keyed into existing slopes and rough-graded according to geotechnical recommendations.	3.8.3 and Appendix G-1
Topsoil Application:		
Amendments	Growth media to be amended with materials available from the site or imported soils, as available	4.2
Depth	Soil preparation depth for scrub: minimum 6” with 50% ripped overburden rock mixed with 50% topsoil blend; for tree and shrub: 12” with 50% overburden rock blended with 50% topsoil blend. Percentages of the blend may be adjusted in future reclamation efforts based on test plot results and material availability.	4.2, Appendix F
Moisture	No irrigation proposed, but the need will be assessed as stated in the revegetation plan, Sections 4.2 and 4.4.	Appendix F
Application Methods	Varies based on surface type (coarse overburden, highwall benches, soil backfill, or general compacted surfaces)	4.2
REVEGETATION		
Test Plots	Previously completed; results documented and incorporated in revegetation plan.	3.7
Species Mix	Erosion control, seeding and tree planting are specified.	4.4 and 4.5
Density	200 to 400 plants per acre, depending on reclamation surface	4.4 and 4.5
Percent Cover	20 to 40 percent, depending on reclamation surface	4.4 and 4.5
Species Richness	Two to five species per plot area, depending on reclamation surface	4.4 and 4.5
Protection	Herbivory protection for specific species to be evaluated based on the results of initial plantings.	4.6
Success Monitoring	Revegetated areas would be monitored in late spring or early summer to ensure that most plants will be identifiable to the species level. Monitoring will be conducted by a qualified biologist with experience in plant identification. After monitoring data has been collected, a report summarizing the success of revegetation efforts, comparison of data to Year 5 performance standards at the point that performance is met and	4.6

Requirements	Description	Reclamation Plan Section
	the area is planned to be released from financial assurance requirements.	
Invasive Species Control	Species listed by Cal-IPC (2006) as highly invasive will be considered problematic and will be targeted during maintenance if they exceed the designated threshold of 10 percent cover.	4.7
OTHER		
Structures	To be removed.	4.8
Equipment	To be removed.	4.8
Closure of Adits	During final reclamation, the entrance and exit to the conveyor tunnel (from crusher to Cement Plant) will be sealed.	4.8
Other Reclamation Plan Requirements	NA	NA

Notes: BMP = best management practices; COA = condition of approval; County = Santa Clara County; EMSA = East Materials Storage Area; RWQCB = San Francisco Bay Regional Water Quality Control Board; msl = mean sea level; MT = million tons; NA = not applicable; SCVURPPP = Santa Clara Valley Urban Runoff Pollution Prevention Program; SMARA = Surface Mining and Reclamation Act; SWPPP = stormwater pollution prevention plan; SWRCB = State Water Resources Control Board; WDR = waste discharge requirements; WQO = water quality objectives; WMSA = West Materials Storage Area.

1.1 Purpose

This amended reclamation plan for Permanente Quarry is a comprehensive update to the reclamation plan developed and approved in 2012. It incorporates new California Surface Mining and Reclamation Act (SMARA) requirements adopted in 2017 and modifications developed to:

- address planned additional mining areas to access additional mineral resources;
- ensure interim and long-term water quality by incorporating guidance from the San Francisco Bay Regional Water Quality Control Board (RWQCB) that did not exist in 2012, when the previous reclamation plan was approved, and advances in closure plans adopted under recent issued waste discharge requirements (WDRs);
- provide a regional location to beneficially reuse imported soil materials from off-site regional projects while reducing vehicle miles traveled to use these materials, thus reducing regional air emissions;
- improve the aesthetic appearance and geotechnical stability of the northern Permanente ridgeline; and
- enhance revegetation plans for areas of the site visible from surrounding communities for long-term aesthetics following final reclamation.

1.2 Operations Overview

Permanente Quarry is a cement-grade limestone and construction aggregate mining operation located in the Santa Clara County foothills west of the city of Cupertino (see Figure 1, “Regional Location,” and Figure 2, “Site Location”). Figure 3, “Existing Conditions Aerial Photograph,” identifies the location of key features on-site. Permanente Quarry produces minerals for two types of mineral products. It produces cement-grade limestone used for manufacturing cement at the adjacent Cement Plant. In addition, the quarry uses greenstone, low-grade limestone and other rock types to produce construction aggregates. No increase in production of either mineral product will change under this reclamation plan. Production volumes for cement-grade limestone will remain limited by throughput limits on the Cement Plant itself. Production volumes for aggregates will remain subject to the market demand for construction aggregate materials.

Minerals are currently excavated by drilling, blasting, and using loaders or excavators. Once extracted, minerals are hauled to a processing area. Materials destined for the Cement Plant are processed using crushers and conveyors located southeast of the North Quarry. Mined materials destined for use as construction aggregates may be hauled directly off-site or further processed and stockpiled at the Rock Plant located in the far southeast portion of the site.

Overburden (i.e., materials not suitable for use as cement-grade limestone or construction aggregate) is hauled to designated placement areas using trucks. One overburden stockpile area, the West Materials Storage Area (WMSA), is west of the North Quarry. Another overburden stockpile area, the East Materials Storage Area (EMSA), is to the east.

Ancillary facilities include haul roads, property access and maintenance roads, the Administration area, maintenance and parking surfaces, drill roads for exploration and materials sampling, stormwater ponds, and water conveyances. A series of groundwater monitoring wells, and a water treatment facility and related system designed to capture and convey stormwater and remove selenium (a naturally occurring element in the limestone reserves) to ensure that discharges Permanente Creek comply with water-quality standards established by the RWQCB.

1.3 Reclamation Overview

Mined and reclaimed surfaces under this plan will cover approximately 631 acres of the 3,510-acre property. The following sections summarize the key components of this reclamation plan.

1.3.1 Final Land Use

SMARA requires reclamation planning such that when the mineral reserves are exhausted, the mined lands are reclaimed to a usable condition that is readily adaptable for alternative land uses. Reclamation of Permanente Quarry will return the site to an open space condition. Reclamation will provide a condition where mine slopes are stable and safe, surfaces are properly graded to prevent erosion, and a vegetation cover is established that will be effective in controlling wind and water erosion as well as attenuation of the aesthetic contrasts where surfaces are visible from surrounding communities.

1.3.2 West Materials Storage Area

The WMSA is an approximately 173-acre area where approximately 48 million tons of low-grade limestone and greenstone were placed. The disposition of the WMSA has changed over the course of reclamation planning, initially remaining in place, then intended for backfill, and again intended to largely remain under this reclamation plan amendment. The primary purpose of keeping the WMSA in place is to prevent decreased water quality.

Since 2012, significant additional site-specific data has been developed regarding the hydrologic conditions at the North Quarry, including the underlying mechanisms affecting surface water and groundwater quality. Additional data has also been generated to evaluate use of the WMSA materials as the sole source of backfill material for the North Quarry backfilling project. Lehigh commissioned an expanded set of investigations to meet sampling and reporting obligations under the County's 2012 conditions of approval (COA) and to comply with more recent investigatory requirements imposed by the RWQCB. The RWQCB's requirements include comprehensive surface water and groundwater monitoring investigations of the WMSA. A regional selenium monitoring study is also ongoing pursuant to RWQCB orders under California Water Code Section 13267. The data developed through these investigations has allowed Lehigh to refine its approach to reclamation backfilling to further achieve long-term water quality objectives (WQOs). Alternative fill from regional construction is generated in sufficient quantities to use as backfill. Use of these alternative materials will minimize or eliminate certain water quality risks from moving the WMSA materials to a location where conditions could exacerbate the leaching of metals into groundwater. This amended reclamation plan provides for alternative sources of backfill materials other than the WMSA. Reducing or eliminating the amount of WMSA materials used as backfill will reduce certain risks to water quality that are disfavored by the WDRs. A portion of those suitable materials will be generated via the regrading and mining of the upper slopes of the north highwall of the North Quarry. Other material will be obtained from importing suitable surplus soils generated by regional development and construction projects.

The WMSA will increase from the maximum final elevation of approximately 1,900 feet mean sea level (msl) to approximately 2,060 feet msl. The WMSA will be reclaimed in place. The final WMSA surface will be contoured to blend in with the surrounding topography and vegetation.

1.3.3 East Materials Storage Area

The East Materials Storage Area (EMSA) is an approximately 75-acre area with a design capacity of 6.5 million tons of waste rock. Monitoring of the EMSA is completed under the WDRs because characterization studies suggest that metals and metalloids are a concern, although constituents of concern are at low concentrations and are not observed in downgradient wells, suggesting they may be relatively immobile. Closure will therefore ensure the materials are adequately isolated. WDRs require monitoring of groundwater and hydrogeologically connected surface waters beneath and downgradient of the EMSA and evaluation of the interim cover and proposed final cover.

1.3.4 North Quarry

The topography of the Permanente property is generally steep, ranging generally from 40 to 80 percent (20 to 40 degrees). Quarry highwalls resulting from conventional hard rock mining methods are similarly steep (50 to 80 percent [26 to 38 degrees]). North Quarry highwalls will be covered by fill at lower elevations and reclaimed in a stabilized benched configuration at upper elevations. This process of fill placement for concurrent reclamation is already ongoing in the North Quarry. An approximately 90-acre area of flat (2 percent slope) surface will result from the backfill of the North Quarry to an elevation of +/- 990 msl. Areas covered by fill stockpiles (the WMSA and EMSA) will be reclaimed at an approximately 35 percent slope (20 degrees).

This amended plan includes a slope “lay-back” at the crest of the north highwall that is designed to improve reclaimed conditions along the ridgeline, which were cut more than 40 years ago. The 2012 reclamation plan ensured that the upper slopes of the North Quarry would remain stable according to California standards. The crest along this area will be modified under this amended plan as a result of laying back the slopes internal to the quarry. This work will lower the ridge crest along a portion of the highwall to a minimum elevation of approximately 1,400 feet msl and allow for improved revegetation and enhanced long-term stability. The slope crest will be contour graded to blend with ridgeline topography, resoiled, and planted with native trees as a first phase of the project (within approximately 18–24 months).

1.3.5 Rock Plant Reserve

The Rock Plant Reserve is a cement-grade limestone and construction aggregate deposit located at the southern property limits on a vested parcel. Mining and reclamation plan will encompass approximately 30 acres. It would be developed as a single northerly facing slope that would not capture surface or groundwater at reclamation. The benches are planned for revegetation with trees, both because the north-facing aspect will accommodate such plantings and for visual attenuation of the mining from easterly off-site locations.

1.3.6 South Resource Area

The South Resource Area contains geologic resources of cement-grade limestone determined from a prior exploration drilling program. Exploration roads are used to access several monitoring wells. Roads not needed for property maintenance and access would be reclaimed under this plan at final reclamation.

The South Resource Area is located partially in nonvested lands. Development and reclamation of mineral resources that may exist in the South Resource Area would require new land use entitlements and related environmental reviews that are not requested or included in the current project, and are not a reasonably foreseeable future project.

1.3.7 Permanente Creek Reclamation Area

The Permanente Creek Reclamation Area (PCRA) includes approximately 49 acres of historic mining disturbance north of Permanente Creek. This disturbance adjacent to the WMSA is associated with overburden storage operations beginning in the 1950s. Historic aerial photographs indicate that the full extent of the storage-related disturbance on the WMSA’s southern edge was reached by 1975 (before

SMARA's effective date on January 1, 1976). The 2012 reclamation plan amendment documented that approximately 15 acres in the PCRA were redisturbed or additional surfaces were disturbed for which SMARA requires "proportional" reclamation. This reclamation is being addressed as a separate project associated with restoration plans for Permanente Creek, for which the County will be completing environmental review and approvals independent of this reclamation plan for the site. Meanwhile, other laws protecting surface waters and biological resources require ongoing attention to certain areas. An ongoing limitation is accessibility to these areas without compromising safety or creating other environmental damage.

1.3.8 Off-Road Haul Routes for Construction Aggregate Materials

This reclamation plan amendment provides for reclamation of two alternative roadways that could supply materials to the adjacent off-site Stevens Creek Quarry: an existing utility road that has been improved to facilitate safe haul truck travel or a new haul road that could be constructed if use of the utility road is determined unacceptable. Providing for reclamation requirements does not require that the haul road be constructed. Improvement and use of either route will depend on final determinations by the County and City of Cupertino regarding the construction and the capability for Stevens Creek Quarry to accept such materials.

The utility access road is a preexisting roadway that was previously limited to general-purpose access and utility company (currently Pacific Gas and Electric Company [PG&E]) access to power lines in the area. In spring 2018, the road was improved to allow off-road haul trucks from the neighboring Stevens Creek Quarry to obtain aggregate material from the Permanente Quarry aggregate plant. The utility road would be reclaimed by flattening the slope and narrowing the roadway, which would then be retained following mining operations to provide long-term access by public utilities and for property maintenance and an additional emergency access. Drainage improvements that convey surface water from the utility road to the existing system of surface water controls at the rock plant area will be maintained.

The Rock Plant Haul Road falls entirely within the 159.42-acre parcel (Accessor's Parcel Number 351-10-033) located in the southeastern portion of the property and is within the County's unincorporated jurisdiction. The haul road will connect adjacent properties and is a property improvement that will therefore remain following reclamation of this area and the overall quarry. The roadway is located on private properties and is not intended for public use. Long-term safety is integrated into the engineered design for stability.

1.3.9 Revegetation

This plan incorporates site-specific data for reclamation of the site's surface conditions and the results of on-site revegetation test plots. This plan also provides conceptual recommendations for resoiling and revegetation. Because no single solution optimally addresses the entire area to be revegetated, this plan provides for different species and community structures as suited for success at different locations.

Limited soils and materials are for needed revegetation growth media. This amendment therefore recognizes the different substrates and applies commensurate revegetation goals. SMARA contemplates that soil may be needed for backfill and for revegetation purposes (see California Code of Regulations [CCR] Section 3501 and Section 3503[f]). Thus, imported soil used to backfill the North Quarry may also be used for revegetation on other surfaces.

The revegetation plan will result in self-sustaining revegetation that supports open-space land uses. The vegetation communities established will mature over time to be similar to surrounding natural areas. The planting plan includes consideration of final slope angles and aspect; solar radiation; environmental objectives (e.g., aesthetics from public viewpoints); substrate; and topographical requirements (e.g., highwall benches designed for stability). For example, south- and west-facing slopes, which are warmer and drier, are designed to be scrub and chaparral habitats, while north- and east-facing slopes, which are cooler and moister, are designed to support woodlands.

The species palette is based on the results of 16 test plots and the assessment of native plants in undisturbed areas. Native and naturalized local plant species will be used to control erosion and for final revegetation. Plants will be acquired from native plant suppliers, locally collected seed, and plugs and container plants (where local slope and aspect will support larger species). Substrate options are provided to address the shortcomings of overburden and other mined surfaces. The materials used to amend the substrate may include fine-grained rock, salvaged soils, or imported soils, as available.

Revegetation success will be ensured through performance standards, which will be demonstrated by monitoring and measuring for species richness, density, and cover. The site will be monitored until the success criteria are met. Supplemental planting and weed control will be applied as determined necessary.

2. SITE DESCRIPTION

The following sections provide general site details such as contact information for the mine owner and operator; evidence of landowner notification of reclamation; reclamation responsibility; and site location, size, site features, and land uses.

2.1 Contact Information

Owner:

Hanson Permanente Cement, Inc.
300 E. John Carpenter Freeway #1645
Las Colinas, TX 75062

Operator:

Lehigh Southwest Cement Company
12667 Alcosta Blvd., Suite 400
San Ramon, CA 94583

Site Contact:

Erika Guerra, Environmental and Land Management Director
Lehigh Southwest Cement Company
24001 Stevens Creek Blvd.
Cupertino, CA 95014-5659

2.2 Notification of Landowner

Signed landowner notification forms are included in Appendix B, “Notification of Landowner,” providing evidence that all landowners have been notified of the proposed use.

2.3 Reclamation Responsibility

A statement for responsibility to complete reclamation in accordance with this plan is provided by the current operator in Appendix C, “Statement of Responsibility.”

2.4 Location, Size, and Legal Description

The site location is shown in Figures 1 and 2. The operation is located in the County foothills west of the city of Cupertino. The property includes approximately 3,510 acres, and the area within the amended reclamation plan boundary is approximately 1,312 acres. Figure 4, “Parcels and Vested Rights,” provides a map showing assessor’s parcel numbers and acreages and shows which parcels have vested mining rights.

The legal description of the property under ownership is provided in Appendix D, "Legal Description, Parcel Data, and Vested Parcels." Included therein is Appendix D-1, "Legal Description," which includes site maps that have been prepared, signed, and stamped by a California Professional Land Surveyor.

Current conditions and topography at the time of this reclamation plan amendment are shown in Figure 5, "Existing Topography," and Sheet 1, "Existing Conditions."

2.5 Conditions of Approval and Mitigation Measures

In accordance with California Public Resources Code Section 2772(b)(1)(B), Appendix E, "Conditions of Approval," provides a location for a list of future conditions of approval or binding mitigation measures adopted by the County upon approval of this reclamation plan pursuant to the California Environmental Quality Act; those conditions necessary to meet SMARA requirements are noted.

2.6 Existing and Allowed Land Uses

Mining activity at Permanente Quarry began in 1903. Surface mining activities have been continuous since at least 1939 and have been formally recognized by the County and the courts as a legal nonconforming (i.e., vested) use (See Figure 4 for a map of the vested areas).

The property is designated under the County's general plan as Hillsides (HS) with a small portion designated as Other Public Open Lands (OPOL). The remainder of the property has no designation in the County's general plan because it is within the City of Cupertino's urban service area. Two parcels are within the City of Palo Alto. See Appendix D-4 for a summary of parcels, acreages, vested parcels, and parcels that fall within the boundaries of the reclamation boundary. None of the mining operation occurs within the city of Palo Alto.

The operation is subject to the County's zoning ordinance and is classified as listed in Table 2, "Applicable Zoning Designations." Uses allowed under the County Zoning Ordinance include mineral and other resource extraction and land in its natural state.

TABLE 2
APPLICABLE PROPERTY ZONING DESIGNATIONS

Zoning Designation	Definition	Assessor's Parcel Number
County A-d1	Exclusive Agriculture, Santa Clara Valley Viewshed	351-10-003, 004, -005, -006, -008, -010, -012, -038
County A1-d1	General Use, Santa Clara Valley Viewshed	351-10-037
County A1-20s-d1	General Use, Minimum Lot Size 20,000 Square Feet, Santa Clara Valley Viewshed	351-10-037
County HS-d1	Hillsides, Santa Clara Valley Viewshed	351-09-013, -022, -023, -025; 351-10-011, 033; 351-11-005, -006, -007; 342-64-001
County HS-d1-sr	Hillsides, Santa Clara Valley Viewshed, Scenic Roads	351-11-001, -081
County HS	Hillsides	351-09-020
City of Cupertino	Residential Hillsides	351-10-17, -023, -030, -039; 351-45-045

Sources: Santa Clara County 2016, Santa Clara County 2019, ParcelQuest 2019, City of Palo Alto 2017, City of Cupertino 2018

No agricultural uses are on-site; no soils on-site are classified as Prime farmland according to the California Department of Conservation pursuant to the Farmland Mapping and Monitoring Program (California Department of Conservation 2009a) and the U.S. Department of Agriculture, Soil Conservation Service report (USDA 1958) and the Western Santa Clara County soil survey (U.S. Department of Agriculture 2011). The site is not subject to a Williamson Act contract.

2.7 Site Features and Utilities

The site is supported with all necessary infrastructure for mining and reclamation. Existing utility services to Permanente Quarry include water from San Jose Water, electrical from Pacific Gas and Electric Company (PG&E), sewer, and telecommunications. Major equipment, facilities, and structures receiving electricity include the:

- primary crusher,
- secondary crusher,
- conveyors,
- upper water treatment plant,
- offices, and
- lights to illuminate certain access roads, conveyors, and processing facilities.

Sewage generated from the offices located immediately east of the North Quarry is disposed into a septic system. Portable toilets are stationed throughout the quarry.

Power and water not needed for groundwater monitoring or other postreclamation SMARA needs will be dismantled and removed or abandoned in place (e.g., wells in accordance with state requirements) after service or use is completed.

2.8 Existing Entitlements and Approvals

The quarry is a *vested operation,* which is recognized under SMARA as a surface mining operation with existing mining rights that does not require a use permit for mining to occur.. All parcels where surface mining operations and reclamation will occur under this plan are part of the vested operation. The County Board of Supervisors affirmed the quarry's vested status in a February 8, 2011, public hearing. The vested parcels are shown in Figure 4. The accompanying resolution (see Appendix D-3, "Resolution No. 2011-85 Regarding Vested Rights") states:

> 4. That the Board has determined, on the basis of substantial evidence in the record and controlling legal authority, that vested rights exist over the entirety of parcels 1, 2, 3, 5, 6, 7, 8, 9, 11, 14, 15, 16, and 17, as shown on Exhibit 45 attached hereto ("Vested Parcels"), and that vested rights do not exist over parcels 4, 10, 12, 13, 18 and 19. Quarry surface mining operations on the Vested Parcels are a legal non-conforming use, and do not require a County use permit for continued surface mining operations within the geographic area bounded by the Vested Parcels.

Just as a quarry with a use permit requires an approved reclamation plan, a vested operation must also have a reclamation plan that ensures that planned mining areas will be reclaimed pursuant to SMARA and the County's implementing ordinance. The initial reclamation plan for the quarry was approved in 1985. The plan was comprehensively revised in 2012, reflecting the known and planned development of mineral reserves at that time. Changing conditions and new data caused the 2012 reclamation plan to become outdated in its descriptions of the mineral reserves, the timing of completion and topography of final surfaces, and the best methods to reclaim and meet long-term WQOs. This amended reclamation plan has been updated to the 2019 conditions in accordance with SMARA and incorporates all applicable new statutory and regulatory requirements.

All surface mining operations planned in connection with the project would occur within the geographic boundaries of the quarry's vested rights as determined by Resolution No. 2011-85. As it has throughout its history, the quarry will continue to produce cement-grade limestone to supply the adjacent cement plant and construction aggregates to serve market demand.

2.9 Permit and Planning Boundaries

Figure 4 shows the permit boundary for mining (vested parcels) and the applicable reclamation plan boundary under this plan. The SMARA *reclamation boundary* requirement was enacted with 2017 statutory revisions ensures that all surfaces for planned mining are included in plans for reclamation. All surfaces disturbed by mining operations must be reclaimed under SMARA. Current surfaces are shown in Figure 3 and on Sheet 1. Changes to the footprint and acreages must be addressed annually under SMARA in the annual financial assurance cost estimate (FACE). Surface disturbances must remain within the reclamation boundary unless an amendment is obtained.

2.10 Designated Mineral Resource

An objective of SMARA is to create a mineral lands inventory by designating certain areas of California as important for the production and conservation of existing and future supplies of mineral resources. Pursuant to SMARA Section 2790, the Surface Mining and Geology Board has designated certain mineral resource areas to be of regional significance. The purpose of this designation is to provide local agencies, such as the County, with information on the location, need, and importance of mineral resources and to ensure that this information is considered in local land use decisions. Construction aggregate was the first mineral commodity selected by the State of California for the regional significance designation because of its importance throughout the construction industry. Construction aggregate is used in Portland cement concrete, asphalt, railroad ballast, stucco, road base, and fill. The availability of aggregate deposits and their proximity to markets are critical factors in the strength of the overall economy.

The Mineral Land Classification for the South San Francisco Bay Production-Consumption Region, published by the California Department of Conservation, Division of Mines and Geology (DMG) in 1996, classifies aggregate resource areas of the Permanente site as Mineral Resource Zone 2a (MRZ-2a). For a mineral deposit to be considered significant and therefore eligible for MRZ-2 classification, it must meet criteria established by the State Mining and Geology Board for material quality, marketability, and economic value. MRZ-2a is specifically defined as:

> Areas underlain by mineral deposits where geologic data indicate that significant measured or indicated resources are present. MRZ-2 is divided into MRZ-2a and MRZ-2b on the basis of degree of knowledge and economic factors. Areas classified MRZ-2a contain discovered mineral deposits that are either measured or indicated reserves as determined by such evidence as drilling records, sample analysis, surface exposure, and mine information. Land included in MRZ-2a is of prime importance because it contains known economic mineral deposits.

DMG updated its report on aggregate availability in its 2018 publication “Aggregate Sustainability in California.”

3. CURRENT CONDITIONS AND MINING PLANS

The following sections review the mining plan and its relationship to the reclamation requirements. Figure 5 shows the surfaces as they exist at the time of reclamation plan preparation (2019).

3.1 Material Quantity and Type

Permanente Quarry produces cement-grade limestone cement and construction aggregates. A total of over 60 million tons of cement-grade limestone, construction aggregates, and overburden are identified for production under this plan. Additional resources have been previously identified on the property (South Resource Area) which are not proposed for development under this plan. Those resources are not fully permitted under the vested right and would require subsequent approval.

3.2 Mining Initiation and Termination Dates

Mining activity at the quarry began by 1903. Surface mining activities have been continuous since at least 1939. For purposes of this reclamation plan, foreseeable cement-grade limestone and construction aggregates production would continue to 2050, depending on market demand. Reclamation of the North Quarry with imported fill would extend through 2055, with final reclamation completed by 2060. For the purposes of SMARA compliance under this plan, the ultimate reclamation configuration and condition is projected to be complete by December 31, 2060.

3.3 Mining Plan

The current plans for reserve development are shown in Figures 6, "Mine Plan," and corresponding Sheet 2, and in 7, "Mine Plan Cross Sections," and corresponding Sheet 3. The plans are based on estimated elevations for cut and fill surfaces. Actual elevations may vary based on volumes of ore and overburden, scheduling and placement, and reclamation phasing, but not to a degree that would substantially deviate from reclamation planning or related environmental conditions. Maximum anticipated depth of the North Quarry excavation is +/- 440 feet msl. The maximum anticipated depth of the Rock Plant Reserve is +/- 915 msl.

Surfaces that will result from mining are categorized in Figure 8, "Reclamation Treatment Surfaces." These surfaces where resoiling and revegetation will occur have different substrate conditions, and the recommended treatment varies accordingly to meet the reclamation objectives.

3.4 Equipment Storage

Equipment, supplies, and other materials for maintenance are stored in designated areas. Current storage areas, identified as "Equipment and Maintenance" are shown in Figure 3 and Sheet 1

3.5 Topography and Climate

3.5.1 Topography

Topography on-site and on surrounding lands consists of gentle to steep terrain. These areas contain a series of ridges and valleys trending in a general east-west direction. Steep slopes predominate, with flatter terrain occurring within some previously disturbed areas. Elevations within the larger quarry ownership generally increase from west to east, ranging from about 500 feet msl near the entrance to the quarry to about 2,640 feet msl at the western and southwestern property boundaries. See Figure 3 and Sheet 1 for existing topography on-site.

3.5.2 Climate

The site lies within a semi-arid Mediterranean climate zone characterized by warm summers and mild winter temperatures with a substantial slope effect contributing to vegetative community differences on north- and south-facing slopes. Rainfall occurs mainly from November–April. Average annual rainfall is about 22 inches; however, precipitation can range widely from year to year. On north-facing slopes, conditions are moister and cooler than on south-facing slopes as evidenced by the dramatic differences in vegetative communities. The site contains both north-facing and south-facing slopes. Typically, winds tend to blow from the mountains toward the valley in a general southwest to northeast direction. Winds are light averaging between 6 and 10 miles per hour (mph).

During the summer, winds shift to blow from the north and northeast. Summer wind speeds range from 5 to 10 mph. Temperatures range from the low 40s to about 60 degrees Fahrenheit from November–April. During the remainder of the year, temperatures range from the high 40s to the high 80s.

3.6 Soil Resources, Salvage, and Storage

3.6.1 Soils

As depicted in Figure 9, "Soils." The *Soil Survey of Santa Clara Area, California* (USDA 1958) indicates that the site has nine native soil types (map units) and depicts excavated quarry areas as a "Pit" map unit. These map units are described in detail below. According to the soil survey, the native soils on-site were subject to erosion and gullying, were generally quite shallow, and hosted a plant community almost wholly dominated by scrub. Although historical quarry activities have disturbed the native soils, previous successful restoration plantings and the quarry's test plot program have shown that plant communities and soil characteristics may be restored.

Pit (Ec): This map unit consists of areas large enough to map where excavations have been made and where the original soil has been removed. Excavations in this area have been principally for cement-grade limestone and construction aggregate production.

Azule silty clay, 20–30 percent slopes (At): Azule silty clay surface soil consists of brown or pale-brown silty clay that normally varies from 8 to 15 inches in depth. The surface soil overlies a brown or pale-brown slightly compact subsoil of silty clay texture. The underlying material occurs at depths of 20 to 45 inches and is light-brown or light yellowish-brown unconsolidated material of clay loam or silty clay loam texture. In a few places a small amount of gravel occurs in the profile. The native vegetation is mostly brush, but there are some areas of this soil type in grassland and woodland.

Los Gatos clay loam, 20–35 percent slopes (La): The Los Gatos surface soils are brown and become nearly reddish brown when moist. They grade into brown or reddish brown subsoil of clay loam texture. In most places some rock fragments occur in the subsoils. The number and size of fragments increase with depth. The soils are underlain by hard but generally broken or shattered metamorphosed sedimentary rock at depths of 26 to 38 inches.

Los Gatos clay loam, slightly eroded, 20–35 percent slopes (Lc): This soil differs from the uneroded Los Gatos clay loam described above mainly in degree of erosion. In a number of places, the exposed soil is somewhat redder and somewhat finer textured than typical, because of partial or complete removal of the surface soil and mixture with subsoils.

Los Gatos–Maymen stony soils, undifferentiated, 50+ percent slopes (Lf): This map unit consists of very steep and stony areas of Los Gatos and Maymen soils. Slopes are steep, and in most places rock outcrops are numerous. The vegetation is a dense growth of brush. The Los Gatos soils predominate, but in some places fairly large areas of Maymen soils occur. The Los Gatos surface soils are brown and become nearly reddish brown when moist. They grade into brown or reddish brown slightly compact subsoils of finer texture than the surface soils. In most places some rock fragments occur in the subsoils. The number and size of fragments increase with depth. The soils are underlain by hard but generally broken or shattered shale or sandstone that has undergone varying degrees of metamorphosis. Maymen surface soils are light brown or pale brown. They overlie light brown or light reddish brown medium textured subsoils. In most places rock fragments occur in the subsoils and in the surface soils. The subsoils grade irregularly at shallow depths into hard sandstone or conglomerate bedrock.

Maymen loam, 20–35 percent slopes (Md): The typical uneroded soil profile for Maymen loam soils are light-brown or pale-brown loams to depths of 6 to 10 inches. In most places some rock fragments are present. This surface soil grades into a light-brown or light reddish-brown loam subsoil that contains numerous rock fragments. At depths of 11 to 16 inches, the subsoil grades into hard sandstone or conglomerate bedrock. Slightly eroded Maymen loams are associated with other Maymen soils and with soils of the Los Gatos series, mainly on Monte Bello Ridge.

Permanente stony soils, undifferentiated, 50+ percent slopes (Pa): These very steep areas of Permanente soils are very shallow and stony. The surface soils are brown (becoming nearly reddish-brown when moist), medium textured, stony, and generally noncalcareous. In most places fragments

of bedrock are mixed with the surface soils, which grade irregularly at very shallow depths into light-gray or white hard limestone bedrock. The natural vegetation is almost entirely brush.

Soper gravelly loam, 20–35 percent slopes (Sm): The surface soil is a brown or light-brown, slightly or medium acid gravelly loam to depths of 8 to 13 inches. The surface soil grades into a slightly more reddish-brown, moderately compact, weakly blocky subsoil of gravelly clay loam texture. The subsoil retards drainage somewhat and causes waterlogging of the surface soil during heavy rains. At depths of 23 to 32 inches the subsoil grades into noncalcareous moderately or weakly consolidated conglomerate bedrock that is somewhat more permeable than the subsoil.

Soper gravelly loam, 35–50 percent slopes (So): This soil is normally somewhat shallower than that on less steep slopes. The natural vegetation is a thick growth of brush. The typical slopes of Soper soils usually range from 20 to 35 percent, but steep slopes are more common in this area. The surface soils are brown or light brown, medium textured, and generally gravelly. The surface soils grade into slightly more reddish-brown, moderately compact, weakly blocky subsoils of gravelly clay loam texture. The subsoils in most places are dense enough to retard drainage to a moderate degree. The subsoils grade into brown or yellowish-brown noncalcareous, moderately or weakly consolidated conglomerate bedrock.

3.6.2 Topsoil and Vegetation Stripping and Salvaging

Topsoil from new mined surfaces will be harvested and stockpiled for reclamation purposes. In cases where woody plant material must be removed, the material will be chipped and later combined with the topsoil to increase the organic matter. Available topsoil is a priority material because it will potentially also contain native seeds and microorganisms that can improve revegetation success.

Undisturbed topsoil samples described above represent native soil conditions found within the footprint of planned North Highwall Reserve and Rock Plant Reserve surfaces. The soil texture, organic matter content, and other characteristics of the topsoil samples tested varied in quality, with 60 percent of the samples having generally adequate amounts of organic matter for native plant establishment. The samples generally exhibited favorable soil chemical composition and clearly can support planned revegetation.

When undisturbed areas are graded, topsoil will be harvested from those areas and stockpiled. Before topsoil is harvested, the area will be cleared of woody vegetation and root balls using chainsaws and a portable excavator. Plant debris will be chipped in place and spread on the topsoil. This organic matter is to be blended with the topsoil during harvest. Salvaging topsoil for reclamation helps ensure productivity of reclaimed lands. Identifying topsoil locations and depth is important to securing appropriate topsoil in optimal locations. At this time, the only locations where new mined surfaced are planned that could generate top soil are the North Quarry highwall lay-back area, and the Rock Plant Reserve. Mapped soils for those areas are shown in Figure 8. Locations of existing and planned topsoil storage are shown in Figure 6 and the corresponding Sheet 2. Additional locations may be added as needed nearest the intended area of use for that topsoil.

The following actions will be implemented related to topsoil stockpiles:

- Topsoil and vegetation removal will not precede mining by more than 1 year.
- After topsoil is stripped, it will be hauled to areas undergoing active reclamation for immediate placement if such areas are available, and stored if it cannot be used at that time for concurrent reclamation activities.
- The topsoil will be compacted to the minimum extent necessary. Topsoil compaction will not be such that its ability to perform as a planting medium will be compromised.
- Topsoil stockpile areas will be identified and marked.
- If topsoil is stored during the winter rainy season, erosion control measures will be implemented. See Section 3.9.1, “Water Quality Protection,” the “Stockpile BMPs” subsection, for erosion control measures.

3.6.3 Overburden Stockpiling

Overburden is stockpiled separately from topsoil or other growth media. Overburden has been placed in the WMSA and the EMSA. The EMSA has previously received a cover of nonlimestone materials and will receive a soil layer to support vegetation. The WMSA is scheduled to receive a soil cover layer.

Following completion of mining, some overburden may be placed in the North Quarry. The overburden will be covered by imported soil. The floor of the Rock Plant Reserve will be capped with native soil salvaged during development of this area.

Additional considerations regarding the stockpiled materials is provided regarding slope stability in 3.9.1, "Water Quality Protection," the "Stockpile BMPs" subsection and for the final disposition of overburden in Section 4.8.1, "Waste Disposal."

3.7 Test Plots

Sixteen test plots were constructed on top of bare, graded, overburden rock at two locations in fall 2008. To test the response of the seed mixes and plantings to various soil treatments, the test plots each differed by soil composition and soil depth. The soil treatments consisted of a combination of materials, including overburden rock, North Quarry fine greenstone material, rock plant fines, and imported compost. Each test plot was divided into four equal quadrants, upon which four different native seed mixes were applied, followed by straw mulch, a hydroslurry of fertilizers, and a tackifier.

Results indicate that all soil materials added to overburden rock help to increase total plant cover, and grass cover in particular. While shrub cover was low after the first 2 years, shrub density was fairly high with many small individual plants observed. A higher cover of grasses appears to suppress shrub establishment, which is particularly true in plots with higher percentages of compost. Deeper and richer compost-laden plots mimic grassland soils more so than typical scrub soils, which promote grass growth. Test plots with larger amounts of overburden rock supported lower cover, fewer grasses, and a greater number of shrub seedlings, although they are small and develop slowly. These results were used to refine the recommended seed mixes listed in this amended plan. In particular, species that were seeded but never observed were omitted from the proposed plant palette, while species that performed well were retained. The quantity of some native annual grass seed was reduced to prevent overcompetition with shrubs, a target natural community. The test plot program is complete and its results are incorporated in the revegetation approach.

Appendix F, "Revegetation Plan," provides a detailed description of the completed test plot program.

3.8 Geology and Geotechnical

3.8.1 Geology

The site is located within California's Coast Range geomorphic province and overlies three geologic formations (WDR Order No. R2-2018-0028):

- The western portion of the site (including most of the WMSA) overlies fractured bedrock of Mesozoic metavolcanics (Mzv), including andesite, rhyolite, greenstone, volcanic breccia, and other pyroclastic rocks, in part strongly metamorphosed. This portion of the site includes volcanic rocks of the Franciscan Complex (basaltic pillow lava, greenstone, and minor pyroclastic rocks).
- The center of the site (including the eastern portion of the WMSA, the North Quarry, and the Quarry Office/Maintenance Area) overlies Cretaceous-Jurassic marine sedimentary and meta-sedimentary rocks (KJf). These units are also part of the Franciscan Complex, including sandstone with smaller amounts of shale, chert, conglomerate, as well as the limestone that is mined for cement production. The limestone units are of limited extent and occur within a structural block that is truncated and surrounded by greenstone and greywacke.

- The eastern portion of the site (including the EMSA and the cement manufacturing plant) overlies Pliocene-Pleistocene non-marine (continental) sedimentary rocks of the Santa Clara Formation (QPc), which consists primarily of loosely consolidated sandstone, shale, and gravel deposits and which in turn overlie rocks of the Franciscan Complex.)

Cement-grade limestone and construction aggregates are extracted from limestones and metabasalts (greenstones).

The geology in the area of the cement-grade limestone reserves, shown in Figure 10, "Geology," is complex because of 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 degrees. High-angle faults, including the regional Berrocal Fault, are typically oriented in the northwest-southeast direction and dip at greater than 60 degrees. The geology has been mapped several times by different geologists, and numerous drilling programs have been conducted.

The geology of the North Quarry consists of the Franciscan Complex, as discussed above. The highwalls are mostly limestone mixed with a minority of greenstone. After the layback and slope regrade, the highwall will only be 25% limestone Several faults, including the Berrocal Fault, intersect the existing highwall.

- Bedding is well-developed in the limestone, and although it roughly parallels the thrust faults, bedding orientations can change abruptly due to small-scale folding, or across the contacts between adjacent limestone blocks. Bedding is overturned near the Northwest Berrocal Fault strand. Bedding is involved in the control of bench face angles along the west and north walls; and in the development of slides two to three benches high in the north wall, west of the 1987 greenstone slide, below elevation approximately 1,500 feet.
- Surface weathering affects rock mass strength of all lithologies to some extent, but particularly greenstones, which are pervasively oxidized and reduced to a clay-rich residual soil within 50 to 100 feet of the original ground surface. This is the cause of the conditions along the quarry ridgeline.
- Thrust contacts along the north wall dip to the south, toward the North Quarry. A greenstone/ limestone contact is implicated in development of the 1987 greenstone slide.

3.8.2 Slope Specifications

An updated geotechnical evaluation has been completed for this reclamation plan amendment for each of the critical areas where cut and fill work is being revised under this plan, namely: the WMSA, the North Highwall Reserve, the Rock Plant Reserve, and the North Quarry Backfill. Reports for each are provided in Appendix G, "Geotechnical Evaluations," that present the planned mining and reclamation, document previous and recent investigations of each area, and provide results of stability analyses to support mining and reclaiming.

The North Quarry is where mineral extraction currently occurs. The North Quarry features a large mining area, with elevations that currently range from approximately 550 feet to 1,750 feet msl. The North Quarry has a history of localized instability, and an integral part of this reclamation plan involves addressing the 1987 greenstone slide by removing it entirely and reducing the slope angle at the ridgeline to provide for long-term stability. Both steps would be completed in conjunction with mining of the remaining reserves at the North Highwall Reserve.

As a result of the recent geotechnical investigations, updated specifications for cut and fill slopes have been developed, as provided in Table 3, "Cut and Fill Slopes Specifications."

TABLE 3
CUT AND FILL SLOPE SPECIFICATIONS

Slope Specifications
CUT SLOPES:
North Highwall Reserve • 26.5° to 38° • benches 50' tall/25–50' wide • 1.28H:1V (38 degrees) below 1,250 feet msl, with a 0.75H:1V face angle
Rock Plant Reserve: • 26.5° to 38° • benches 50' tall/25–50' wide
FILL SLOPES:
WMSA: • Graded to 3H:1V or less
EMSA: • 2.6H:1V, interbench slopes of 2H:1V • benches 25-feet-wide, at 40-foot vertical intervals
North Quarry Backfill: • 2% slope (backfilled surface)

The highwalls at the North Highwall Reserve and Rock Plant Reserve will be mined to reclamation grade and limits.

3.8.3 Fill Slopes

The following subsections describe the fill plan for those areas that will involve fill.

WMSA

The majority of existing fills will be left in place. Waste rock material will be left in place at the western extent of the area to an elevation of approximately 2,070 msl. The waste rock material will be placed at slope angles of 35–39° in 50-foot-high lifts with 80-foot-wide benches between the lifts. Once placement of the waste rock material is completed, the slope will be graded to a 3H:1V slope with the crest of the slope remaining at an elevation of approximately 2,070 feet msl.

Geotechnical stability analyses were completed on two cross sections through WMSA. These cross sections represent the deepest fill depths, greatest fill slope heights, and/or the presence of a native slope below the fill area. All other cross sections are a subset of these sections. The target minimum factor of safety for the analyses are 1.3 for static conditions and 1.0 for pseudo-static conditions, which are appropriate for the postmining land uses at this site. All configurations modeled meet the minimum target factor of safety

EMSA

The EMSA is located near the eastern border of the site. The final elevations in the EMSA at reclamation will be a maximum of approximately 900 msl, and overall slope angles reach a maximum gradient of 2.6H:1V, with interbench slopes of 2H:1V. The EMSA was designed with stable slopes that will not require significant regrading for reclamation.

North Quarry Backfill

The North Quarry will be backfilled to an elevation of approximately 990 feet msl. This elevation corresponds to the lowest depression in the surrounding natural topography and will prevent the accumulation of standing water on the reclaimed surface.

A total design volume of 34.5 million cubic yards (mcy) is needed to fill the North Quarry to its final design surface at approximately 990 feet msl. Approximately 14.1 mcy is assumed to be from on-site

sources (such as the greenstone slide and material recovered from the WMSA). The remainder would be received as suitable surplus soil from off-site sources. Actual quantities of source materials will depend on the availability at the time work begins and completed.

Backfill is phased in two steps such that the placement can begin as the North Highwall Reserve is being concurrently mined. The initial fill placement is depicted in the mine plan (Figure 6 and Sheet 2) and mine plan cross sections (Figure 8 and Sheet 3).

- Step 1 from the quarry floor (approximately 500 feet msl to approximately 850 feet msl): Greenstone overburden generated on-site, potentially some materials from the WMSA, and imported off-site fill are planned to backfill this lower portion. The final elevation of step 1 will depend on the amount of material available during mining operations.
- Step 2 from approximately 850 to 990 feet msl: Suitable surplus soil, imported from off-site sources, will be used to backfill the upper elevations so that positive drainage from the quarry is established and no water is impounded.

Geotechnical stability analyses were completed. The target factors of safety for the analyses are 1.3 for static conditions and 1.0 for pseudo-static conditions. All configurations modeled as part of these analyses meet this factor of safety.

Backfill will occur from the bottom upward. Material will be placed in lifts according to the predominant material type within the lift (either greenstone overburden or suitable surplus soil). Adequate compaction will be achieved by truck and dozer traffic, as the lifts are advanced.

The final backfilled surface will slope at 2 percent toward the east end of the south wall, which is the lowest area of the surrounding topography.

See Appendix G-3, “North Quarry Backfill Geotechnical Evaluation,” for details of the fill stability evaluation.

3.8.4 Backfill Materials

The North Quarry will be backfilled to 990 feet msl to ensure a pit lake is not present at reclamation. Since 2012, a significant amount of additional data has been developed, derived from the numerous and intensive regulatory-driven investigations and other data-gathering exercises. These investigations were performed to further evaluate the stockpiled materials, groundwater, and surface water. Based on these data, and in consideration of WDR mandates, using the WMSA as the sole source of backfill (as scheduled in the 2012 reclamation plan) is not the most environmentally preferable option for backfilling the North Quarry, as described in detail in Appendix H, “Hydrologic Investigation.” Instead, the primary use of other supplemental earth materials is expected to provide an environmentally superior solution that will lead to better certainty for compliance with water quality–related mandates and reduce the potential need for additional controls/mitigation measures for final closure. The supplemental earth materials include nonlimestone overburden generated by the proposed mining and imported fill generated from off-site sources.

The characterization of nonlimestone indicates that these materials are suitable for use as backfill material pending approval by the RWQCB. However, sources of nonlimestone materials are limited, and insufficient quantities of nonlimestone will be produced from mining operations to backfill the entire North Quarry. Backfilling the quarry using surplus soil from regional construction projects would be beneficial to long-term water quality. The use of imported fill will be superior because the type and chemical composition of the backfill material can be specified to ensure water quality impacts are minimized during placement and once North Quarry dewatering activities cease and groundwater levels are restored. By doing so, attainment with WQOs and the WDR mandates can be achieved with greater certainty, with limiting interim impacts, and in an expedited time frame.

An imported soils management plan will be developed for approval by the RWQCB to govern the procurement and placement of the imported fill and outline a systematic approach for acceptance of the

material. The management plan will meet acceptance criteria based on RWQCB environmental screening levels and potential exposure pathways and will outline the required geotechnical and geochemical characterization of the material before selection, acceptance, and placement to ensure the quality of the material. The material will not contain construction debris, asphalt, or other potential contaminants that could adversely affect water quality. Further, pursuant to the closure plan required by the WDRs, the expected outcomes will be monitored, verified, and reviewed by the RWQCB and, informationally, by other regulatory agencies.

3.8.5 Off-Road Haul Routes for Construction Aggregate Materials

The locations of the Rock Plant Haul Road and Utility Road are shown on Figure 6. The details of the preliminary design for the haul road and the details of the existing utility road are provided in Appendix G-5, "Rock Plant Haul Road and Utility Road Geotechnical Evaluations."

The utility road would be reclaimed by flattening the slope and narrowing the roadway, which would then be retained following mining operations to provide long-term access by public utilities and for property maintenance and an additional emergency access. Drainage improvements that convey surface water from the utility road to the existing system of surface water controls at the rock plant area will be maintained. A geotechnical evaluation of the slope stability was completed for both the cut and fill slopes.

The minimum acceptable factors of safety for the analyses are 1.3 for static conditions, and 1.0 for pseudo-static conditions, consistent with industry practice. The slope stability results indicate that the cut and fill slopes are stable (FOS>1.0) during both the static and pseudo-static conditions.

The Rock Plant haul road will connect adjacent properties and is a property improvement that will therefore remain following reclamation of this area and the overall quarry. The roadway is located on private properties and is not intended for public use. Long-term safety is integrated into the engineered design for stability. A geotechnical analysis has been completed to ensure stability of the final cut and fill slopes. The slope stability results present the minimum factors of safety for each analysis, and these results are included in Appendix G-5. The factors of safety are greater than 1.0 during both the static and pseudo-static conditions.

3.9 Hydrology and Water Quality

The hydrostratigraphy of the North Quarry area consists of a heterogeneous groundwater system within low to moderately permeable greenstone, limestone, and graywacke. Groundwater flow generally mimics surface topography, with recharge occurring at higher elevations and prominent ridges, and discharge occurring in low-lying areas, streams, and in the North Quarry. Groundwater flow is preferentially within the more fractured and rigid limestone blocks, but the limestone is limited in extent and compartmentalized, resulting in a groundwater flow system that is overall controlled by limited groundwater recharge, because of the climatic conditions and overall movement through the less permeable greenstone. Groundwater flow is under a downward component of hydraulic gradient below the hillsides and an upward component of hydraulic gradient in the valley bottoms.

Annual recharge to the groundwater system is estimated to range between 2 to 8 inches and is primarily from the infiltration of precipitation, but also locally from infiltration of surface runoff. Areas with flatter slopes or areas in topographic lows receive more recharge than steeper topographical areas; this is because there is more runoff in areas of steeper slopes and more run-on in flatter areas. Runoff from the steeper slopes may also accumulate in local topographic depressions, resulting in localized increased infiltration.

Groundwater discharges to surface water bodies, such as Permanente Creek and its tributaries, where the groundwater table intersects ground surface. Areas of discharge are southeast of the existing North Quarry, where the groundwater intercepts Permanente Creek in the topographically low areas. Groundwater discharge to streams typically sustains base flow in the dry season.

The regional-scale direction of groundwater flow is interpreted to be from southwest to northeast from the topographic high at Black Mountain toward the Santa Clara Valley. Groundwater flow is predominantly controlled by local- to intermediate-scale systems, linking recharge in topographically higher areas to discharge within adjacent or nearby topographically lower areas. Based on the higher hydraulic conductivity in the limestone compared to the greenstone and unweathered graywacke, groundwater flow is preferentially within the more permeable limestone units comprising the Franciscan Formation. However, because the limestone units are of limited extent (truncated by greenstone and graywacke), the overall groundwater flow system is controlled by faults, the limited groundwater recharge, and the lower hydraulic conductivity units.

Groundwater flow in the WMSA is controlled by the prestockpile surface topography and the two main ridges that formed the side canyon prior to the placement of the overburden material in the WMSA. The predominant ridgeline that runs from west to east acts a groundwater divide just to the north of the WMSA. Groundwater south of this ridgeline flows to the south and southeast toward Permanente Creek and follows the former canyon drainage axis. The southwestern ridge, which forms the southern WMSA boundary, acts as another divide to flow. Groundwater was not encountered in the overburden material within the WMSA when the monitoring wells were installed in 2015. Groundwater near the North Quarry either flows toward and into the North Quarry or into local drainages, depending on the geometry of the local surface topography relative to the quarry. It is inferred that with greater depth, the influence (hydraulic gradient) of the local surface topography dissipates, and the influence of the hydraulic sink associated with the North Quarry increases, resulting in a transition of groundwater flow controlled by local surface topography to groundwater flow controlled by the North Quarry.

Appendix H provides an overall characterization of the current hydrologic conditions at the quarry, including surface water and groundwater quality, and an evaluation of potential changes to these hydrologic conditions associated with mining and reclamation activities.

3.9.1 Water Quality Protection

Surface water flow during mining is shown on the mine plan (Figure 6 and Sheet 2). Appendix I, "Drainage Report," provides contains drainage analyses of postreclamation flow rates from the backfilled North Quarry, WMSA, and Rock Plant Reserve. The drainage report also contains analyses for temporary desiltation basins that will capture storm runoff from the combined North Quarry/WMSA and the Rock Plant Reserve.

SMARA water quality goals and performance standards are regulated under the State Water Resources Control Board (SWRCB) via WDRs, and therefore, the WQOs will meet or exceed SMARA requirements and will be in place beyond closure under SMARA.

In addition, the activities described in this reclamation plan are designed to control surface runoff to protect surrounding land and water resources in accordance with the Porter-Cologne Water Quality Control Act, the federal Clean Water Act, and other applicable federal, state, and local requirements. These goals are achieved through a series of best management practices (BMPs) pursuant to the storm water pollution prevention plan (SWPPP). Drainage and erosion controls apply at all stages of operation and reclamation and are designed to exceed at least the 20-year storm event. The SWPPP covers existing operations on-site. Sediment basins (known as "ponds") provide stormwater detention and sediment control over the property. Basins are maintained according to the site's SWPPP and applicable National Pollutant Discharge Elimination System (NPDES) permits. The WDRs and SWPPP are under separate permitting authority and are not included in this reclamation plan.

North Quarry and Backfill

Backfill material will primarily consist of nonlimestone and imported fill. As described in Appendix H,, the North Quarry water level will be managed during backfilling to ensure placement can occur under dry conditions. Water quality in the reclaimed North Quarry will primarily depend on the interaction of stormwater runoff with materials that remain exposed above the water level and the long-term water quality associated with the backfill materials (See Appendix H, Section 2.3.2).

During backfilling, water will be contained within the North Quarry and not discharged to Permanente Creek without being processed through the final treatment system because groundwater flow will be inward to the quarry. As the North Quarry is flooded and reducing environments (where reactions involving the transfer of electrons occur) are reestablished, deep groundwater in the backfilled quarry is anticipated to have the water quality of regional groundwater (See Appendix H, Section 2.3.2).

Shallow groundwater quality (i.e., the pore water in the upper portion of backfill material that is influenced by infiltration from the surface) may vary seasonally as inflows change. Some features of the North Quarry that influenced water quality during operations and reclamation will have less of an influence on water quality in the postreclamation period. Cement-grade limestone minerals present mainly on the northern portion of the North Quarry walls above the final groundwater elevation (i.e., limestone in the exposed highwall estimated to cover approximately 33 acres of the North Quarry catchment area) are expected to continue to be a source of sulfate and metal loading to water after backfilling, and after the water level reaches 990 feet msl. This surface water will run down the quarry walls and infiltrate the backfill material to mix with the North Quarry water (i.e., groundwater in the backfill material). Where vegetated soil covers are established, the peak runoff flow rates will be substantially lower than in the operational period, and the quality of the runoff is expected to improve because of reduced exposure and attenuation of runoff and metals, sulfate, and other constituents. Once the North Quarry is backfilled and groundwater returns to regional groundwater levels, selenium concentrations in the North Quarry water are predicted to be less than 5 micrograms per liter (µg/L) (see Appendix F in Appendix H). Treatment is currently required for water discharged from the North Quarry to Permanente Creek to meet water quality standards for selenium. Once the proposed backfilling project is complete, or geochemical conditions allow, Lehigh can evaluate ceasing active water treatment for this area.

WMSA

As provided in Appendix H, Section 2.4, WMSA materials in their present state do not appear to be significantly affecting groundwater quality under the WMSA, based on post-2012 investigations and monitoring. Data collected demonstrates that the WMSA was placed at grade (thus, not in direct contact with groundwater), and the overburden is largely dry. Much of the material has been buried at depth for many years and is exposed to limited oxygen, thus reducing the occurrence of sulfide oxidation and selenium mobilization via water contact. Much of the overburden material appears to be unexposed to the wet-dry cycle that tends to maximize the generation of selenium. While certain areas, mainly in more recently disturbed overburden, show elevated concentrations of selenium, these areas are localized and can be managed through regrading, removal, or capping of surface materials to protect water quality.

Selected portions of the WMSA will be regraded and the entire area will be covered to ensure nonlimestone material is present at the surface to reduce the potential for selenium or other constituents to become entrained in stormwater. At reclamation, stormwater will no longer be directed to the North Quarry, but instead to Permanente Creek, because runoff is anticipated to be similar to the values observed at the EMSA. Low levels of selenium (i.e., less than 5 µg/L) have been measured in the majority of samples collected from the EMSA. These samples were taken from areas where water collected on the surface or in runoff samples that had contacted the nonlimestone cover, which demonstrates that runoff in contact with the cover material will not generate elevated levels of selenium.

Based on the groundwater monitoring program and material characterization, there appears to be limited groundwater areas within the WMSA that are impacted from the material placement. In undisturbed areas within the WMSA, groundwater quality generally meets water quality standards. Portions of the WMSA remain the subject of ongoing testing and investigation under the WDRs and are expected to be addressed through approval of the final closure plan. The water quality protection measures for this area will be developed and approved through the preliminary and final closure plan process mandated by the WDRs and the amended reclamation plan, which is expected to mirror the work that will be implemented under the WDRs to achieve final closure.

Siltation and Pollutants

The quarry's surface water discharges, including stormwater, are subject to discharge requirements and NPDES permits. The current NPDES permit prohibits any discharges related to process water, except through a single, treated, discharge point (Discharge Point 001, Pond 4A), such that all remaining discharge points comprise stormwater and/or authorized nonstormwater. A monitoring and reporting program (MRP) is part of the NPDES permit. The NPDES permit includes requirements for the SWPPP and an annual report.

The SWPPP specifies responsible persons and describes the facility, potential pollution sources, BMPs, source control, monitoring, and reporting. BMPs include measures such as scheduling activities to limit exposure of disturbed soil, preserving existing vegetation, hydroseeding, applying geotextiles and mats, slope protection, compost blankets, and soil binders.

Temporary BMPs will be installed on-site postreclamation until the vegetation is established. The BMPs include desiltation basins, which have been sized based on the SCVURPPP and SWRCB guidelines. As a result, the site has been designed for both the required design and water quality flow rates and meets SMARA's current standards (CCR, Title 14, Section 3706) for erosion and sediment control. The BMPs will be updated as needed to meet water quality standards reported to the RWQCB at reclamation and for final closure. Internal travel routes, access roads, or ramps specifically developed for mining and unnecessary for postmining land use will be inspected for road-base materials and petroleum or lubricant spill residue. If present, this material will be removed before soil decompaction and revegetation.

Fertilizers and Amendments

Fertilizers may be used sparingly on soils which support native plants. Manufacturers' directions for use, storage, and disposal are followed to ensure their safe use.

Stockpile BMPs

The following BMPs are implemented as necessary to minimize water and wind erosion related to stockpiled materials:

- Run-on and stormwater generated from within the facility is diverted away from all stockpiled materials.
- Fiber rolls or straw wattles can be installed surrounding the entire outside perimeter of the disturbed soil area as well as surrounding stockpiles. Fiber rolls should be placed along the toe, top, face, and at grade breaks of exposed and erodible slopes to shorten slope lengths and spread runoff as sheet flow Fiber rolls, should not include any synthetic component because of this material's potential adverse impact to wildlife.
- Temporary stockpiles are stabilized using an appropriate combination of BMPs to cover the exposed rock material, intercept runoff, reduce its flow velocity, and provide a sediment control mechanism (such as silt fencing, fiber rolls, or hydroseeded vegetation). Standard soil stabilization BMPs include sedimentation basins, geotextiles, mats, erosion control blankets, vegetation, silt fence surrounding the stockpile perimeter, and fiber rolls at the base and on side slopes.
- Up-gradient berms are installed where cement–grade limestone fines or stockpiles are placed, to protect against stormwater run-on, and ditches and down-gradient berms are installed to promote infiltration rather than run-off.

The above descriptions of the ongoing methods to protect surface and groundwater quality are included in this reclamation plan for compliance with SMARA regulations at Section 3710(a). The NPDES permit, SWPPP, and related implementing requirements are under the jurisdiction of the RWQCB and will change as they are periodically updated, and therefore are not specifically included in their entirety in this reclamation plan. SMARA regulations reference prevailing laws and regulations for compliance and are not intended to duplicate those efforts.

3.9.2 Grading, Drainage, and Erosion Control

A drainage analysis of the postreclamation flow rates is provided in Appendix I. The majority of the postreclamation flows will be conveyed to Permanente Creek. The County's current County drainage manual indicates that new storm drain systems and channels shall be designed to convey the 10-year storm without surcharge, and a safe release shall be provided for the 100-year flow. Furthermore, SMARA states that erosion control methods shall be designed for the 20-year/1-hour storm and shall control erosion and sedimentation during operations as well as after reclamation is complete (see CCR Title 14, Section 3706). The County's drainage manual (Santa Clara County 2007) provides parameters for the 25-year storm event, but not the 20-year event. The 25-year event was analyzed in this report to satisfy the requirements for the 10- and 20-year events. Since the 25-year event is greater than these two events, the 25-year results will provide a greater factor of safety in the drainage design. The 100-year event was also analyzed in accordance with the County's drainage manual criteria. The analysis completed indicates an overall decrease in the discharge volumes from the reclaimed site will be reduced under this reclamation plan amendment for both the 25- and 100-year existing condition flow rates. Reclamation of the North Quarry will ultimately fill the quarry, so reclamation will eliminate the precipitation capture occurring during operations and reestablish surface runoff to Permanente Creek. The Federal Emergency Management Agency (FEMA) has established an existing condition 100-year flow rate in Permanente Creek, below the site, and delineated the associated floodplain. Hydrologic analyses performed demonstrates that the postreclamation condition will not adversely increase the FEMA 100-year flow rate nor the floodplain. Therefore, the project will not increase the risk of downstream flooding as defined by FEMA.

The analyses also included consideration of temporary desiltation basins that will capture storm runoff from the combined North Quarry/WMSA and the Rock Plant Reserve. The basins, and other interim erosion control measures, will be used until the vegetation establishes. The desiltation basins have been sized according to criteria from the SWRCB and SCVURPPP.

The following specific methods will be used to control erosion:

Revegetation

- Seed mixes include rapidly establishing annuals to provide interim erosion control until such time that the surfaces may be reclaimed with permanent plants for the approved end use.
- Revegetation will be sufficient to stabilize the surface against the effects of long-term erosion and is designed to meet the postmining land use goals (see Appendix F).

Settling Ponds

- Temporary desiltation basins will capture storm runoff from the combined North Quarry/WMSA and the Rock Plant Reserve. The basins will be used until the vegetation establishes. The desiltation basins have been sized according to criteria from the SWRCB and SCVURPPP.

Erosion and sedimentation will be controlled during reclamation and closure to minimize off-site siltation.

Monitoring

The facility's surface water discharges, including stormwater, are subject to discharge requirements and NPDES permits. In accordance with the SWPPP, an inspection for erosion of slopes, drainage channels, and unpaved areas at the facility is completed after each significant rain storm. Conditions and maintenance will be recorded and the appropriate remedial measure identified as part of an annual monitoring report. The SWPPP is required to be revised and implemented before specific changes in industrial activities, as specified by the NPDES General Permit.

Sedimentation basins will be maintained until areas of disturbance are revegetated sufficiently to provide for self-sustained erosion control, based on the revegetation monitoring. Following

completion of revegetation and demonstration that surface erosion control is effective, siltation basins will be allowed to accumulate silt and revegetate naturally. Postreclamation monitoring and reporting to the RWQCB will ensure that discharge is functioning properly and not causing off-site sedimentation.

3.10 Fish and Wildlife Habitat and Protection Measures

3.10.1 Biological Setting

The majority of the site surface disturbance that occurred before SMARA and environmental regulation existed. The extent of mining planned at this time, under this reclamation plan, is shown in Figure 6 and Sheet 2. The southern portion of the site is predominantly undisturbed, apart from limited areas of past exploration.

The biological communities on the property, but located outside of the reclamation plan boundary, are documented in Appendix J, "Biological Resources," Biological communities were classified based on specific vegetation alliances observed within each community. Twenty (distinct biological communities are located on the Permanente property. Nonsensitive biological communities include: (1) ruderal herbaceous grassland, (2) mixed scrub, (3) northern mixed chaparral, (4) chamise chaparral, (5) oak chaparral, (6) poison oak scrub, (7) nonnative annual grassland, (8) California bay forest, (9) California buckeye woodland, (10) rock outcrop, (11) revegetated areas, (12) active quarry, (13) disturbed areas, and (14) settling ponds and operational water features. Sensitive biological communities include: (15) wetland, (16) willow riparian forest and scrub, (17) sycamore alluvial woodland, (18) white alder riparian forest, (19) oak woodland, and (20) streams and ponds. The locations and extent of these communities is shown in Appendix J (Figures 2a, 2b, 2c, and 2d). Nonsensitive habitat would be removed for development of the North Highwall Reserve and the Rock Plant Reserve areas. Remaining areas will remain unaffected by mining and reclamation activities under this amended reclamation plan.

3.10.2 Sensitive Avian Species

Potentially suitable foraging and/or nesting habitat for several special-status birds is present throughout oak woodland/forest, scrub, and chaparral communities, including white-tailed kite, olive-sided flycatcher, and yellow warbler; white-tailed kite is the only species with potential to nest. All of these species, except white-tailed kite, are California species of special concern; white-tailed kite is a fully protected species.

In addition to special-status species, nests of nearly all other native birds are protected by the Migratory Bird Treaty Act and California Fish and Game Code. Many common bird species are likely to occur and could nest in the study area, such as acorn woodpecker (*Melanerpes formicivorus*), Nuttall's woodpecker (*Picoides nuttallii*), California quail (*Callipepla californica*), and mourning dove (*Zenaida macroura*). To avoid affects during the breeding season, the following measures would be implemented in consultation with a qualified ornithologist:

Preconstruction Surveys: Ground disturbance into undisturbed areas and vegetation (tree and shrub) removal would be planned to avoid the breeding season for most bird species. If such clearing would occur during breeding season, preconstruction surveys will be performed.

Use of Buffers to Avoid Nests: If preconstruction surveys determine that active nests are found close enough to the land clearing and tree removal area, the ornithologist will determine a construction-free buffer zone to be established around the nest to prevent nest abandonment and direct mortality.

3.10.3 Bats

Habitats within the study area have the potential to support roosting special-status bat species, including western red bat and pallid bat. These species are known to roost in tree cavities, under exfoliating bark (particularly the pallid bat), and in tree foliage (particularly the western red bat). Oak woodland/forest habitat nearby contains marginally suitable roost sites for these bats.

Tree removal associated with initial site preparation and mining could directly affect roosting bats, and elevated sound levels from heavy equipment could cause adult bats to abandon maternity roosts. To avoid adverse effects, the following measures will be implemented:

Nonroosting 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 will be planned in September and October to avoid impacts to bat maternity or hibernation roosts. 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. Active roosts identified during surveys will be protected by a minimum buffer determined by a qualified bat biologist.

Hibernation Season: During the November 1 to March 31 hibernation season, new work will not be planned within 100 feet of woodland habitat unless a qualified bat biologist determines that woodland areas do not provide suitable hibernating conditions for bats and that they are unlikely to be present in the area.

Maternity Season Emergence: 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.

3.10.4 San Francisco Dusky-Footed Woodrats

San Francisco dusky-footed woodrats are known to nest in vegetated areas of the Permanente property and have potential to nest or otherwise occur in oak/woodland forest, scrub, and chaparral habitats. Vegetation removal and grading associated with initial site preparation and mining activities could directly affect dusky-footed woodrats. Direct impacts associated could include injury or mortality of adults or young, and destruction of woodrat stick nests. To avoid adverse effects, the following measures will be implemented:

Preconstruction surveys: Before initial ground disturbance in woodland or scrub/chaparral communities, preconstruction surveys for active woodrat stick nests will be completed. Stick nests discovered 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 will be placed back on the nest and remain for young to have enough time to mature and leave.

Other measures: Trash and food waste will be disposed of in proper waste receptacles and emptied on a regular basis to reduce indirect impacts from attracting urban-adapted predators. Additionally, quarry personnel, contractors, and visitors will not feed wildlife.

3.10.5 California Red-legged Frog

California red-legged frog (CRLF) is a medium-sized frog with reddish-colored legs. The species is generally restricted to riparian and lacustrine habitats in California and northern Baja California. In response to a significant decrease in the historic range of the CRLF, USFWS listed the subspecies as threatened in 1996. CRLF prefer deep, quiet pools in creeks, rivers, or lakes below 1,500 meters in elevation. Habitat requirements include fresh emergent or dense riparian vegetation, especially willows adjacent to shorelines. CRLF can survive in seasonal bodies of water that are dry for short periods if a permanent water body or dense vegetation stands are nearby; rodent burrows and grasslands provide upland aestivation habitat.

Numerous surveys have been conducted for CRLF on the Permanente property. CRLF were first discovered on the Permanente property in September 1997. The results of the surveys show that CRLF consistently occupy limited areas of lower Permanente Creek and appear to be present in Monte Bello Creek. Protocol surveys conducted in 2007 concluded that CRLF were present in Ponds 14, 21, and 22 along the creek. No CRLF were found in any other sedimentation basin on the Permanente property. Most recently, CRLF were observed to successfully breed in Ponds 14 and 21. Upstream of the occupied ponds, aquatic breeding habitat is generally not present on the Permanente property because of lack of

deep slack-water pools and lack of upland habitat within the active quarry. CRLF are unlikely to occur in the active quarry or in heavily disturbed portions of the Permanente Property because of a lack of cover, exposure to predation, and frequent vehicle traffic.

3.10.6 Stream and Wetland Protection Measures

Section 404 of the Clean Water Act (1977, as amended) requires a permit for discharge of dredged or fill material into waters of the United States. Under Section 404, areas such as wetlands, rivers, and streams (including intermittent streams and tributaries) are considered waters of the United States. The extent of wetlands is determined by examining the presence of hydrophytic vegetation, hydric soils, and wetland hydrology. Under normal circumstances, all three of these parameters must be satisfied for an area to be considered a jurisdictional wetland under Section 404 of the Clean Water Act. Fill within wetlands is regulated under the Clean Water Act through a Nationwide Permit Program and an Individual Permit Program.

Drainages and seasonal wetland are subject to RWQCB jurisdiction under the Porter-Cologne Act. All on-site ephemeral drainages are also subject to California Department of Fish and Wildlife (CDFW) jurisdiction (California Fish and Game Code Section 1602).

Five sensitive habitat communities are located within the reclamation plan boundary: wetland, willow riparian forest and scrub, white alder riparian forest, oak woodland, and streams and ponds. No designated or proposed critical habitat or natural communities of special concern are present on or adjacent to the Rock Plant Reserve site. Regarding the new disturbance area of the North Highwall Reserve, no wetlands, waters, or riparian habitats under U.S. Army Corps of Engineers (USACE), RWQCB, or CDFW jurisdictions occur.

The Rock Plant Reserve footprint includes ephemeral drainages and an isolated seasonal wetland that will likely require an agreement with CDFW under California Fish and Game Code Section 1602. No other features that qualify as federally or state-protected wetlands, subject to jurisdiction of USACE, RWQCB, or CDFW, are present in the planned mining areas. No mining or reclamation activities have the potential to adversely affect wetlands.

4. RECLAMATION

The following sections describe the end use and approach, including soil treatment, revegetation, monitoring and maintenance, weed abatement, and other closure activities. Reclaimed conditions for the site are shown in Figure 11, “Reclamation Plan,” and Figure 12, “Reclamation Plan Cross Sections,” (and corresponding Sheets 4 and 5). Reclamation conditions for the PCRA component of the property are shown in Figure 13, “Permanente Creek Restoration Area and Reclamation Area.”

4.1 Reclamation Plan and Surface Treatment

4.1.1 Subsequent Use and Approach

The Permanente property is extensive, encompassing nearly 5.5 square miles. The applicable County (and City of Cupertino) zoning designations provide for a broad range of uses, and additional uses are allowed with use permit permission (see Table 2). The end use at the completion of mine reclamation is open space.

Aside from meeting each of SMARAs reclamation performance standards, the overall goal of reclamation at this site is to control erosion and facilitate revegetation that will mature to reduce aesthetic contrasts where viewed from off-site locations.

4.1.2 Land Use Impacts

Mining and reclamation at Permanente Quarry would affect approximately 631 (not including the PCRA) of 3,510 acres. Mining has occurred such that views of the quarry from northerly urbanized areas have

been effectively restricted; reclamation is designed to further reduce aesthetic contrasts. No effects of reclamation are identified under this plan that would restrict the uses of surrounding properties as provided under their applicable zoning.

4.2 Soil

The following subsections cover how soil will be handled for reclamation (e.g., amendments, resoiling, and compaction).

4.2.1 Soil Amendments

The objective of this plan is to meet revegetation objectives using the entirety of available on-site topsoil. To the extent that topsoil blending is necessary to enhance the amount of growth media available to achieve growth targets, certain soil preparation strategies have been developed. Soil preparation in the majority of the site will involve preparing the overburden rock as well as incorporating soil and topsoil materials and soil amendments as needed to provide suitable plant growth media for revegetation activities. Different soil treatments may be used for the various portions of the site, depending on the target plant community and general aspect and substrate of each area. The soil blending materials used will not include limestone materials. See Section 3.4, "Soil Blends," of Appendix F for a menu of soil amendment options that can be used strategically during reclamation." Recommendations provided in Appendix F may be implemented at the operator's discretion to meet the performance objectives.

4.2.2 Resoiling

The conditions of this site limit the conventional SMARA regulation approach to soils salvage and redistribution. Detailed investigations have been undertaken to address the different surfaces and the materials that may be available to develop growth media capable of meeting reclamation objectives. The revegetation plan therefore provides options for the operator to employ. Existing stockpiles of topsoil, new topsoil generated during new mined surfaces, and potentially imported fill will be incorporated with the top layer of overburden rock when present to improve soil conditions. However, the majority of quarry surfaces have long been established, and new disturbance areas, which contain salvageable topsoil and vegetation, namely the North Quarry highwall lay-back area and the Rock Plant Reserve, are limited to approximately 50 acres. The overburden rock substrate and potential soil materials are characterized as follows:

Overburden Rock: The results of soil analysis indicate that the overburden rock alone is not an ideal substrate for certain plant communities. The U.S. Department of Agriculture classification for the overburden rock is a gravelly sandy loam with a diverse distribution of particle sizes. With this varied distribution of particle sizes, the susceptibility to consolidation is high. Given its rocky texture and low organic content, the overburden rock would benefit from the addition of topsoil and/or organic amendments. Blending stockpiled overburden rock with topsoil and other materials is a consideration for improving texture and nutrient content.

Native Topsoil: The planned new areas of mining at the lay-back area for ridgeline stabilization and the Rock Plant Reserve, where topsoil salvage and vegetation salvage and chipping may occur, is limited to approximately 50 acres, producing little soil for overall site reclamation. Undisturbed topsoil samples described above represent native soil conditions found within the footprint of planned North Quarry Reserve and Rock Plant Reserve surfaces.

North Quarry Fine Greenstone: The North Quarry fine greenstone material may be left in place or harvested from a slope failure occurring in the North Quarry if layback of the northern slope is implemented as part of mining and reclamation operations. This material contains coarse sands with high gravel content, and, similar to the overburden rock material, is susceptible to consolidation. Creating a homogeneous blend with this material may be difficult to achieve on the broad scale required.

Rock Plant Fines: The Rock Plant fines material is a by-product of the rock processing activities at the quarry. It has a clay loam texture and contains a substantially greater amount of silt and clay compared to the overburden rock. The Rock Plant fines material has relatively low organic matter content (1.4 percent). Blending the Rock Plant fines material with the overburden rock may improve soil texture conditions. However, based on efforts to create soil blends by the Soil & Plant Laboratory, creating a homogeneous blend with this material may be difficult to achieve on the broad scale required. The Rock Plant fines material has high moisture content and would have to be dried before it is incorporated with the other soil materials. Only nonlimestone fines would be used for revegetation purposes, to address water-quality considerations.

Imported Soils: Under the current plan, the North Quarry will be backfilled with greenstone overburden (generated on-site) and imported surplus construction soil that meets site-specific acceptance criteria. Potential sources of this material will be evaluated for contamination and testing for pesticides, salts, and other impediments to plant growth. To augment growth media, imported surplus construction soil with higher organic matter content than on-site materials may also be used in revegetation.

Based on investigations of native soils and the planting palette and considering the available and potential materials to develop a planting substrate, the soil preparation depth for areas targeted for scrub planting over the majority of the surfaces is 6 inches, a depth tested in the test plots and considered suitable to support most shrub and grass species to be seeded. This target could include 50 percent ripped overburden rock mixed with 50 percent topsoil blend. Preliminarily, this could include 3 inches of loamy topsoil, which would be amended with other materials to achieve the 6-inch planting medium. In practice, the exact percentages of the blend may be altered based on topsoil and fill availability.

The tree and shrub plantings on highwall benches will require a deeper planting substrate, such as 12 inches, to support root establishment. Similar to the reclaimed slopes, the ideal planting substrate could consist of 50 percent overburden rock with a 50 percent topsoil blend amendment. Preliminarily, this could include 6 inches of pure topsoil, to be amended with other materials to achieve a 12-inch planting medium. The exact percentages of the combination may be adjusted in future reclamation efforts based on test plot results and material availability. These topsoil quantities were chosen based on the results of test plot monitoring. Test plots with thicker soils (up to 24 inches) were consistently overrun by undesired annual grasses.

4.2.3 Compaction

Compaction is not required for reclamation to open-space end uses but is employed as a matter of quarry practice. Before the incorporation of topsoil or other soil-building materials, the upper layer of the overburden rock and compacted substrates, when present, should be ripped, disked, or otherwise broken up to loosen the material to facilitate topsoil blending and seed and plant establishment.

4.2.4 Soil Stabilizing Practices

The addition of various types of bonded fiber mulches is an available option for blending with seed mixes that could contribute to both plant growth and soil stabilization. Soil-bonding agents are also added to the fiber mulches to provide erosion control.

4.3 Revegetation

Revegetation will establish a self-sustaining vegetation cover that will, over time, control erosion, prevent off-site sedimentation, and attenuate visual contrasts where mined surfaces are visible from off-site locations. Use of native shrubs and trees will assist in blending surfaces into the surrounding landscape. Revegetation efforts are planned to be implemented in stages following completion of each stage of growth media placement. Planting and maintenance should be conducted using an adaptive management approach, based on revegetation test plots. The seed mix shown in Table 4, “Erosion Control Seed Mix,” includes species that have proven successful in other revegetation efforts on the site and is intended for initial establishment of grasses and herbaceous species as needed in temporarily disturbed areas.

TABLE 4
EROSION CONTROL SEED MIX

Scientific Name	Common Name	Pure Live Seed *(lb./acre)*
Bromus carinatus	California brome	16.00
Elymus glaucus	blue wildrye	10.00
Lupinus nanus	sky lupine	5.00
Stipa pulchra	purple needlegrass	8.00
Plantago erecta	California plantain	3.00
Trifolium willdenovii	tomcat clover	3.00
Festuca microstachys	three weeks fescue	8.00
	Total	**53.00**

4.4 Seeding

Contoured surfaces would be amended as necessary and covered with grass, herb, and shrub species via seeding either bulk seed or through hydroseeding over the areas to be revegetated. Drainage ditches and access roads will be left bare until the completion of the contouring and slope seeding, at which time roads will be ripped and revegetated. The small area of steep benches on quarry highwalls will not be recontoured, but they will be seeded. Appropriate native seed mixes for reclamation are listed in Table 5, "Preliminary Species for General Seeding," and were developed from the test plots.

TABLE 5
PRELIMINARY SPECIES FOR GENERAL SEEDING

Scientific Name	Common Name	Pure Live Seed *(lb./acre)*	Bulk Seed *(lb./acre)*
SHRUBS			
Artemisia californica	California sagebrush	1.4	16
Baccharis pilularis	coyote brush	0.2	20
Eriogonum fasciculatum	California buckwheat	1.0	20
Salvia leucophylla	purple sage	0.7	2
Salvia mellifera	black sage	1.1	3
GRASSES AND HERBS			
Achillea millefolium	yarrow	1.7	2
Artemisia douglasiana	mugwort	0.1	1
Bromus carinatus	California brome	4.6	6
Elymus glaucus	blue wildrye	4.6	6
Eschscholzia californica	California poppy	1.2	2
Heterotheca grandiflora	telegraph weed	0.2	1
Acmispon americanus var. americanus	Spanish clover	0.7	1
Acmispon glaber	deerweed	1.5	2
Lupinus nanus	sky lupine	0.8	1
Melica californica	California melic	1.3	2
Stipa pulchra	purple needlegrass	2.9	4
Poa secunda	one-sided bluegrass	1.3	2
Trifolium willdenovii	tomcat clover	1.4	2
	Total	**26.7**	**93**

Though all revegetation areas will be revegetated to meet performance criteria, key areas on ridgelines visible from surrounding communities are provided additional consideration to reach performance criteria more quickly to blend in with vegetated surroundings. These techniques may include tools such as irrigation when practical, enhanced growth media application (such as using soil islands with deeper soil depths or elevated levels of organic components), emphasis on hydroseeding over broadcast seeding, and higher densities of container plantings.

Areas within the PCRA at the foot of slopes adjacent to the Permanente Creek Restoration Area will reflect the seed mix of the latter, as provided in Appendix F-2, "PCRA Revegetation Specifications," and in Table 6, "PCRA Floodplain Planting Area Seed Mix."

TABLE 6
PCRA FLOODPLAIN PLANTING AREA SEED MIX

Scientific Name	Common Name	Application Rate (Pure Live Seed Pounds/Acre)
Bromus californica	California brome	10.0
Elymus glaucus	blue wildrye	8.0
Elymus triticoides	creeping wildrye	6.0
Festuca microstachys	small fescue	8.0
Hordeum brachyantherum	meadow barley	6.0
Sisyrinchium bellum	blue-eyed grass	1.0
Stipa pulchra	purple needlegrass	5.0
Trifolium willdenovii	tomcat clover	4.0
	Total	**48.0**

4.5 Trees and Shrub Plantings

Trees and shrubs will be planted as container plants or seeds in the revegetation areas. Tree and shrub container plantings will occur on the benches where a deeper layer of topsoil and/or soil-building materials is applied to ensure adequate space for root development. To the extent practical, trees and shrubs to be planted will be generated from seeds collected from the quarry property or from local sources. Shrubs should be planted at approximately 4.5-foot spacing and trees at 9-foot spacing in the designated planting areas. The remaining slopes and benches will be covered with shallower topsoil and/or soil-building materials and seeded with a grass/herb/shrub seed mix, without containerized tree and shrub plantings.

The north-facing benches of the Rock Plant Reserve can support a wider variety of tree and shrub species because they have less solar radiation and higher soil moisture. These north-facing benches will be revegetated with oak-dominated plantings along with the seeding treatment. The oaks will be a mixture of acorn and container plantings. East-facing benches of the North Highwall Reserve will be planted with approximately 75 percent grey pine (*Pinus sabiniana*), a native tree species that is tolerant of drier conditions, along with approximately 25 percent other native tree and shrub plantings common to oak woodland habitats. The need for herbivory protection for specific species can be evaluated based on the results of initial plantings. Weed mats or several inches of mulch may be placed around planted trees and shrubs to reduce competition and retain moisture.

This plan is designed to provide appropriate conditions for planting so it is not dependent on irrigation. A preliminary list of trees and shrubs to be planted on benches is provided in Table 7, "Preliminary List of Trees." Species selection and numbers will depend on propagule collection and availability.

TABLE 7
PRELIMINARY LIST OF TREES

Scientific Name	Common Name
Arbutus menziesii	Pacific madrone
Pinus sabiniana	grey pine
Quercus agrifolia	coast live oak
Quercus douglasii	blue oak
Cercocarpus betuloides	mountain mahogany
Heteromeles arbutifolia	toyon
Quercus berberidifolia	scrub oak

Scientific Name	Common Name
Rhamnus californica	coffeeberry
Ribes californicum	hillside gooseberry

See Section 4.5.4 regarding sudden oak death.

4.5.1 Vegetation Timing

Seeding would be performed and completed between September 1 and December 1 to take advantage of warm soil temperatures and winter rains for successful germination and establishment. Container planting should be performed during the winter season and completed by approximately the end of January to improve plant establishment.

4.5.2 Irrigation

This plan is designed to provide appropriate conditions for native species so that they are not dependent upon irrigation. The need for irrigation during initial establishment will be assessed during the adaptive management reclamation efforts. By planting a large number of acorns without irrigation, a more drought-tolerant stand of oaks may be established, increasing the chances of their survival. However, if monitoring during the first 5 years of the early revegetation stages indicates significant losses of plant material that threatens achievement of performance standards, the need for irrigation will be reevaluated.

4.5.3 Revegetation Baseline

A test plot program was completed to determine the seed and plantings needed to meet the revegetation goals. Details of the program design and results are available in Appendix F. Reference data values for percent cover and density of trees and shrubs describe mature woody communities that have not seen significant disturbance in decades. While the target plant communities of the revegetation areas should eventually blend with these mature communities, they cannot be expected to achieve similar characteristics over only 5 years of growth. Instead, shrub and tree planting areas are designed to mimic pioneering plant communities that will continue to develop and dominate the benches and slopes over several decades through tree growth and natural regeneration.

4.5.4 Sudden Oak Death

Indicators of sudden oak death (SOD) have been observed within the Permanente Quarry property, and many oak trees in the site area are foliar hosts of *Phytophthora ramorum*, the pathogen that causes SOD syndrome, including coast live oak and canyon live oak. Foliar hosts are thought to be an important component in spreading SOD as the pathogen can fruit (sporulate) within 1 to 3 days on infected foliage. Known or suspected hosts of *P. ramorum* are listed by the California Oak Mortality Task Force (COMTF) (2008). Species not known to be susceptible to *P. ramorum* (such as Valley oak, blue oak, and grey pine) will be more heavily represented in revegetation plantings to reduce the susceptibility of the revegetation program.

The U.S. Department of Agriculture restricts the interstate movement of certain regulated and restricted articles from quarantined areas in California to prevent the spread of *Phytophthora ramorum* (7 CFR Part 301). Within California, transport of regulated and restricted articles from quarantined counties is regulated by the California Department of Food and Agriculture (CCR 3700). Fourteen California counties including Santa Clara, are included in the quarantine. The spread of the SOD pathogen will be avoided by obtaining the necessary certificates of transport pursuant to the regulations.

4.5.5 Revegetation Success Criteria

Performance standards describe the minimum targets for species richness and percent cover. Performance standards represent anticipated conditions 5 years after installation, based on a study of reference sites in the vicinity and test plot results. SMARA requirements state that performance standards

must be met for 2 years without significant human intervention before release of financial assurances. Revegetation is intended to create appropriate surface cover of native tree and shrub habitat interspersed among grasses within 5 years of installation. Planting areas on south-facing benches would be dominated by shrubs, while planting areas on north- and east-facing benches will eventually be dominated by trees and shrubs.

Reference site data were used to develop an achievable set of performance standards. Native species richness targets have been chosen to reflect data collected from the reference sites and test plot results and then adjusted for anticipated soil surface treatments These densities and percent cover values reflect the expected growth of trees and shrubs in the first 5 years of the revegetation areas.

Shrub and tree planting areas are designed to mimic pioneering plant communities that will continue to develop and dominate the benches and slopes over several decades through tree growth and natural regeneration.

The following tables (Table 8, "Five-Year Performance Standards for Coarse Overburden Soil Treatment Areas," Table 9, "Five-Year Performance Standards for Soil Backfill Soil Treatment and Created Revegetation Islands Areas," Table 10, "Five-Year Performance Standards for General Compacted Soils Soil Treatment Areas," and Table 11, "Five-Year Performance Standards for Highwall Berm Soil Treatment Areas") summarize the performance standards.

TABLE 8
FIVE-YEAR PERFORMANCE STANDARDS FOR COARSE OVERBURDEN SOIL TREATMENT AREAS

Criteria	Oak Woodland *(north- and northeast facing benches)*		Pine Woodland *(east-facing benches)*		Seed Areas shrub/grassland mix	
	Wood Plants	*Herbs*	*Woody Plants*	*Herbs*	*Woody Plants*	*Herbs*
Richness (avg. native species per plot)**	2	2	2	2	1*	1*
Density (avg. native individuals per acre)	300	-	250	-	-	-
Canopy Cover	20%		20%		20%	

* Performance standards for seeded areas may need to be adjusted to reflect feasible 5-year results of the species mix ultimately selected based on test plot results and early revegetation efforts during the reclamation period. In particular, the balance between shrub and herbaceous species cover may vary.
** Richness standards are based on plot sizes used in reference data collection and described in this Plan: 10-meter-radius plots for trees, 5-meter-radius plots for shrubs, and 1m-radius plots for herbs/grasses.

TABLE 9
FIVE-YEAR PERFORMANCE STANDARDS FOR SOIL BACKFILL SOIL TREATMENT AND CREATED REVEGETATION ISLANDS AREAS

Criteria	Oak Woodland *(north- and northeast facing benches)*		Pine Woodland *(east-facing benches)*		Seed Areas shrub/grassland mix	
	Wood Plants	*Herbs*	*Woody Plants*	*Herbs*	*Woody Plants*	*Herbs*
Richness (avg. native species per plot)**	5	3	4	3	3*	3*
Density (avg. native individuals per acre)	470	-	345	-	-	-

Criteria	Oak Woodland *(north- and northeast facing benches)*		Pine Woodland *(east-facing benches)*		Seed Areas shrub/grassland mix	
	Wood Plants	*Herbs*	*Woody Plants*	*Herbs*	*Woody Plants*	*Herbs*
Canopy Cover	40%		40%		40%	

* Performance standards for seeded areas may need to be adjusted to reflect feasible 5-year results of the species mix ultimately selected based on test plot results and early revegetation efforts during the reclamation period. In particular, the balance between shrub and herbaceous species cover may vary.
** Richness standards are based on plot sizes used in reference data collection and described in this Plan: 10-meter-radius plots for trees, 5-meter-radius plots for shrubs, and 1-meter-radius plots for herbs/grasses.

TABLE 10
FIVE-YEAR PERFORMANCE STANDARDS FOR GENERAL COMPACTED SOILS SOIL TREATMENT AREAS

Criteria	Oak Woodland *(north- and northeast facing benches)*		Pine Woodland *(east-facing benches)*		Seed Areas shrub/grassland mix	
	Wood Plants	*Herbs*	*Woody Plants*	*Herbs*	*Woody Plants*	*Herbs*
Richness (avg. native species per plot)**	4	2	3	2	2*	2*
Density (avg. native individuals per acre)	400	-	300	-	-	-
Canopy Cover	20%		20%		20%	

* Performance standards for seeded areas may need to be adjusted to reflect feasible 5-year results of the species mix ultimately selected based on test plot results and early revegetation efforts during the reclamation period. In particular, the balance between shrub and herbaceous species cover may vary.
** Richness standards are based on plot sizes used in reference data collection and described in this Plan: 10-meter-radius plots for trees, 5-meter-radius plots for shrubs, and 1-meter-radius plots for herbs/grasses.

TABLE 11
FIVE-YEAR PERFORMANCE STANDARDS FOR HIGHWALL BERM SOIL TREATMENT AREAS

Criteria	Oak Woodland *(north- and northeast facing benches)*		Pine Woodland *(east-facing benches)*		Seed Areas shrub/grassland mix	
	Wood Plants	*Herbs*	*Woody Plants*	*Herbs*	*Woody Plants*	*Herbs*
Richness (avg. native species per plot)**	5	3	4	3	3*	3*
Density (avg. native individuals per acre)	200	-	150	-	-	-
Canopy Cover	20%		20%		20%	

* Performance standards for seeded areas may need to be adjusted to reflect feasible 5-year results of the species mix ultimately selected based on test plot results and early revegetation efforts during the reclamation period. In particular, the balance between shrub and herbaceous species cover may vary.
** Richness standards are based on plot sizes used in reference data collection and described in this Plan: 10-meter-radius plots for trees, 5-meter-radius plots for shrubs, and 1-meter-radius plots for herbs/grasses.

4.6 Monitoring and Maintenance

4.6.1 Monitoring

Monitoring must be performed to document revegetation success. Following installation, each revegetation area will be monitored as necessary to determine whether reseeding, irrigation, or soil amendments are necessary to demonstrate the performance criteria at the earliest possible time. Revegetation will be conducted in stages; therefore, monitoring of each stage will be stratified, beginning in a particular revegetation area upon completion of installation.

***Soil Surface Treatment Differentiation*:** Limitations in available topsoil volumes require that soil surface treatments differ. These soil surface treatments are anticipated to influence plant growth because of differences in organic matter availability, water holding capabilities, and compaction rates; thus, plant establishment will predictably vary between growth media types. Vegetation monitoring plots will be stratified to be representative of within each soil surface treatment area.

***Tree and Shrub Planting* Areas:** Randomly selected plots will be monitored in planting areas, with the number of plots sampled suitable to attain 80 percent confidence in data results. In addition, both north- and south-facing areas should be represented in sampling. Container planting areas will be sampled using a nested approach as used in reference site data collection; other sampling methods may be used but will require appropriate conversion of species richness standards. The nested approach means that once a plot center is randomly selected, trees are assessed within a 10-meter radius, shrubs within a 5-meter radius, and herbs within a 1-meter radius from the plot center. Monitors will identify and count all trees and shrubs surviving in their respective plots. Cover of all tree, shrub, and herb species within each layer will be estimated within each respective plot, and all species will be identified to the extent possible.

***Seeded Areas*:** Sampling plots will be selected randomly throughout the areas seeded with grasses, herbs, and shrubs to determine native species richness and percent cover of each species. As with the planting areas, sampling will occur in nested plots, with shrubs assessed within a 5-meter radius and herbs within a 1-meter radius from the plot center. The number of plots for each installation stage will be selected to achieve an 80 percent confidence level in the performance results. Stratification of sampling areas may be necessary if the mix of shrubs and herbs varies greatly in different areas either from variation in hydroseed applications or soil or other site conditions. For example, areas strongly dominated by herbs and grasses may instead be monitored using smaller sampling plots appropriate to grasslands.

Revegetated areas will be monitored in late spring or early summer to ensure that most plants will be identifiable to the species level. Monitoring will be conducted by a qualified biologist with experience in plant identification. After monitoring data has been collected, a report will be prepared summarizing the success of revegetation efforts and providing a comparison of data to Year 5 performance standards. Once performance standards are met, the area will be released from financial assurance requirements.

4.6.2 Maintenance

Maintenance of revegetation areas shall consist of reseeding or replanting unsuccessful revegetation efforts, weed control to limit the extent of noxious weeds, and repair of erosion damage. If significant rills or gullies are identified that could contribute to off-site sedimentation, remedial actions will include reseeding of the area with the erosion control seed mix, and if necessary, slope stabilization measures will be undertaken.

If revegetation efforts are not successful with regard to the performance standards following initial seeding, the underperforming areas will be reevaluated to determine the measures necessary to improve performance. If necessary, these areas will be reseeded and/or replanted with methods modified as needed. This may include the use of container stock and irrigation or simply additional seeding during a wet winter season, or other adaptive management as provided in the revegetation plan.

4.7 Weed Abatement

Weed control is necessary to reduce the occurrence of undesirable invasive and noxious species of plants that may invade and where weeds could interfere with revegetation efforts or increase fire hazards, as specified in SMARA regulations. Weeds are undesired, generally introduced, invasive plants that can compete with revegetation efforts. However, many introduced species occur widely in the region and are common in both the surrounding active quarry and adjacent natural open space lands. Eradication of all weeds is therefore unachievable; therefore, specific noxious plant species are targeted for control.

Species listed by Cal-IPC (2006) as highly invasive will be considered problematic and will be targeted during maintenance of this revegetation effort if they exceed the designated threshold of ten percent cover. Invasive plant species typically found on-site and in surrounding lands include yellow star thistle (*Centaurea solstitialis*, annual), black mustard (*Brassica nigra*, annual), stinkwort (*Dittrichia graveolens*, annual), pampas grass (*Cortaderia spp.*, perennial), and fennel (*Foeniculum vulgare*, perennial). Weed control methods may include chemical and mechanical removal techniques depending on the species and number of individuals encountered. Priorities in weed abatement should focus on those species listed as highly invasive, in addition to other weeds that directly threaten the successful establishment and survival of revegetation species. The percent cover of weeds, abatement measures recommended and undertaken, and other observations on weed control will be included in vegetation monitoring reports. Weed abatement responsibilities may end after performance standards have been met for each stage of revegetation efforts, unless invasive species in completed revegetation areas are deemed a threat to nearby efforts still in progress.

4.8 Closure Activities

The following subsections describe those project components that will be removed or remain and their related reclamation activities.

4.8.1 Overburden Disposal

Cement-grade limestone has been mined at the site since approximately 1903 for use in the production of cement and/or aggregate materials. Overburden, unmarketable rock, and processing residuals (sometimes called “waste” materials) have been placed in the WMSA and EMSA. Although these materials are naturally occurring, their removal from the native bedrock environment causes them to be regulated as mining waste. The quarrying process (including blasting, excavation, and crushing) transforms bedrock into particles, sized from fine silt to cobbles. This process increases the surface area that is subjected to weathering, increasing its leaching potential. For example, exposure to oxygen and water can result in the solubilization (dissolution and potential mobilization) of some metals and metalloids that would otherwise be bound in the bedrock (WDR Order No. R2-2018-0028)

The wastes characterized for the WDRs are classified as Group B mining wastes (as defined in Title 27 Section 22480) because they “consist of or contain nonhazardous soluble pollutants of concentrations which exceed water quality objectives for, or could cause, degradation of waters of the State.”

The RWQCB issues WDRs to regulate discharges to land pursuant to CCR Title 27 and Section 13263 of the California Water Code. The RWQCB issues an order that governs wastes and activities that generate waste at the site that have the potential to affect groundwater and hydrogeologically connected surface waters for the protection of human health and the environment. These activities include current and historical disposal activities, aspects of quarrying operations that generate waste, and reclamation of disposal units. Specifically, the WDRs (WDR Order No. R2-2018-0028):

a. Require development of a Self-Monitoring Program (SMP) consistent with Title 27 to enable the detection of chemical releases from the site and to evaluate whether groundwater and hydrogeologically-connected surface waters have been impacted by current or historical activities. In addition, it requires baseline monitoring to dictate reclamation plans, which includes expansion of the existing groundwater monitoring network and development of an updated conceptual site model;

b. Require an Operation, Maintenance, and Contingency Plan for waste management units (WMUs) to ensure containment procedures and monitoring infrastructure are properly operated and sufficiently monitored and maintained to be effective;
c. Require Closure and Post-Closure Maintenance Plans to ensure reclamation strategies are adequately protective and that implementation will not impact groundwater or hydrogeologically-connected surface waters; and Preliminary Closure Plans (to be updated biennially) to enable Water Board staff oversight of interim preparations and evaluation of reclamation strategies; and
d. Require financial assurances to demonstrate that the Dischargers are capable of covering costs associated with closure and post-closure maintenance, as well as corrective actions should a release be identified.

The RWQCB has formally designated the stockpiled overburden materials as a Group B waste (i.e., a nonhazardous waste with pollutant concentrations that could exceed WQOs or degrade waters of the state) and determined that these materials have the potential to adversely affect groundwater quality.

Current waste containment practices for the WMSA and EMSA consist of stormwater controls (e.g., BMPs such as berms, wattles, settling ponds, gabion basket check dams, floc logs, or active treatment for stormwater from the EMSA) to minimize the discharge of runoff that has come in contact with mining waste. Stormwater discharges from the site are regulated under the NPDES permit for Permanente Quarry.

As addressed in Appendix H, pursuant to the Permanente WDRs, the operator must submit a preliminary closure plan that includes closure alternatives that will minimize water quality impacts. Additional site-specific data has been acquired since 2012 regarding the hydrologic conditions at the North Quarry, including the underlying mechanisms affecting surface water and groundwater quality. Data has also been generated to evaluate use of the WMSA materials as the sole source of backfill material for the North Quarry.

The primary constituent of concern (COC) is selenium, though Lehigh evaluates both surface and groundwater quality for a variety of constituents. Selenium occurs primarily in association with the sulfides present in limestone and is released following sulfide oxidation. Following sulfide oxidation, water infiltration is the primary transport mechanism for selenium transport. Selenium water quality standards are derived from the RWQCB's basin plan (as well as applicable federal regulations) and are the basis of the RWQCB environmental screening levels. The WQO for selenium in federally recognized surface waters is 5 µg/L (chronic) and 20 µg/L (acute), which is based on the protection of aquatic habitat. The drinking water maximum contaminant level applicable to regional ground waters and surface waters used for municipal and drinking water supply is 50 µg/L. The aquatic habitat WQO is more stringent because it must protect aquatic species and the bioaccumulation potential of selenium.

The above descriptions of the ongoing methods to protect surface and groundwater quality are included in this reclamation plan for compliance with SMARA regulations at Section 3710(a). The WDRs and the various implementing requirements are under the jurisdiction of the RWQCB and will change as they are periodically updated, and therefore are not specifically included in their entirety in this reclamation plan. SMARA regulations reference prevailing laws and regulations for compliance and are not intended to duplicate compliance efforts.

4.8.2 Structures and Equipment Removal

With the exception of equipment required for reclamation purposes, equipment and structures supporting mining will be removed at final reclamation. This includes all rolling stock such as loaders, dozers, excavators, haul trucks, storage vans, and water trucks. This also includes all buildings and facilities such as conveyors, crushers, trailers, maintenance buildings, storage sheds and other types of structures. All surplus equipment and supplies stored within the quarry limits will be transported off-site. Scrap equipment will be disposed off-site for salvage value. All trash and miscellaneous debris will be collected and hauled to an appropriate waste disposal facility pursuant to the state and local health and safety ordinances.

4.8.3 Closure of Drill Holes, Water Wells, and Monitoring Wells

Permanente Quarry is well studied, and many geologic drillings and water monitoring wells have been developed. Wells have been improved for monitoring groundwater levels and groundwater quality. The current well locations are shown in Figure 6 and Sheet 2. Additional wells may be developed as needed for mining and environmental monitoring as operations continue.

A well completion report must be filed within 30 days of a new well, in accordance with State of California requirements (DWR Form 188). Well abandonment is required to follow established procedures. Local requirements for a well permit must also be followed. The local drilling permits require notifying the grout inspector so they can be on-site for the abandonment.

Geologic borings for mineral exploration and geotechnical evaluations have been completed at many locations on the property, including recent work at the North Highwall Reserve and the Rock Plant Reserve, as shown on Figure 10 and documented in Appendix G. Those borings were grouted and abandoned within 24 hours, as required. Thus, such temporary borings are not included in Figure 6 and Sheet 2.

At reclamation, monitoring wells no longer needed will be abandoned according to standards set forth in applicable regulations, ordinances, and SWRCB Bulletins 77-81 and 74-90. Many monitoring locations will continue to be used following closure under SMARA for purposes of long-term water quality monitoring pursuant to WDRs. Water production well(s) will also remain to support land uses following reclamation.

Material conveyed from the primary crusher to the secondary crusher area passes through a 550-foot tunnel. The entrance and exit of the tunnel will be closed following conveyor dismantling and removal.

4.8.4 Structures and Surfaces to Remain

Structures at the site are generally limited to mobile buildings in support of mining and would not remain following operations. Power extended to the site is expected to remain to support environmental monitoring and land uses following mining. Water conveyance systems and water treatment features will remain as necessary, and water monitoring installations will remain until such time that the WDRs are rescinded.

Many roads used for postreclamation access throughout the site will remain following mining and reclamation. Roads expected to be retained for property access and maintenance are shown in Figure 11 (and corresponding Sheet 4).

Primary access to the operating site is through a single roadway, which has a gated entrance. Fencing and gating will remain at reclamation.

4.8.5 Impact of Reclamation on Future Mining

If backfilling were completed before recovering this reserve, cement-grade limestone existing in the North Quarry below the 990 msl elevation that is important to regional cement supplies would be buried beneath backfill and not economically recoverable in the future.

Final reclamation of the North Quarry and Rock Plant Reserve as addressed in this plan will have no deleterious effect on mineral resources.

4.8.6 Public Safety Considerations

This site is private property, located in an area that is relatively inaccessible by road except through controlled points (i.e., locked gates or monitored access). Steep slopes and dense vegetation also discourage trespass. The potential for public exposure is therefore limited.

Access to the quarry is currently restricted by a gated entrance manned by security guards 24 hours per day. Security will be continued during reclamation activities in the same manner as during operations. Existing perimeter fences, locked gates, and signs will be maintained to exclude public entry to the site.

Locks, gates, signs, and fences are regularly inspected. Any damage to the security system caused by vandalism, trespassing, or natural wear and tear will be immediately repaired and/or replaced. Signs will be repaired or replaced on an as-needed basis to maintain their visibility.

Post reclamation public health and safety will be protected in accordance with County standards for undeveloped land. Final slopes will be consistent with SMARA stability standards for the postreclamation use and will pose no safety hazard.

4.9 Reclamation Phasing

Table 12, "Reclamation Phasing," provides the anticipated timing for completion of the various components of site reclamation. Final revegetation will occur as soon as each area receives final grading. Thus, the upper areas of both the North Highwall Reserve and the Rock Plant Reserve will be revegetated before mining is completed at the lower areas.

Table 12
RECLAMATION PHASING[1]

Phase	Reclamation Component	Time Frame[2]	Description
I	North Highwall Reserve	0–20	• Ridgeline mining, grading, and stabilization (within approximately 18–24 months) followed immediately by ridgeline revegetation and monitoring • Placement of greenstone slide material on quarry floor. • North Highwall Reserve concurrently mined and reclaimed with slopes meeting geotechnical specifications.
	North Quarry		• Placement of on-site and imported fill where no conflict with access to reserves will occur.
	West Materials Storage Area		• Placement of final fill and regrading of surfaces to geotechnical specifications. • Revegetation and monitoring.
	PCRA		• Permitting process completed; project completed and reclamation initiated
II	North Quarry	15–30	• Mining completed. • Continued backfill with on-site and imported fill.
	East Materials Storage Area		• Final surface preparation, revegetation, and monitoring
	Rock Plant Reserve		• Mining and reclamation of highwalls concurrently • Installation of drainage controls • Grading and revegetation of floor • Overburden placed in North Quarry • Vegetation monitoring
III	North Quarry	30–40	• Final fill elevation reached (+/-990 mean sea level). • Completion of removal of construction aggregate stockpiles. • Installation of final drainage controls. • Revegetation and monitoring
	Operations Areas		• Reclamation of the conveyor tunnel after the conveyor is dismantled and removed • Completion of removal of construction aggregate stockpiles • Revegetation of all remaining areas • Monitoring all areas for erosion and vegetation until success criteria is met

Phase	Reclamation Component	Time Frame[2]	Description

Notes:
[1] Phasing, tasks, and timing subject to actual production depending on market conditions and other engineering and economic factors. Specifications and future updates to waste discharge requirements by the San Francisco Bay Regional Water Quality Control Board may dictate reclamation actions and timing.

[2] Years after approval of the reclamation plan amendment.

5. FINANCIAL ASSURANCE

This section addresses the primary reclamation tasks associated with the reclamation plan. These tasks are the basis of financial assurance calculations for the site. FACEs are required to be revised annually and will therefore change over the course of operations.

Financial assurance cost estimates for the initiation of the operation are based on:

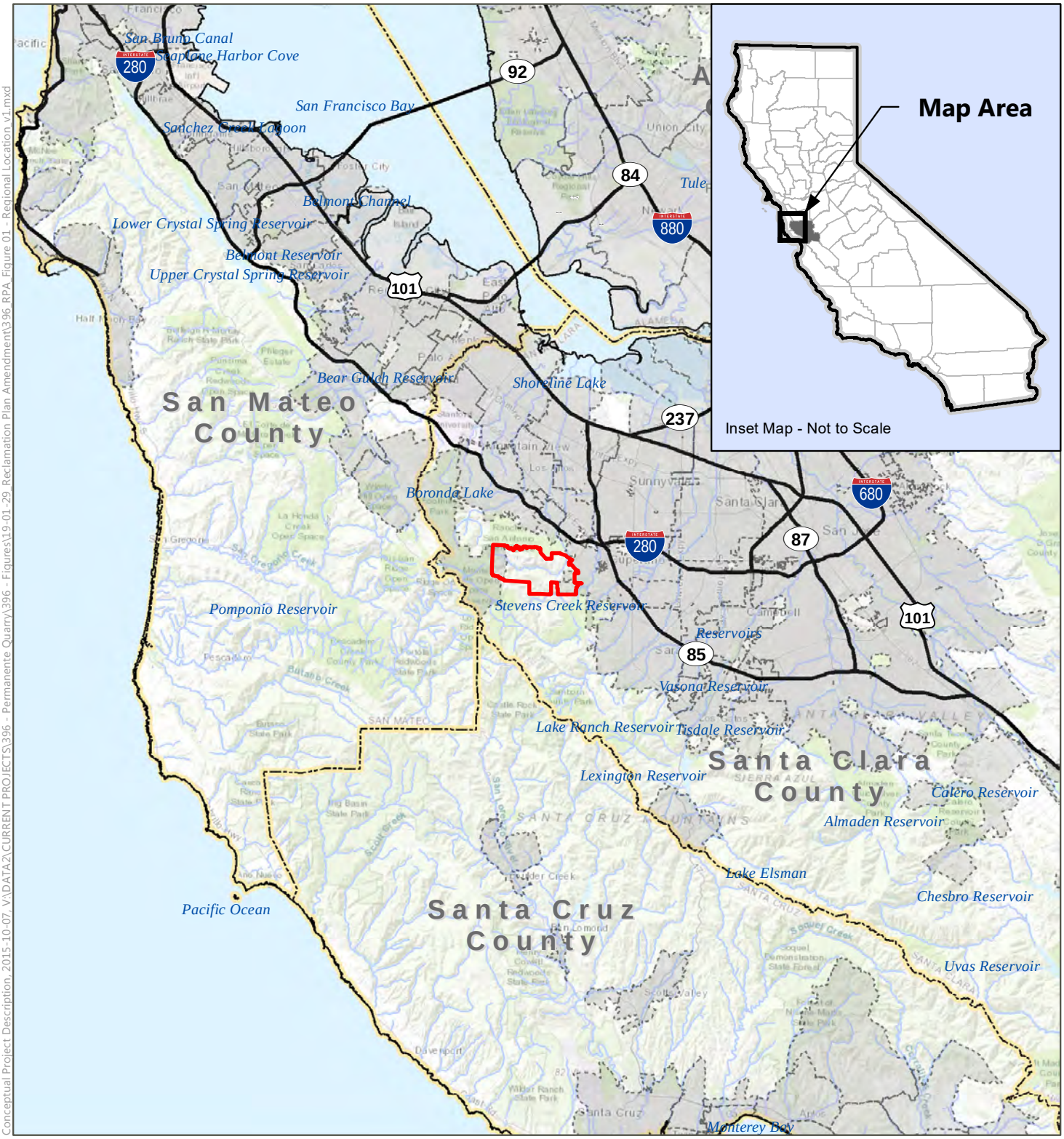
- an analysis of the physical activities necessary to implement the approved reclamation plan,
- the lead agency's (or third party contract) unit costs for each of these activities,
- the number of units of each of these activities, and
- an amount to cover contingency costs (not to exceed 10 percent of the above-calculated reclamation cost) and actual lead agency administrative costs.

The following tasks will need to be completed to implement this reclamation plan:

- **Equipment and Facilities Removal**
  - Remove heavy duty equipment.
  - Remove structures and foundations at rock plant site and the crusher site.
- **Grading**
  - Contour slopes as necessary to conform to the existing topography and establish proper drainage.
- **Revegetation**
  - Manage topsoil stockpiles against erosion.
  - Distribute topsoil.
  - Seed and plant.
- **Monitoring/Maintenance**
  - Inspect planting and seeding success.
  - Inspect slopes for erosion.
  - Monitor for noxious weeds.
  - Maintain and weed the revegetation.
  - Collect data and report on reclamation progress.
  - Prepare contingency for replanting.

THIS PAGE
INTENTIONALLY
LEFT BLANK

FIGURES



Conceptual Project Description, 2015-10-07, V:\DATA2\CURRENT PROJECTS\396 - Permanente Quarry\396 - Figures\19-01-29_Reclamation Plan Amendment\396_RPA_Figure 01 - Regional Location v1.mxd

SOURCES: ESRI World Shaded Relief accessed Jan. 2019, ESRI World Topographic Map accessed Jan. 2019; ESRI World Streetmap, 2009; compiled by Benchmark Resources in 2019

NOTES:

1. Property boundary for illustrative purposes only. See Appendix D-2, "County Parcel Boundaries," for maps of the site and boundaries prepared by a California-licensed professional and Appendix D-1, "Legal Description," for owner information and property details.
2. This figure is prepared for land use planning and informational purposes only. The information shown and its accuracy are refelctive of the date the data was accessed or produced.

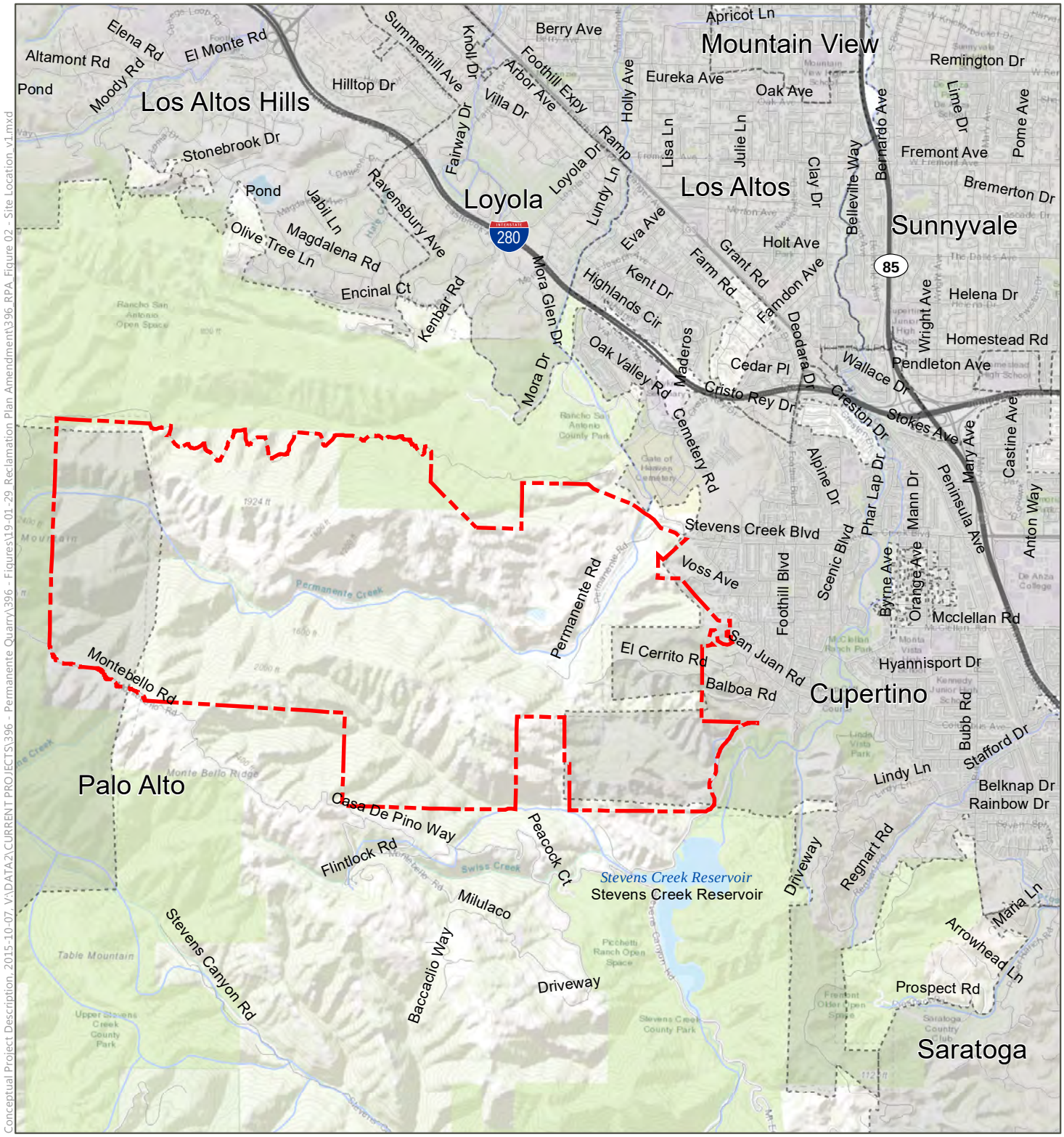
Property Boundary
City Boundary
County Boundary
Major Highway
River

BENCHMARK RESOURCES

N

0 3 6 12 Miles

Regional Location
PERMANENTE QUARRY
AESTHETICS TECHNICAL STUDY
Figure 1



Conceptual Project Description, 2015-10-07, V:\DATA2\CURRENT PROJECTS\396 - Permanente Quarry\396 - Figures\19-01-29_Reclamation Plan Amendment\396_RPA_Figure 02 - Site Location_v1.mxd

SOURCES: ESRI World Shaded Relief accessed Jan.l 2019, ESRI World Topographic Map accessed Jan 2019; ESRI World Streetmap, 2009; adapted by Benchmark Resources in 2019

NOTES:

1. Property boundary for illustrative purposes only. See Appendix D-2, "County Parcel Boundaries," for maps of the site and boundaries prepared by a California-licensed professional and Appendix D-1, "Legal Description," for owner information and property details.
2. This figure is prepared for land use planning and informational purposes only. The information shown and its accuracy are refelctive of the date the data was accessed or produced.

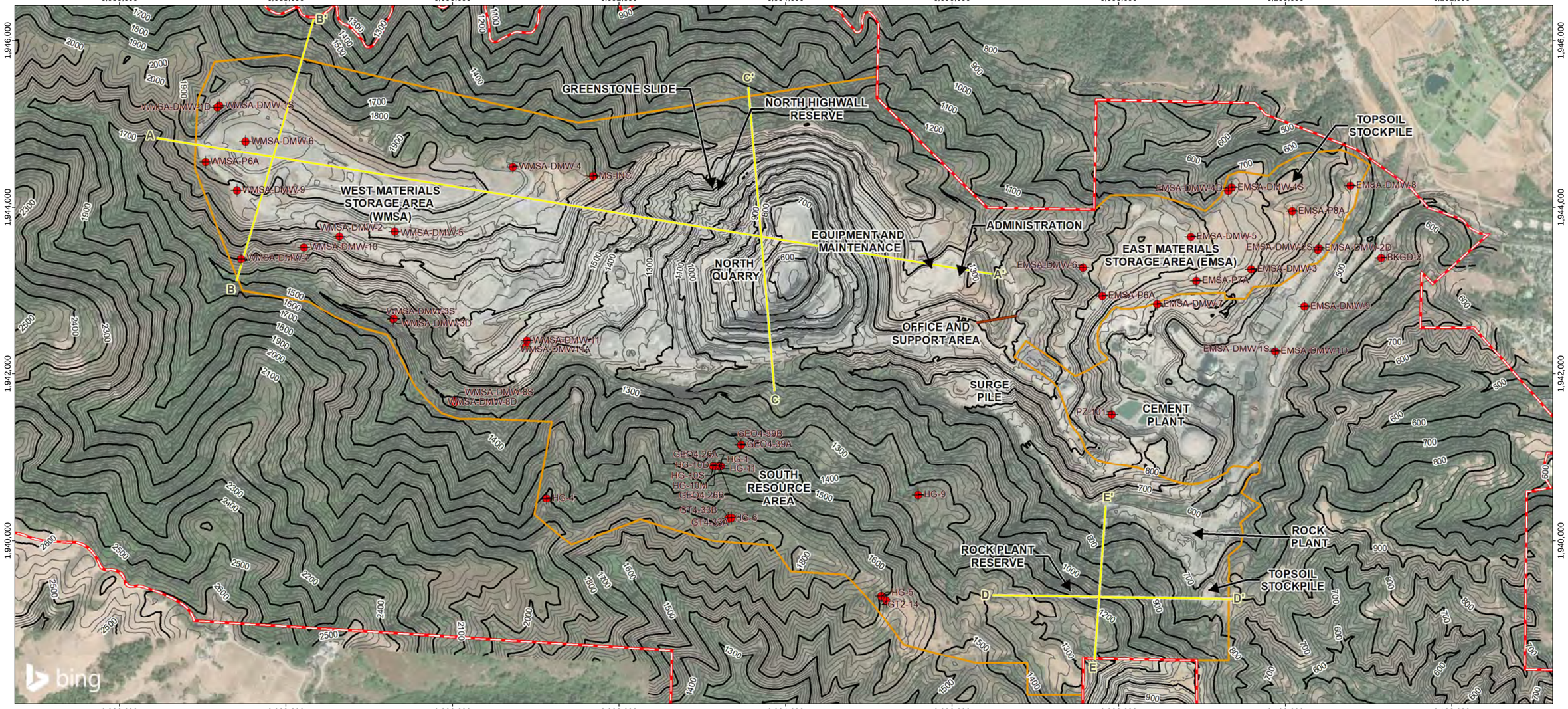
Property Boundary
City Boundary
Water Body
Interstate
Street
River

BENCHMARK RESOURCES

N

0 2,000 4,000 8,000 Feet

Site Location
PERMANENTE QUARRY
RECLAMATION PLAN AMENDMENT
Figure 2



Project Location
T07S, R02W
Santa Clara County, CA

Review
Prepared by JAJ on 2019-05-20
Final Review by PK on 2019-05-20

Notes

1. Coordinate System: NAD 1983 StatePlane California III FIPS 0403 Feet

2. Background: © 2019 Microsoft Corporation © 2019 DigitalGlobe ©CNES (2019) Distribution Airbus DS

- Property Boundary
- RPA Boundary
- Well Location
- Conveyor Tunnel
- Cross-Section

Existing Topography

- 100 ft Index Contour
- 20 ft Contour

Stantec

N

0 250 500 1,000 1,500 2,000 Feet

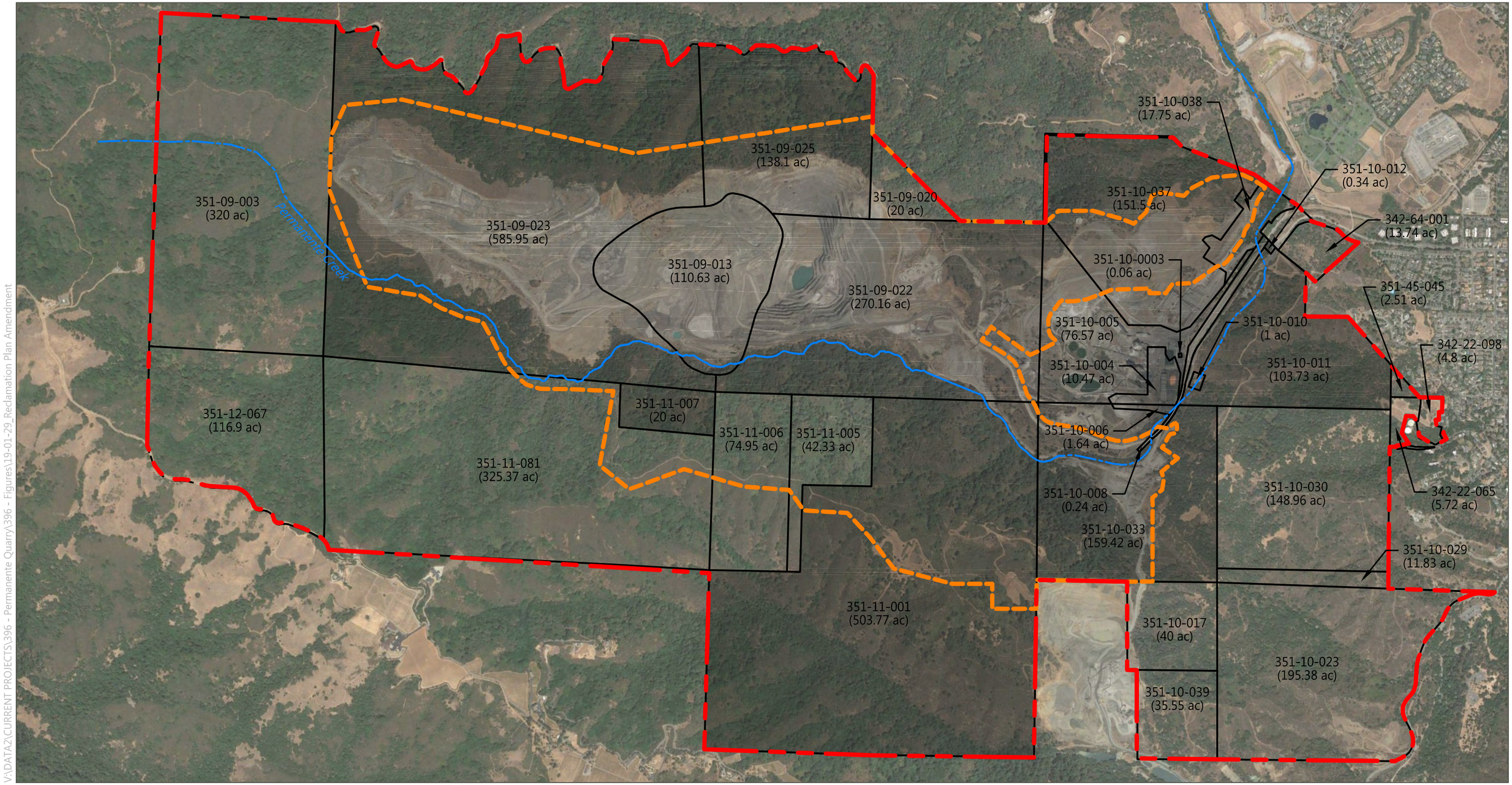
(At original document size of 11x17)

1:14,500

Existing Conditions

PERMANENTE QUARRY RECLAMATION PLAN AMENDMENT

Figure 3



V:\DATA2\CURRENT PROJECTS\396 - Permanente Quarry\396 - Figures\19-01-29_Reclamation Plan Amendment

SOURCES: AERIAL: Google Earth (2018-08-09); SITE BOUNDARY/RECLAMATION BOUNDARY: Lehigh Southwest Cement Company, generated in 2018; PARCELS: Santa Clara County parcel data accessed in 2018; compiled by Benchmark Resources in 2019

NOTES:

1. ac = acres
2. Property boundary for illustrative purposes only. See Appendix D-2, "County Parcel Boundaries," for maps of the site and boundaries prepared by a California-licensed professional and Appendix D-1, "Legal Description," for owner information and property details.
3. See Appendix D-5, "Topographic Survey and Parcels," for parcel boundaries and acreages.

Property Boundary ±3,510 acres

Reclamation Plan Boundary ±1,312 acres

Permanente Creek

Permanente Parcels

Vested Parcels

BENCHMARK RESOURCES

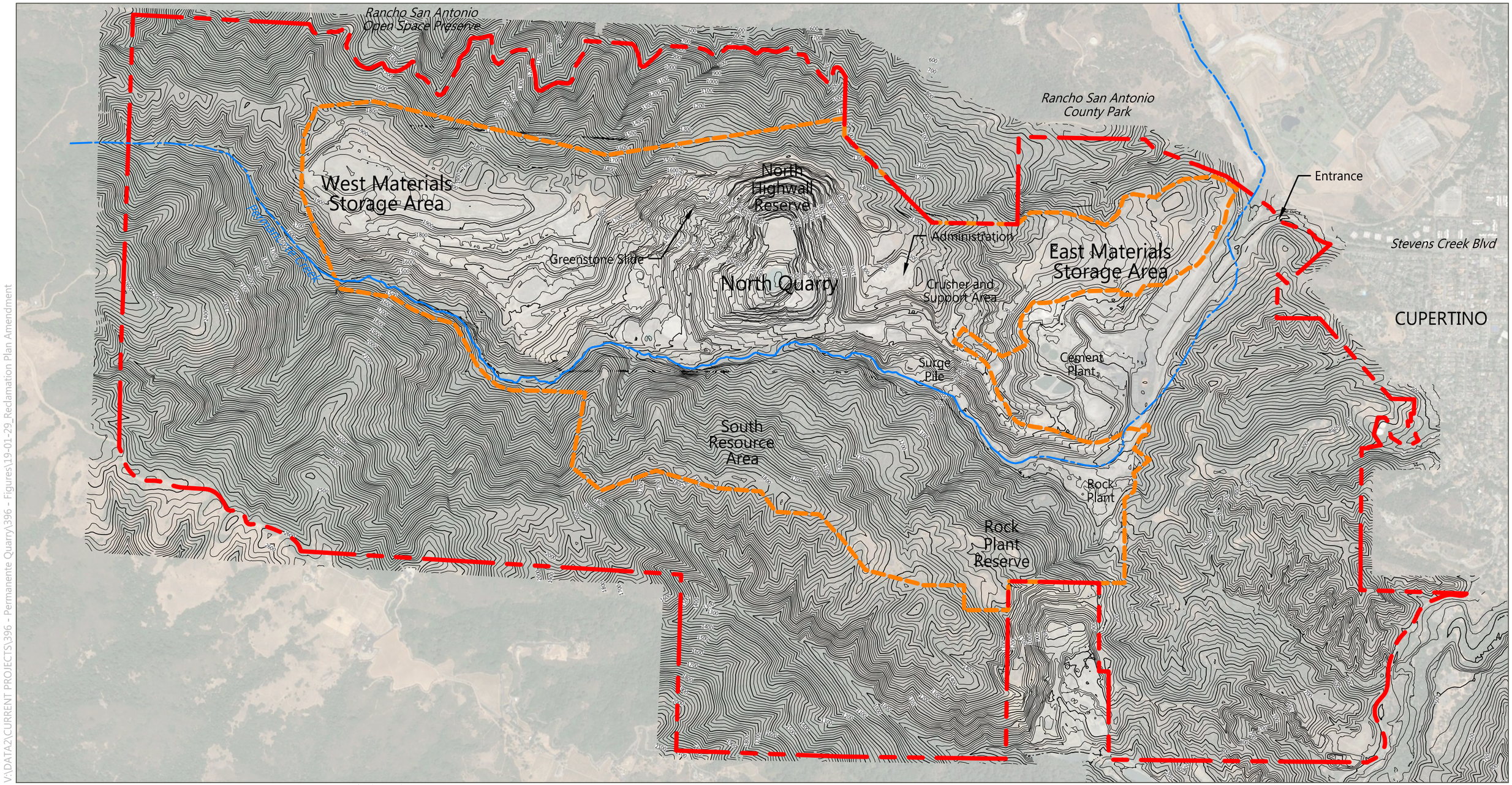
N

0 700 1,400 2,800 Feet

Parcels and Vested Rights

PERMANENTE QUARRY RECLAMATION PLAN AMENDMENT

Figure 4



V:\DATA2\CURRENT PROJECTS\396 - Permanente Quarry\396 - Figures\19-01-29_Reclamation Plan Amendment

SOURCES: SITE BOUNDARY/RECLAMATION BOUNDARIES/TOPOGRAPHY: Lehigh Southwest Cement Company, generated in 2018; compiled by Benchmark Resources in 2019

NOTES:

1. Property boundary for illustrative purposes only. See Appendix D-1, "Legal Description," for owner information and property details and Appendix D-2, "County Parcel Boundaries," for maps of the site and boundaries prepared by a California-licensed professional.
2. See Appendix E-1, "Reclamation Plan," for topography prepared by a California-licensed professional.

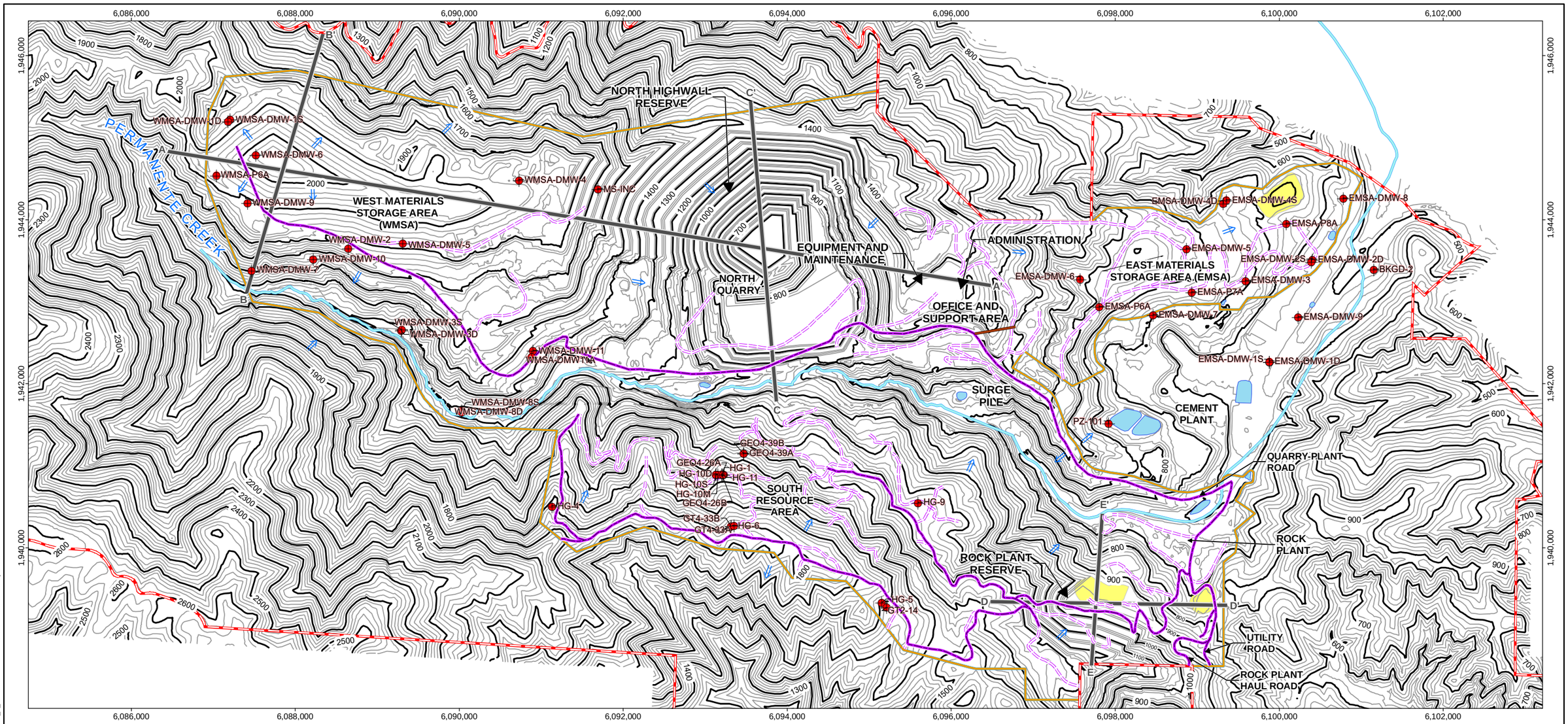
OWNER:
Hanson Permanente Cement, Inc.
300 E. John Carpenter Freeway #1645
Las Colinas, TX 7502

BENCHMARK RESOURCES

N 0 700 1,400 2,800 Feet

Property Boundary	±3,510 acres
Reclamation Plan Boundary	±1,312 acres
Permanente Creek	

Existing Topography
PERMANENTE QUARRY RECLAMATION PLAN AMENDMENT
Figure 5



Project Location
T07S, R02W
Santa Clara County, CA

Review
Prepared by JAJ on 2019-05-20
Final Review by PK on 2019-05-20

Notes

1. Coordinate System: NAD 1983 StatePlane California III FIPS 0403 Feet

2. Background: Phase 3 - Extent of Mining Topography

3. Ramps, access roads, and primary travel routes vary in location and size throughout mine progression.

4. The planned surface disturbance boundary and mining depth are shown; however, the extent of operations may or may not reach these limits. Total acreage to be disturbed and reclaimed will be within the limits of the reclamation plan boundary. Facilities and configurations within this boundary are approximate. All acreages are approximate and not intended to reflect goals for any particular surface type. Variations are subject to actual mined conditions and will not affect success of postmining land uses.

5. Active slopes may be steeper and have different bench intervals than final reclaimed cut slopes.

6. Topsoil locations may vary.

- Property Boundary
- RPA Boundary
- Soil Stockpile
- Stormwater Pond
- Well Location
- Surface Flow Drainage
- Permanente Creek
- Cross-Section
- Conveyor Tunnel
- Road (Retained)
- Road (Reclaimed)

Phase 3 - Extent of Mining Topography

- 100 ft Index Contour
- 20 ft Contour

Stantec

N

0 250 500 1,000 1,500 2,000 Feet

(At original document size of 11x17)
1:14,500

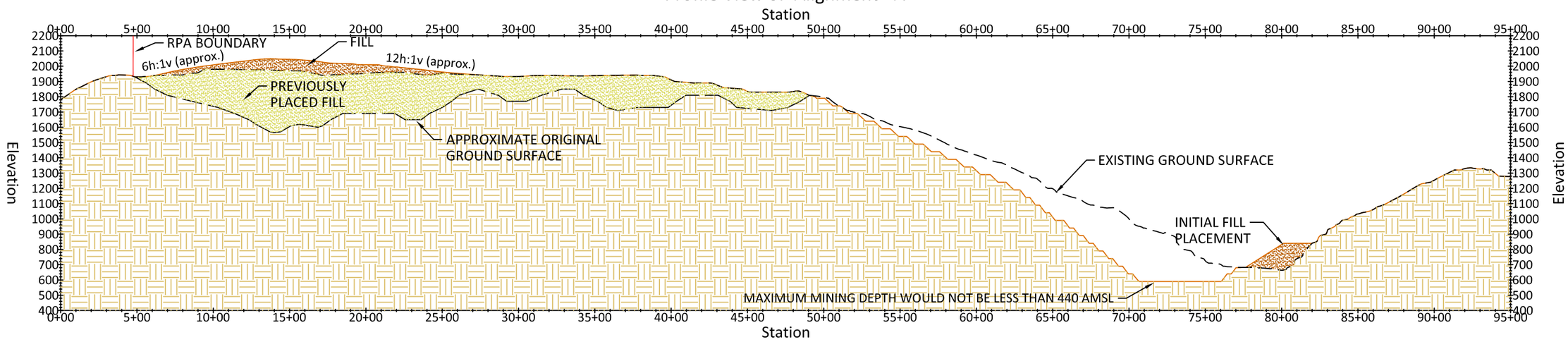
Mine Plan

PERMANENTE QUARRY RECLAMATION PLAN AMENDMENT

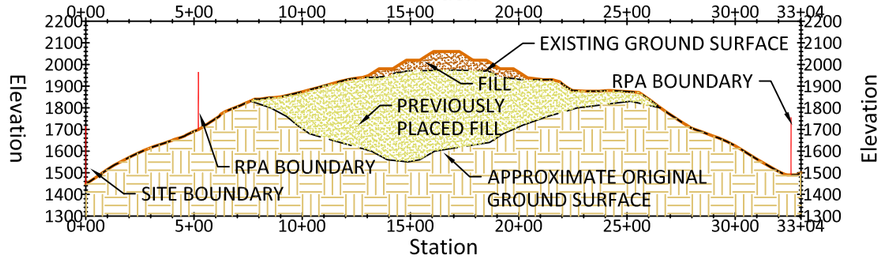
Figure 6

U:\233\001289\gis_MXDs\Reclamation_Plan_Amendment\Lehigh_RPA_MinePlan_11x17_L_20190520.mxd Revised: 2019-05-20 By: JaJarvis

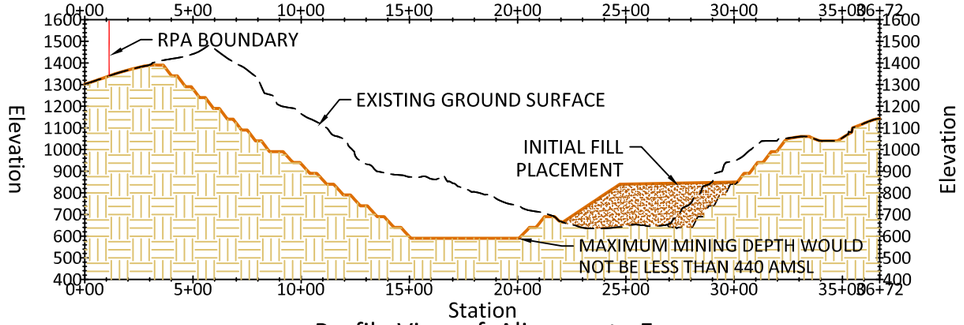
Profile View of Alignment - A



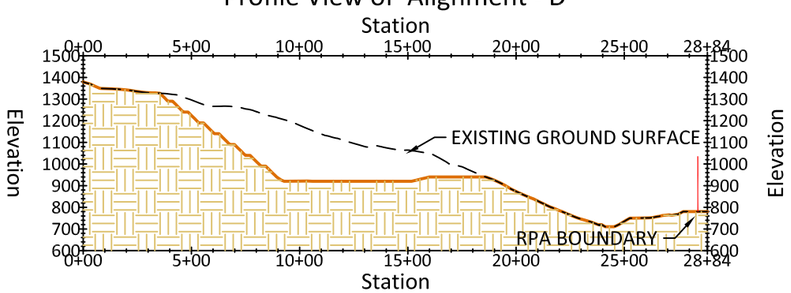
Profile View of Alignment - B



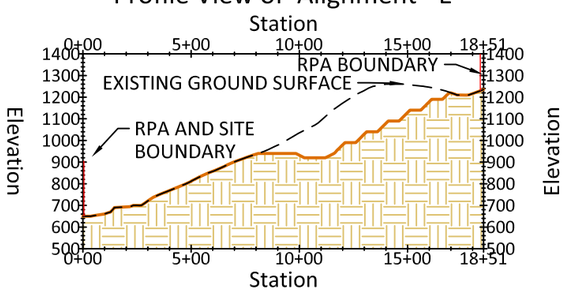
Profile View of Alignment - C



Profile View of Alignment - D



Profile View of Alignment - E



Project Location
T07S, R02W
Santa Clara County, CA

Review
Prepared by PK on 2019-05-20
Final Review by GG on 2019-05-20

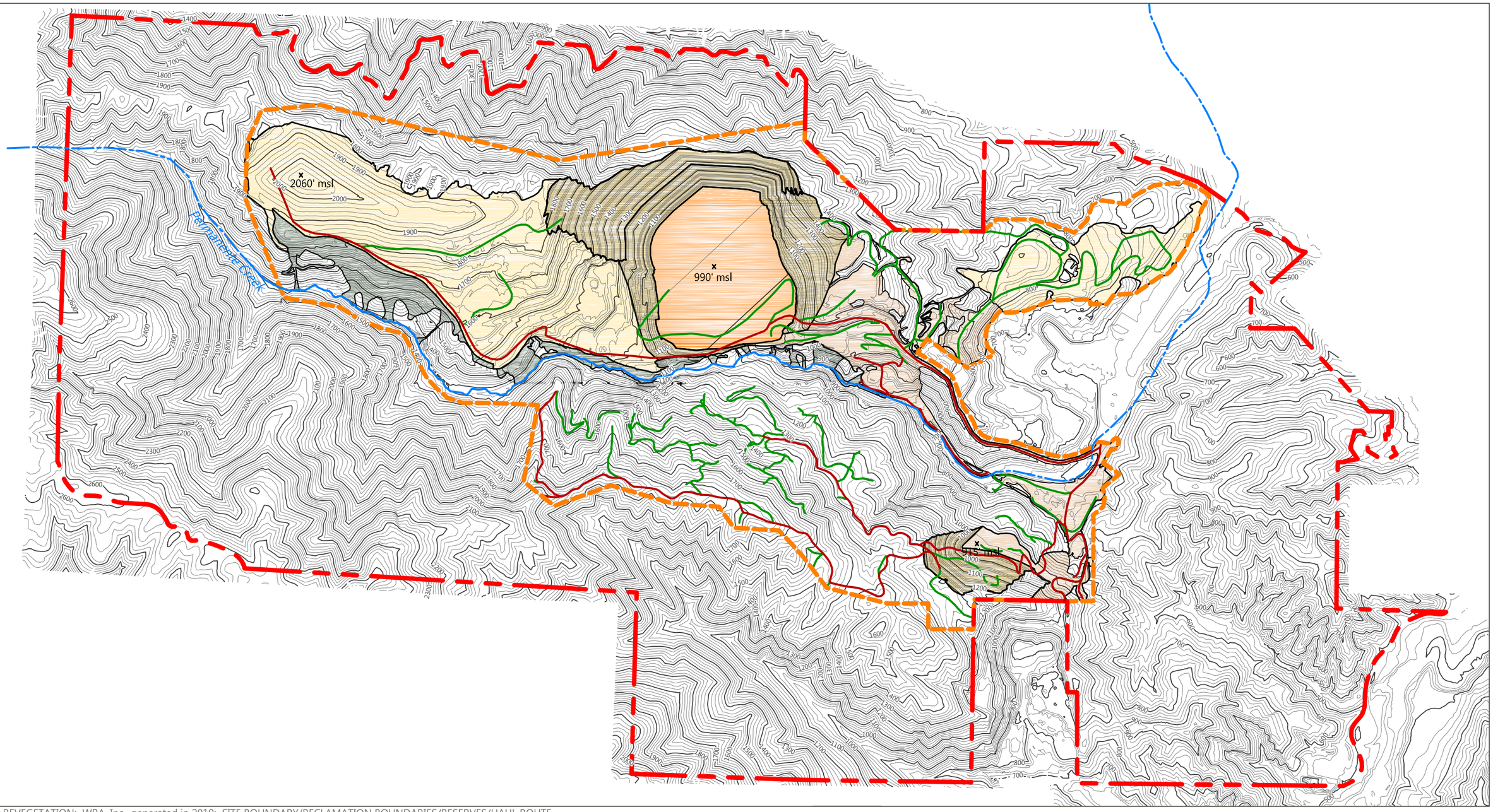
Legend
- RPA or Property Boundary
- Existing Ground Surface
- Proposed Ground Surface
- Native Ground
- Previously Placed Fill
- Proposed Fill

Stantec

0 700' 1400'

Mine Plan Cross-Sections
PERMANENTE QUARRY RECLAMATION PLAN AMENDMENT
Figure 7

v:\2274\active\233001289\lehigh_s_437\437-3, 223001328_permonentseesaw\disc\cad\rpa sheets\rpa_figures_20may2019
2019.05.20 2:30:59 PM



V:\DATA2\CURRENT PROJECTS\396 - Permanente Quarry\396 - Figures\19-01-29_Reclamation Plan Amendment

SOURCES: REVEGETATION: WRA, Inc., generated in 2019; SITE BOUNDARY/RECLAMATION BOUNDARIES/RESERVES/HAUL ROUTE AREAS/TOPOGRAPHY: Stantec, generated in 2019; compiled by Benchmark Resources in 2019

NOTES:

1. Reclamation treatment areas are based on estimated current and planned surface disturbance, actual acreage and boundary may vary. Surface disturbance will be limited under this reclamation plan to areas within the reclamation plan boundary.
2. msl = mean sea level.
3. Property boundary for illustrative purposes only. See Appendix D-2, "County Parcel Boundaries," for maps of the site and boundaries prepared by a California-licensed professional and Appendix D-1, "Legal Description," for owner information and property details.
3. See Appendix E-3, "Reclamation Plan," for topography prepared by a California-licensed professional.
4. The Permanente Creek Restoration Area is being reclaimed under the *Permanente Creek Restoration Plan*, which has been prepared, in part, to fulfill the requirements set forth in an Amended Consent Decree, lodged February 22, 2016.

BENCHMARK RESOURCES

N

0 700 1,400 2,800 Feet

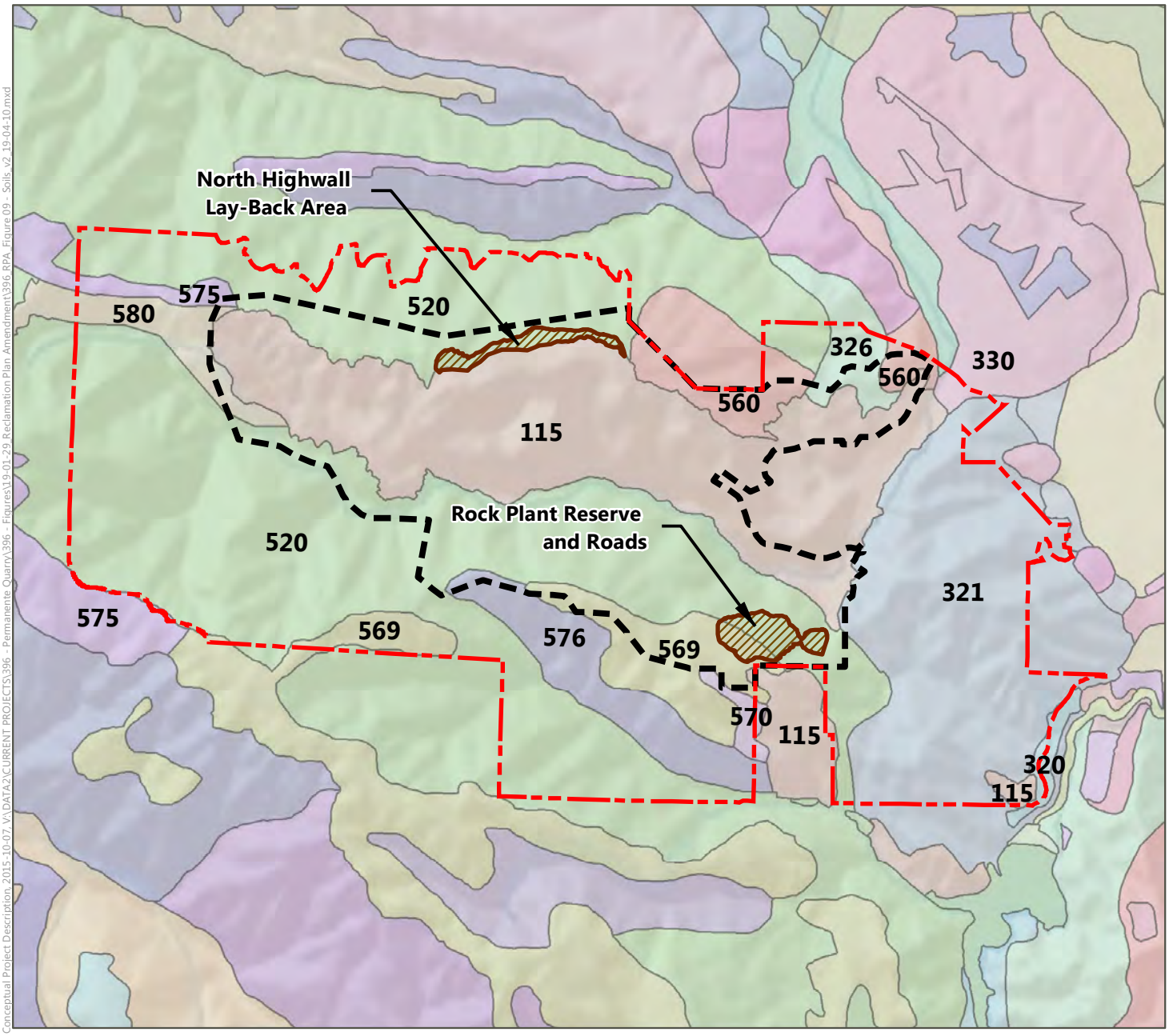
- Property Boundary
- Reclamation Plan Boundary
- Permanente Creek
- Reclaimed Roads
- Retained Roads

Coarse Overburden	279.3 acres
Soil Backfill	92.8 acres
General Compacted Soils	108.2 acres
Highwall Benches	133.7 acres
Permanente Creek Reclamation Area	

Reclamation Treatment Surfaces

PERMANENTE QUARRY RECLAMATION PLAN AMENDMENT

Figure 8



SOURCES: ESRI World Shaded Relief accessed Jan. 2019, U.S. Department of Agriculture Natural Resources Conservation Service Web Soils Survey, accessed Jan. 2019; adapted by Benchmark Resources in 2019

NOTES:

1. Property boundary for illustrative purposes only. See Appendix D-2, "County Parcel Boundaries," for maps of the site and boundaries prepared by a California-licensed professional and Appendix D-1, "Legal Description," for owner information and property details.
2. This figure was prepared for land use planning and informational purposes only. The information shown and its accuracy are refelctive of the date the data was accessed or produced.

Property Boundary | Reclamation Plan Boundary | Soil Salvage Areas

Map Units

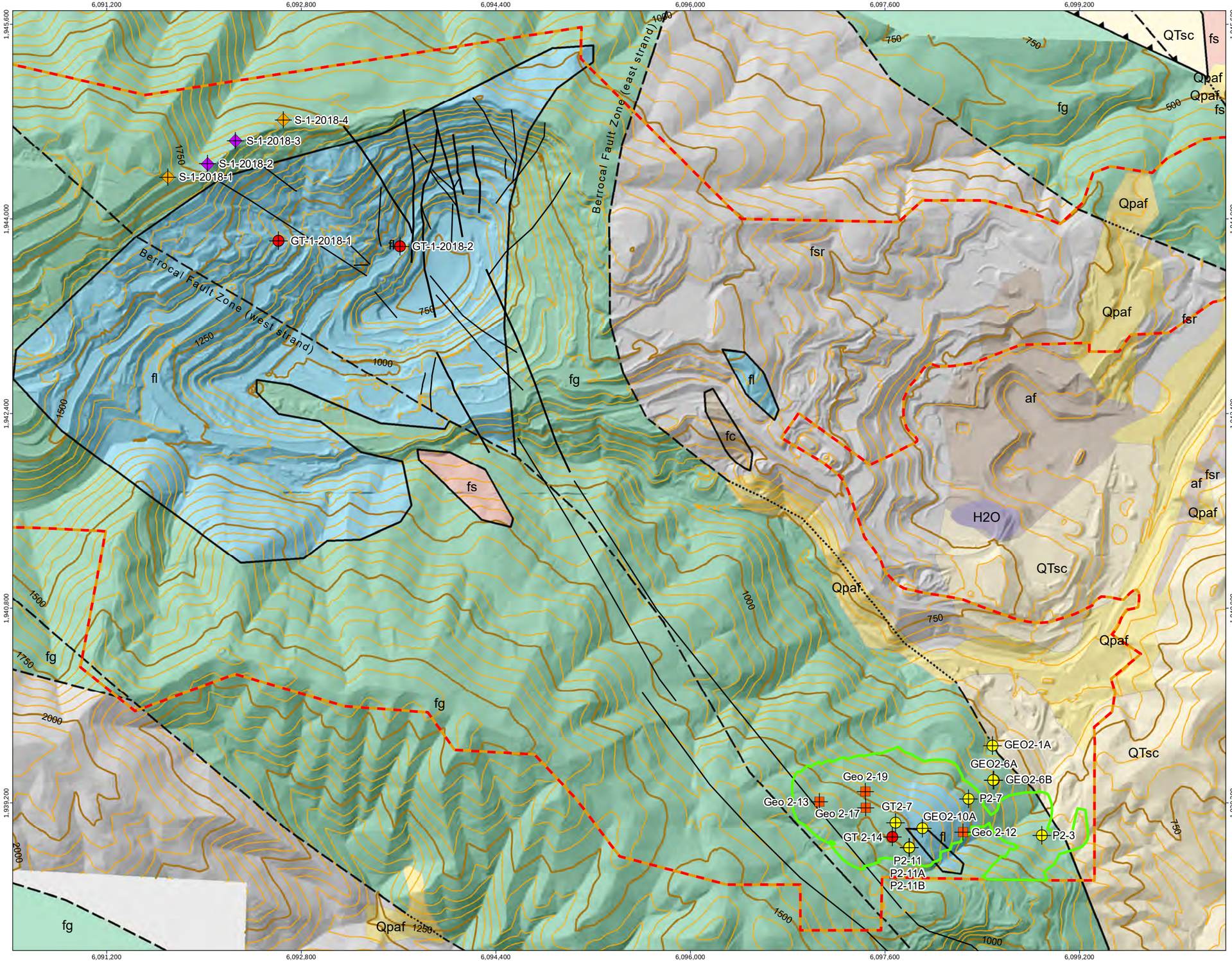
326	Airship-Minlum complex, 40 to 65 percent slopes
570	Footpath-Mouser complex, 50 to 75 percent slopes
560	Katykat-Mouser-Sanikara complex, 30 to 50 percent slopes
569	Katykat-Sanikara complex, 8 to 30 percent slopes
320	Literr-Merbeth complex, 15 to 30 percent slopes
580	Maymen gravelly sandy clay loam, 30 to 50 percent slopes
321	Merbeth-Literr complex, 30 to 65 percent slopes
330	Montavista clay loam, 15 to 30 percent slopes
575	Mouser-Footpath complex, 8 to 30 percent slopes
520	Mouser-Maymen complex, 30 to 75 percent slopes
115	Pits, mine
326	Sanikara-Footpath complex, 30 to 75 percent slopes

BENCHMARK RESOURCES

N

0 1,500 3,000 6,000 Feet

Soils
PERMANENTE QUARRY
RECLAMATION PLAN AMENDMENT
Figure 9



Stantec

- Drill Hole (2007) - Core
- Drill Hole (2018) - Core
- Drill Hole (2018) - RC
- Drill Hole (2018) - Sonic
- Drill Hole (2018) - Sonic Vibrating Wire Piezometer
- Rock Plant Reserve Boundary
- Contour 50 ft
- Contour 250 ft
- 2012 RPA Boundary
- Proposed RPA Boundary
- Fault, moderate to large scale, dashed where certain, dotted where concealed
- Fault, small to moderate scale, dashed where uncertain, dotted where concealed
- Thrust Fault, certain
- H2O-water
- QTsc - Santa Clara Formation
- Qpaf - Alluvial fan and fluvial deposits (Pleistocene)
- af-Artificial fill
- fc-Franciscan complex, chert
- fg - Franciscan complex, greenstone
- fl - Franciscan complex, limestone
- fs-Franciscan complex, sandstone
- fsr - Franciscan complex, sheared rock (melange)

Notes
1. Coordinate System: NAD 1983 StatePlane California III FIPS 0403 Feet
2. Brabb, E.E., Graymer, R.W., and Jones, D.L., 2000, Geologic map and map database of the Palo Alto 30' X 60' quadrangle, California: U.S. Geological Survey Miscellaneous Field Studies Map MF-2332, U.S. Geological Survey, Menlo Park, CA.

T07S, R02W
Santa Clara County, CA

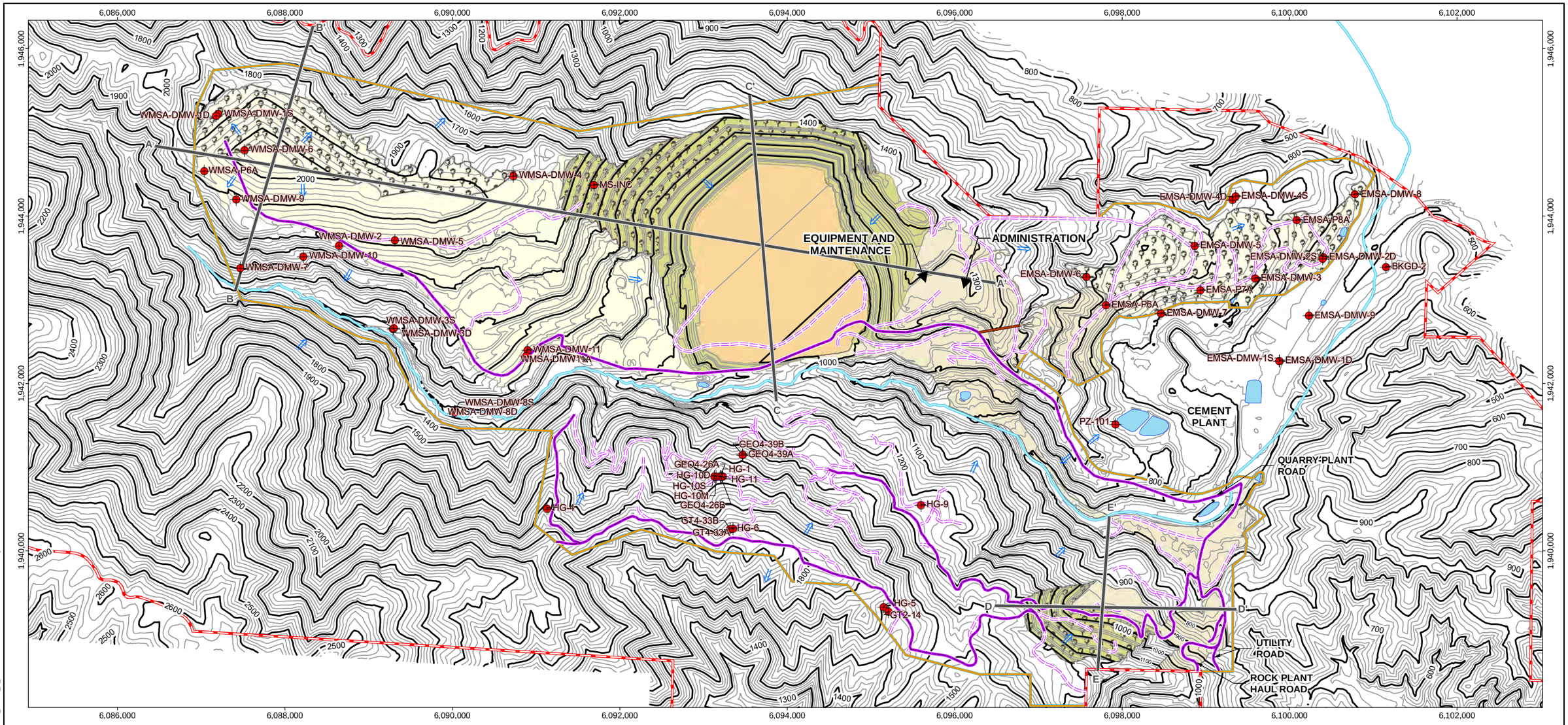
Review
Prepared by CBB on 2018-11-20
Technical Review by JVP on 2018-11-20
Finalized on 2019-04-05

V:\DATA2\CURRENT PROJECTS\396 - Permanente Quarry\396 - Figures\19-01-29_Reclamation Plan Amendment\396_RPA_Figure 10 - Geology_v5_map legend mimic.mxd Revised: 2019-04-10 By: mhernandez

Stantec

0 400 800 4,000 ft
0 1,600 m

Geology
PERMANENTE QUARRRY RECLAMATION PLAN AMENDMENT
Figure 10



Project Location
T07S, R02W
Santa Clara County, CA

Review
Prepared by JAJ on 2019-05-20
Final Review by PK on 2019-05-20

Notes

1. Coordinate System: NAD 1983 StatePlane California III FIPS 0403 Feet

2. Background: Phase 4 - Reclamation Topography

3. The planned surface disturbance boundary and depth are shown; however, the extent of operations may or may not reach these limits. Total acreage to be disturbed and reclaimed will be within the limits of the reclamation plan boundary. Facilities and configurations within this boundary are approximate. All acreages are approximate and not intended to reflect goals for any particular surface type. Variations are subject to actual mined conditions and will not affect success of postmining land uses.

4. Some mined materials will be unusable and varying market conditions may result in additional unsaleable materials (e.g., greenstone). Thus, the volumes of overburden and fill material and, therefore, the ultimate configuration of the reclaimed quarry may vary from the configuration shown. The graphic represents the types of surfaces that would be reclaimed (e.g., overburden, backfill, highwall benches). The final configuration of these surfaces has no bearing on the success of mine reclamation because reclamation would be completed according to plan surface treatment criteria.

- Stormwater Pond
- RPA Boundary
- Property Boundary
- Coarse Overburden (Woodland)
- Coarse Overburden (Shrubs and Grasses)
- General Compacted Soils (Shrubs and Grasses)
- Highwall Benches (Woodland)
- Highwall Benches (Shrubs and Grasses)
- Soil Backfill (Shrubs and Grasses)

- Well Location
- Surface Flow Drainage
- Permanente Creek
- Abandoned Conveyor Tunnel
- Road (Retained)
- Road (Reclaimed)
- Cross-Section

Phase 4 - Reclamation Topography

- 100 ft Index Contour
- 20 ft Contour

Stantec

N

0 250 500 1,000 1,500 2,000 Feet

(At original document size of 11x17)
1:14,200

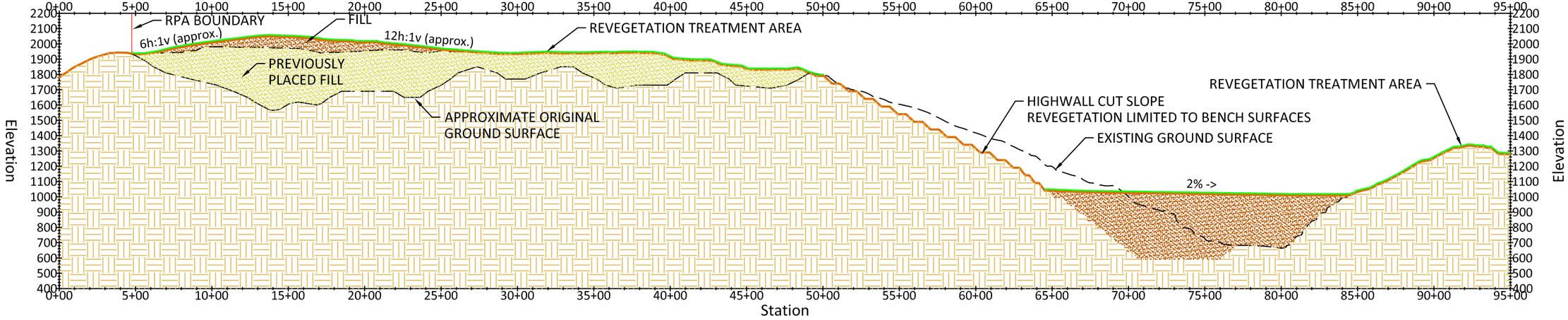
Reclamation Plan

PERMANENTE QUARRY RECLAMATION PLAN AMENDMENT

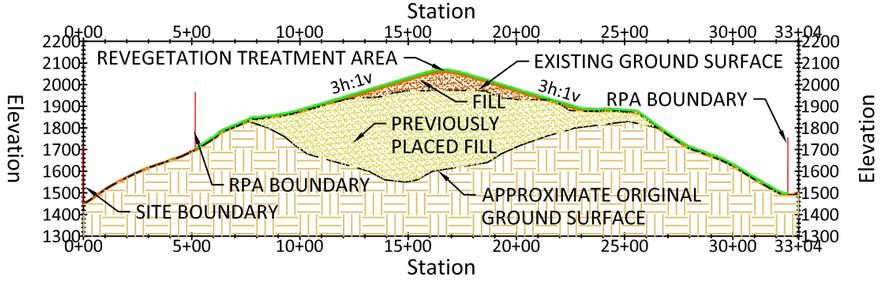
Figure 11

U:\2330\126\gis_MXDs\Reclamation_Plan_Amendment\Lehigh_RPA_ReclamationPlan_11x14_L_20190520.mxd Revised: 2019-05-20 By: JaJarvis

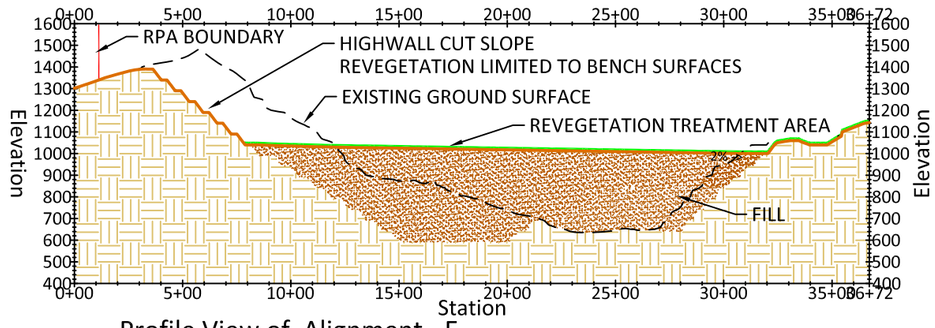
Profile View of Alignment - A



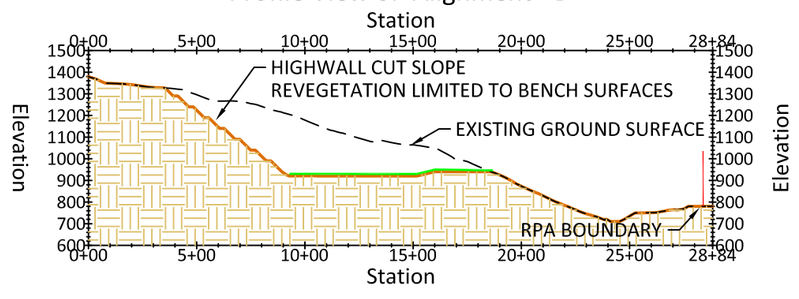
Profile View of Alignment - B



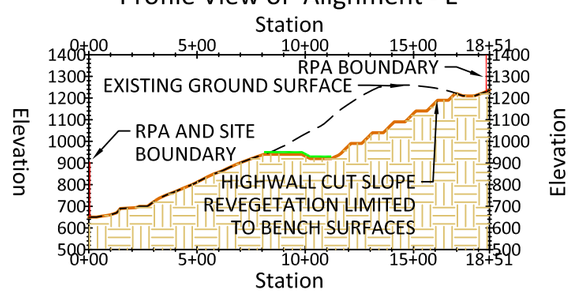
Profile View of Alignment - C



Profile View of Alignment - D



Profile View of Alignment - E



Project Location
T07S, R02W
Santa Clara County, CA

Review
Prepared by PK on 2019-05-20
Final Review by GG on 2019-05-20

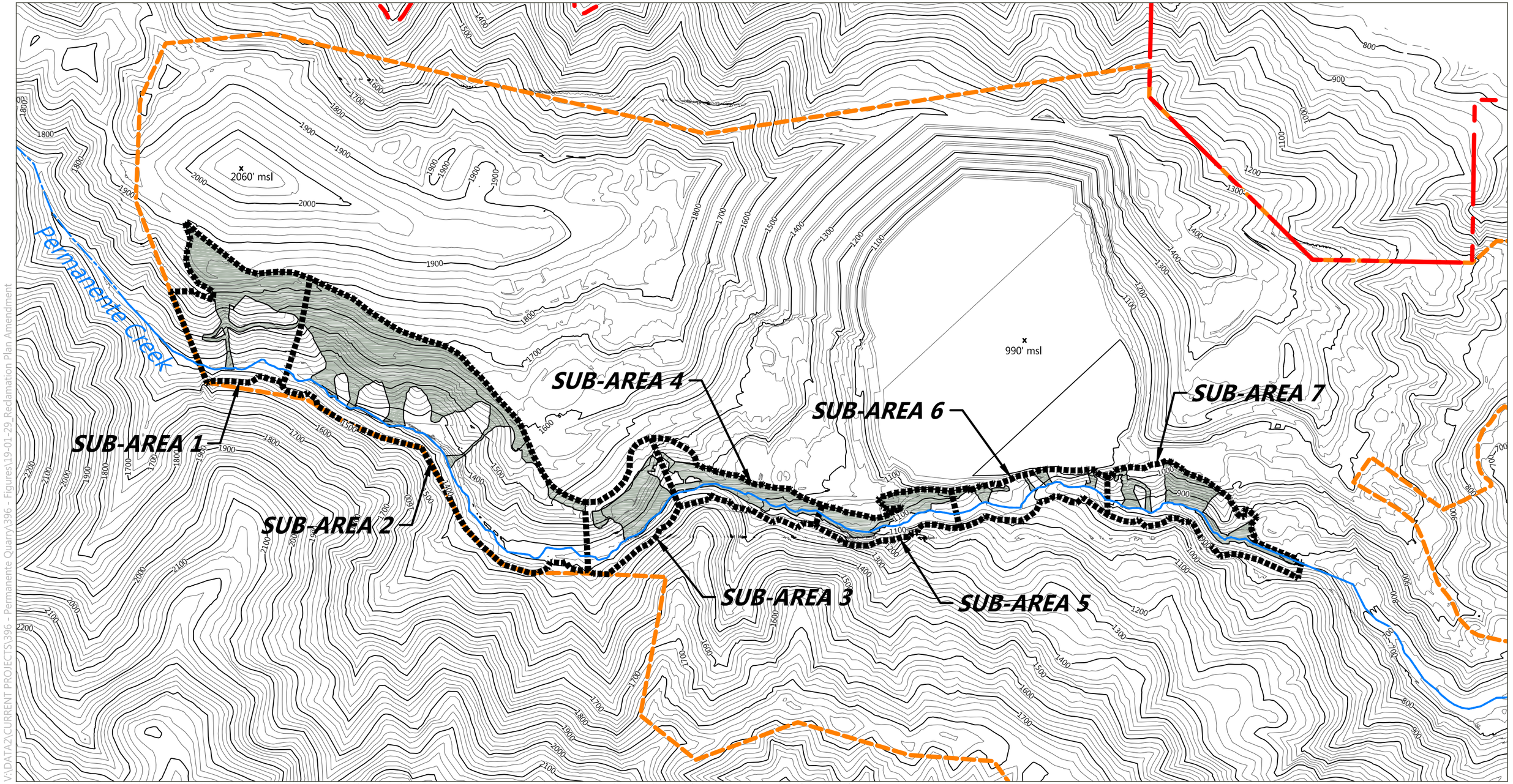
Legend
- RPA or Property Boundary
- Revegetation Treatment Area
- Existing Ground Surface
- Proposed Ground Surface
- Native Ground
- Previously Placed Fill
- Proposed Fill

Stantec

0 700’ 1400’

Reclamation Plan Cross-Sections
PERMANENTE QUARRY RECLAMATION PLAN AMENDMENT
Figure 12

v:\2274\active\233001289\lehigh_s_437\437-3_223001328_permanenteseaw\disc\cad\rpa sheets\rpa_figures_20may2019 2019.05.20 2:30:01 PM



V:\DATA2\CURRENT PROJECTS\396 - Permanente Quarry\396 - Figures\19-01-29_Reclamation Plan Amendment

SOURCES: SITE BOUNDARY/RECLAMATION BOUNDARIES/TOPOGRAPHY: Lehigh Southwest Cement Company, generated in 2018; Sub-areas digitized from 2012 Approved Reclamation Plan; compiled by Benchmark Resources in 2019

NOTES:

1. Property boundary for illustrative purposes only. See Appendix D-1, "Legal Description," for owner information and property details and Appendix D-2, "County Parcel Boundaries," for maps of the site and boundaries prepared by a California-licensed professional.
2. See Appendix E-1, "Reclamation Plan," for topography prepared by a California-licensed professional.
3. The Permanente Creek Reclamation Area (PCRA) includes approximately 49 acres of historic mining disturbance north of Permanente Creek. Limited reclamation is planned for this area, which is largely revegetated and stabilized. However, certain areas will be contoured and receive best management practices for erosion control until final vegetation conditions are met. The existing surface contours of the area shown in this figure will not change substantially. The revegetation for this area is specified in Appendix F.
4. Permanente Creek is the subject of a restoration plan for the Permanente Creek watershed, which is under development in coordination with the San Francisco Bay Regional Water Quality Control Board. The restoration plan describes the removal of historic overburden fills from the creek channel, channel widening, and restoration of the creek to a more natural alignment. This restoration project is the subject of grading permits and environmental review separate from this reclamation plan; all surface treatment will meet or exceed California Surface Mining and Reclamation Act requirements.

BENCHMARK RESOURCES

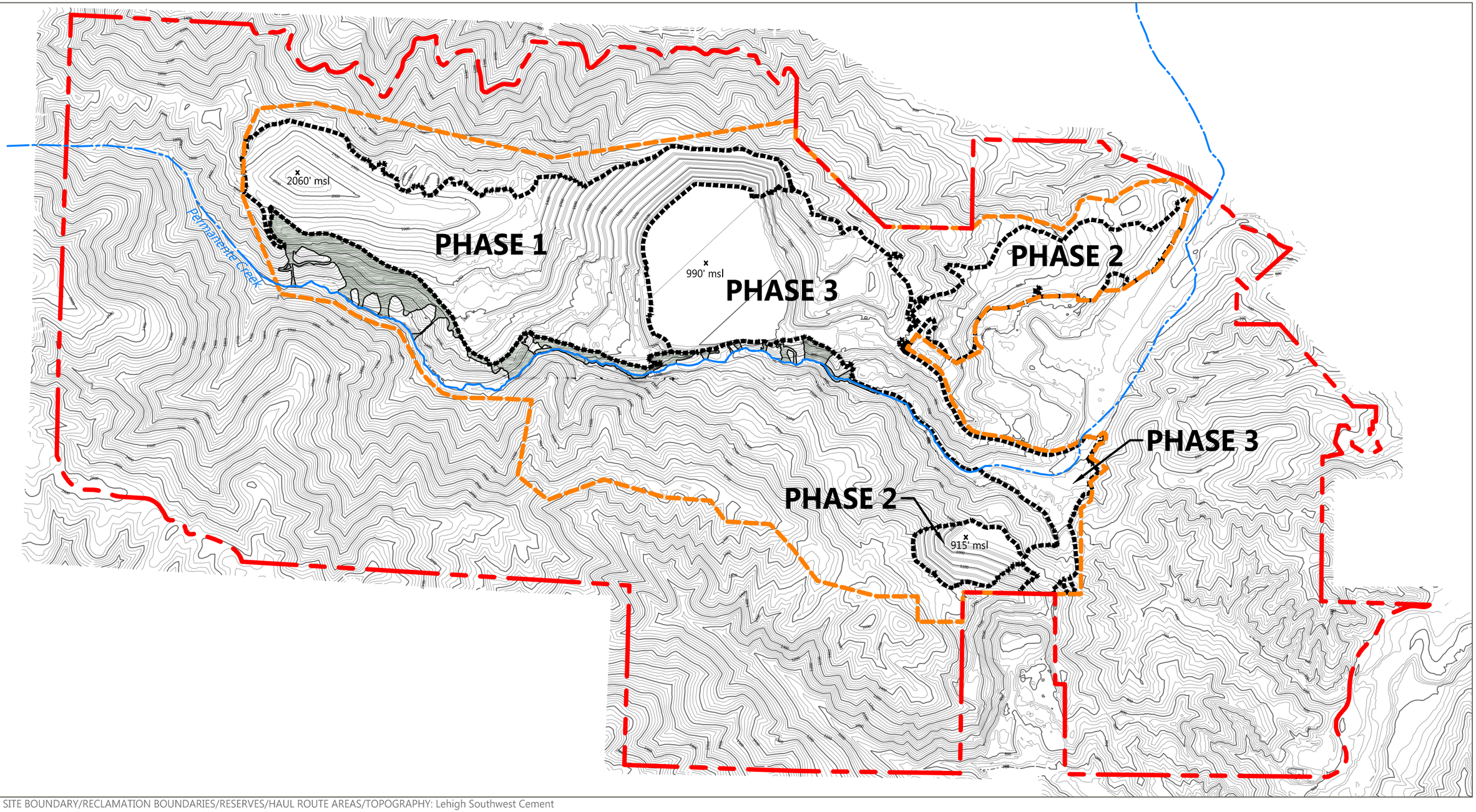
N

0 375 750 1,500 Feet

OWNER:
Hanson Permanente Cement, Inc.
300 E. John Carpenter Freeway #1645
Las Colinas, TX 7502

Property Boundary		±3,510 acres
Reclamation Plan Boundary		±1,312 acres
Permanente Creek		
Permanente Creek Restoration Sub-Area		
Permanente Creek Reclamation Area		

Permanente Creek Restoration Area and Reclamation Area
PERMANENTE QUARRY RECLAMATION PLAN AMENDMENT
Figure 13



SOURCES: SITE BOUNDARY/RECLAMATION BOUNDARIES/RESERVES/HAUL ROUTE AREAS/TOPOGRAPHY: Lehigh Southwest Cement Company, generated in 2019; compiled by Benchmark Resources in 2019

NOTES:

1. msl = mean sea level.
2. Property boundary for illustrative purposes only. See Appendix D-2, "County Parcel Boundaries," for maps of the site and boundaries prepared by a California-licensed professional and Appendix D-1, "Legal Description," for owner information and property details.
3. See Appendix E-3, "Reclamation Plan," for topography prepared by a California-licensed professional.
4. This figure depicts generalized phasing and acreages. See Figure 8 for surface disturbance agreages within each phase.
5. The Permanente Creek Reclamation Area will be restored separately as required under the *Permanente Creek Restoration Plan*, which has been prepared, 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, 2016.

PHASE ACREAGES:

Phase 1:	±299 ac
Phase 2:	±96 ac
Phase 3:	±259 ac
Total:	±654 ac

Property Boundary
Reclamation Plan Boundary
Reclamation Phase Boundary
Permanente Creek
Permanente Creek Reclamation Area

BENCHMARK RESOURCES

N

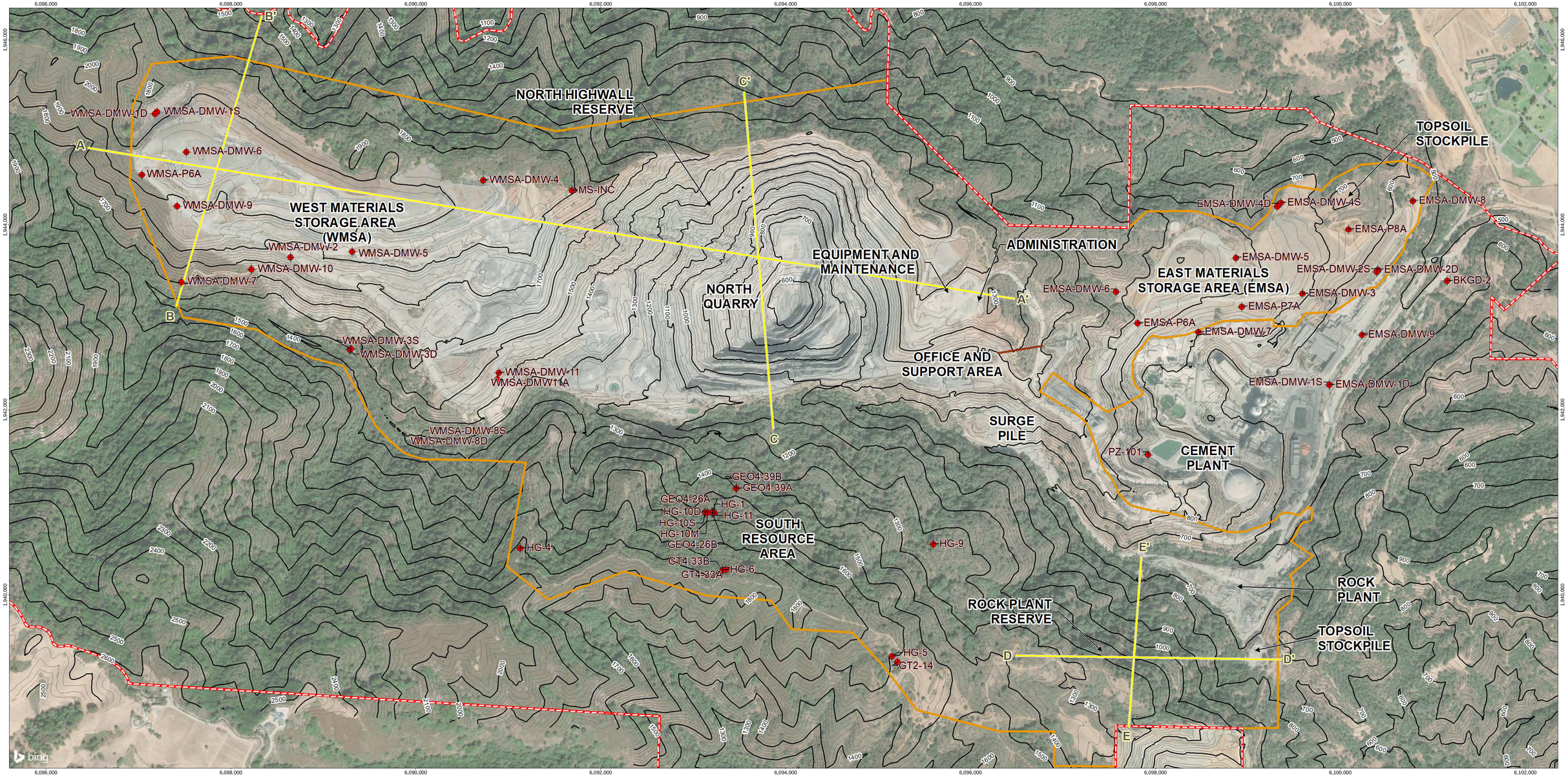
0 700 1,400 2,800 Feet

Reclamation Phasing

PERMANENTE QUARRY RECLAMATION PLAN AMENDMENT

Figure 14

SHEETS



Legend

- Well Location
- Conveyor Tunnel
- Cross-Section

Existing Topography

- 100 ft Index Contour
- 20 ft Contour
- RPA Boundary
- Property Boundary

Notes

1. Coordinate System: NAD 1983 StatePlane California III FIPS 0403 Feet

2. Background: BING Imagery Service © 2019 Microsoft Corporation © 2019 DigitalGlobe ©CNES (2019) Distribution Airbus DS, Existing Topography

N

0 1,000 2,000 Feet

(At original document size of 11x17)
1:6,000

REGISTERED PROFESSIONAL ENGINEER
NELSON KAWAMURA
GE 2868
EXP. 9/30/2019
GEOTECHNICAL
STATE OF CALIFORNIA

Nelson Kawamura

May 20, 2019

Stantec

Project Location
T07S, R02W
Santa Clara County, CA

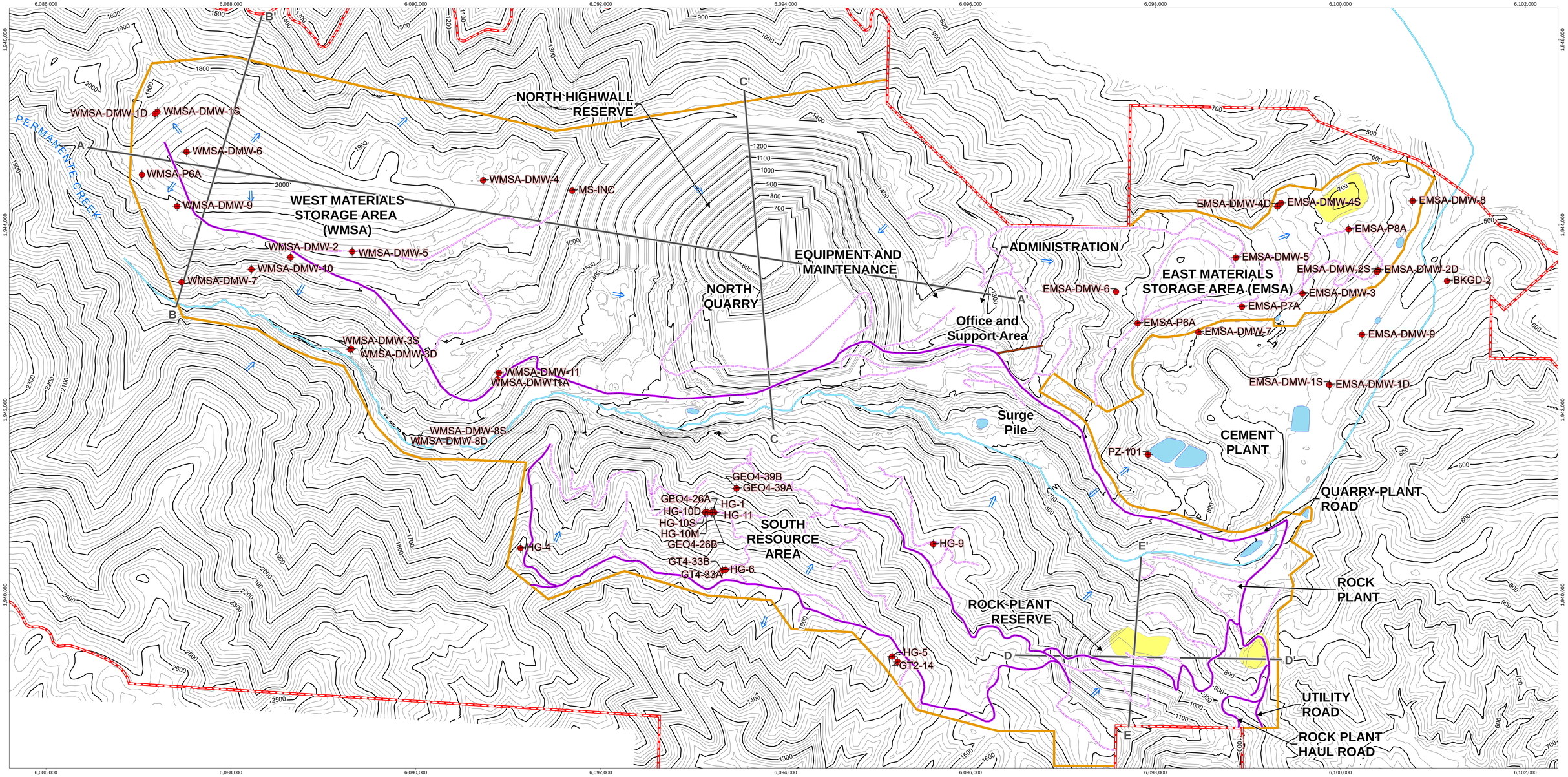
Review
Prepared by CBB on 2019-02-21
Final Review by PK on 2019-05-20

Client/Project
Lehigh Southwest Cement Company
Permanente Quarry Reclamation Plan Amendment

Figure No.
Sheet 1

Title
Existing Conditions

U:\233001289\gis_MXDs\Reclamation_Plan_Amendment\Lehigh_RPA_Existing_24x36_L_20190520.mxd Revised: 2019-05-20 By: JaJarvis



Legend

- Well Location
- Surface Flow Drainage
- Permanente Creek
- Cross-Section
- Conveyor Tunnel
- Road (Retained)
- Road (Reclaimed)
- Phase 3 - Extent of Mining Topography
- 100 ft Index Contour
- 20 ft Contour
- Stormwater Pond
- Soil Stockpile
- RPA Boundary
- Property Boundary

N

0 1,000 2,000 Feet

(At original document size of 24x36)
1:6,000

REGISTERED PROFESSIONAL ENGINEER
NELSON KAWAMURA
GE 2868
EXP. 9/30/2019
GEOTECHNICAL
STATE OF CALIFORNIA

Nelson Kawamura
May 20, 2019

Notes

1. Coordinate System: NAD 1983 StatePlane California III FIPS 0403 Feet

2. Background: Phase 3 - Extent of Mining Topography

3. Ramps, access roads, and primary travel routes vary in location and size throughout mine progression.

4. The planned surface disturbance boundary and mining depth are shown; however, the extent of operations may or may not reach these limits. Total acreage to be disturbed and reclaimed will be within the limits of the reclamation plan boundary. Facilities and configurations within this boundary are approximate. All acreages are approximate and not intended to reflect goals for any particular surface type. Variations are subject to actual mined conditions and will not affect success of postmining land uses.

5. Active slopes may be steeper and have different bench intervals than final reclaimed cut slopes.

6. Topsoil locations may vary.

Stantec

Project Location
T07S, R02W
Santa Clara County, CA

Review
Prepared by CBB on 2019-02-21
Final Review by PK on 2019-05-20

Client/Project
Lehigh Southwest Cement Company
Permanente Quarry Reclamation Plan Amendment

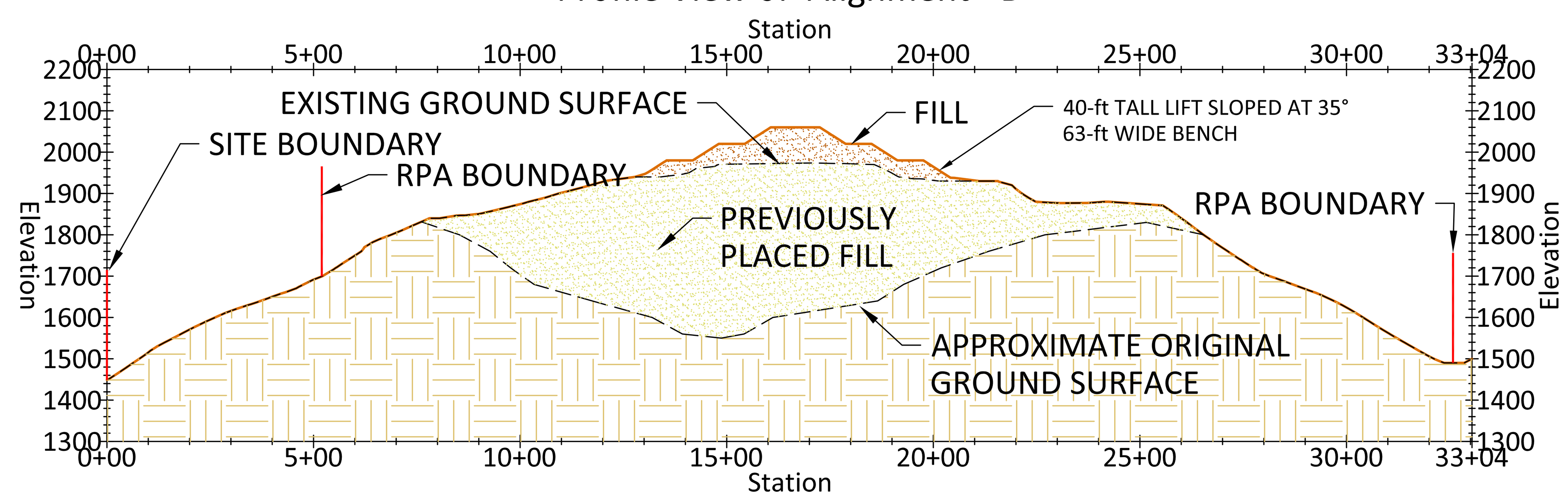
Figure No.
Sheet 2

Title
Mine Plan

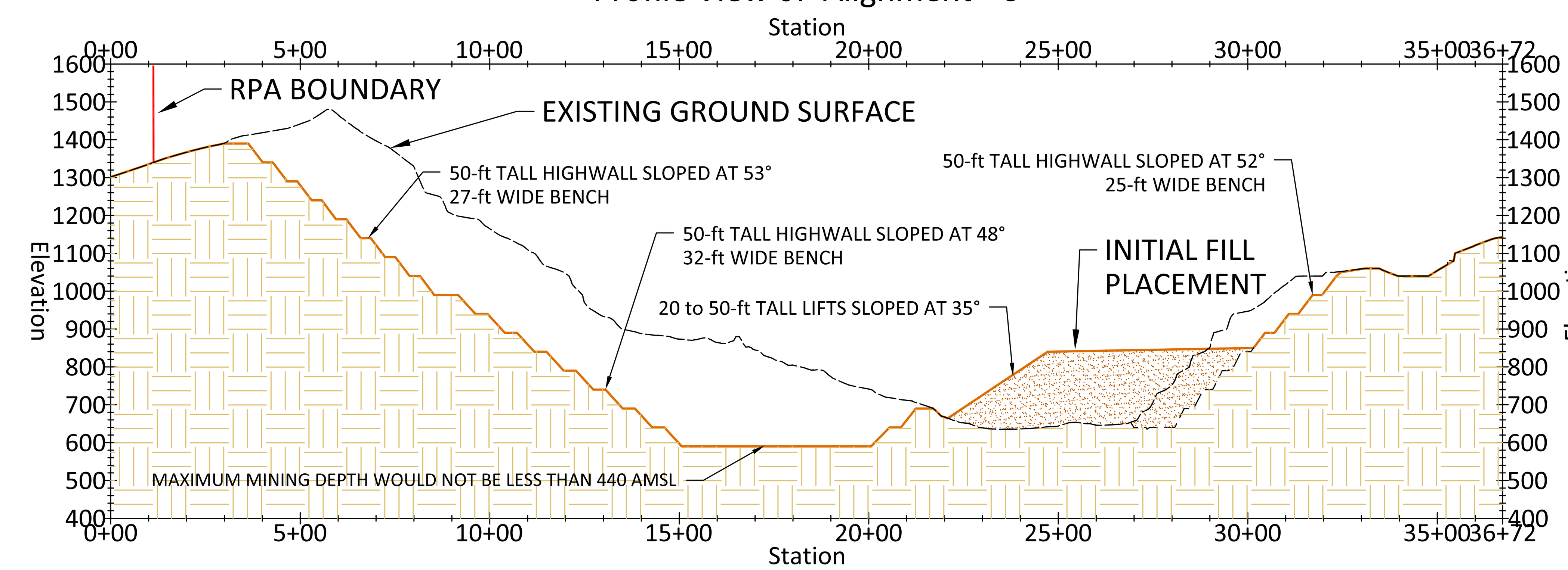
U:\23300\1289\gis_MXDs\Reclamation_Plan_Amendment\Lehigh_RPA_MinePlan_24x36_L_20190520.mxd Revised: 2019-05-20 By: JaJarvis

Profile View of Alignment - A

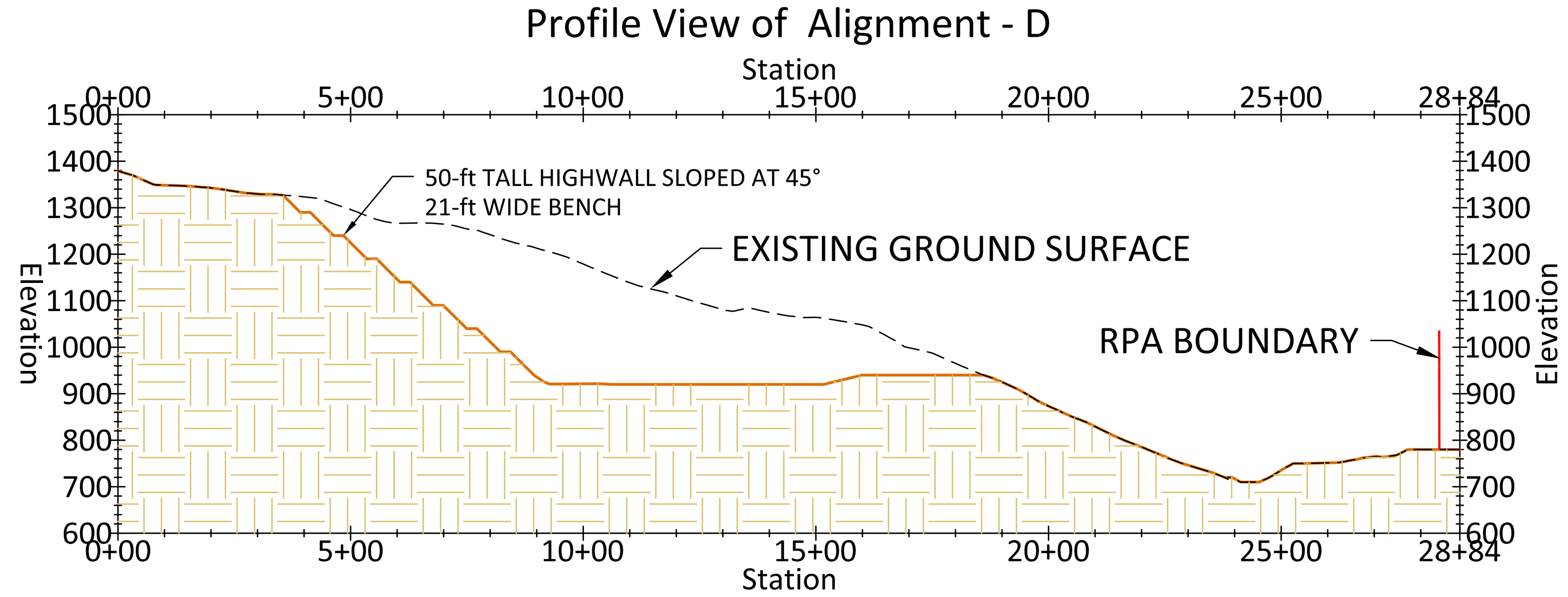
Profile View of Alignment - B



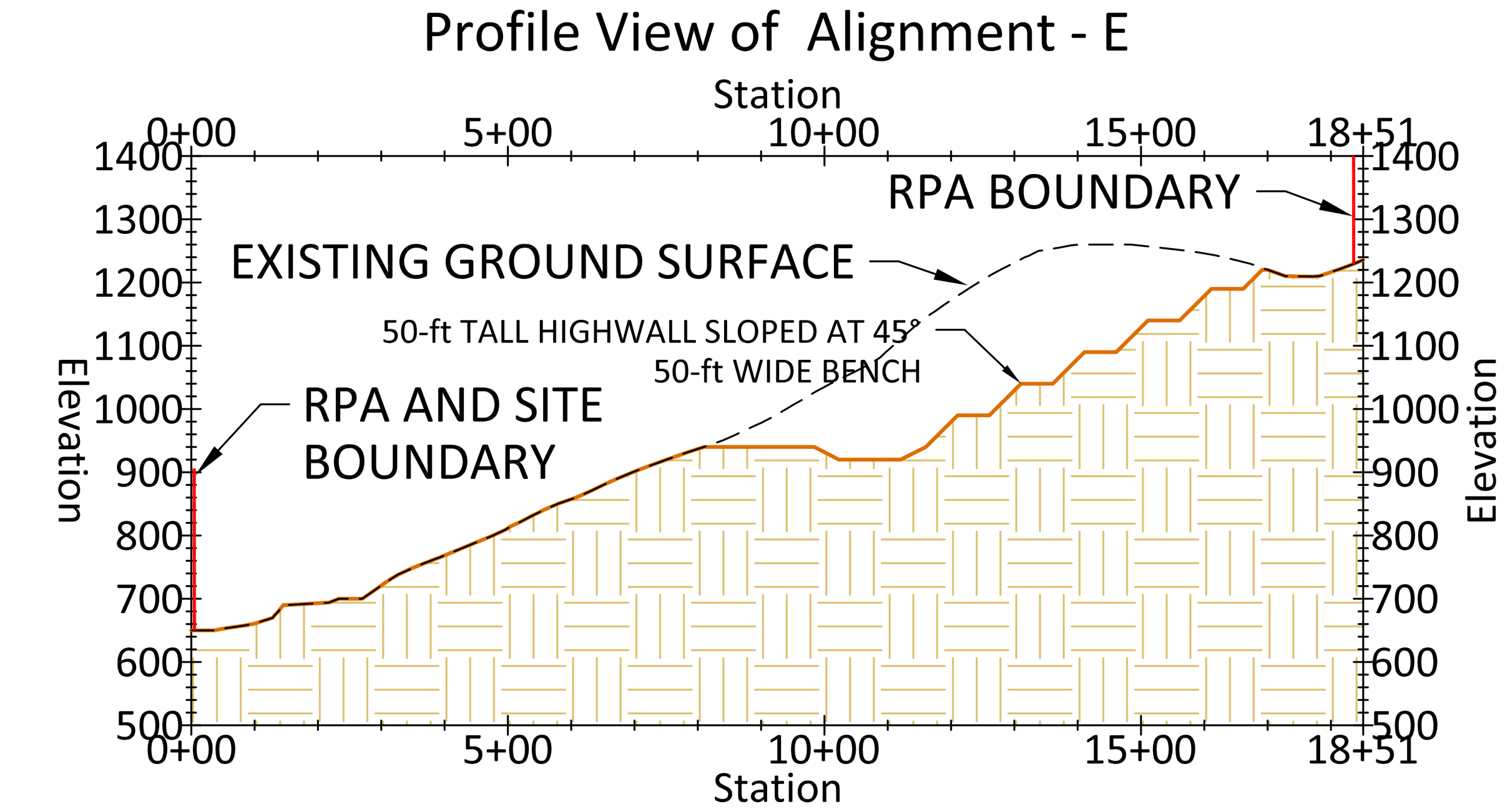
Profile View of Alignment - C



Profile View of Alignment - D



Profile View of Alignment - E



Stantec

Legend

- RPA or Property Boundary
- Existing Ground Surface
- Proposed Ground Surface
- Native Ground
- Previously Placed Fill
- Proposed Fill

REGISTERED PROFESSIONAL ENGINEER
NELSON KAWAMURA
GE 2868
EXP. 9/30/2019
GEOTECHNICAL
STATE OF CALIFORNIA

Nelson Kawamura
May 20, 2019

0 300' 600'
1:3,600 (At original document size of 24x36)

Project Location
T07S, R02W
Santa Clara County, CA

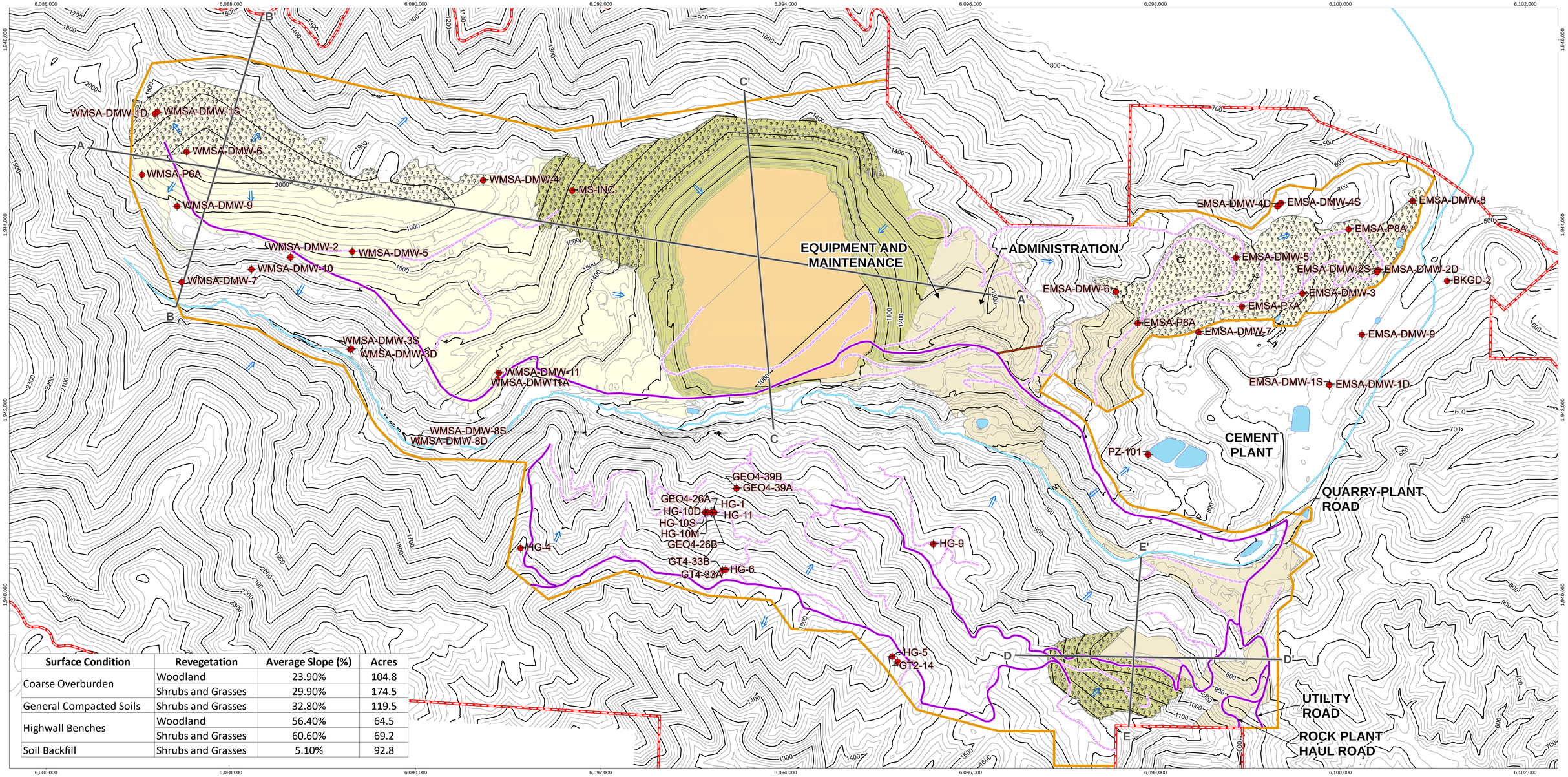
Review
Prepared by PK on 2019-05-20
Final Review by GG on 2019-05-20

Client/Project
Lehigh Southwest Cement Company
Permanente Quarry Reclamation Plan Amendment

Figure No.
Sheet 3

Title
Mine Plan Cross-Sections

ORIGINAL SHEET - ARCH D



Surface Condition	Revegetation	Average Slope (%)	Acres
Coarse Overburden	Woodland	23.90%	104.8
	Shrubs and Grasses	29.90%	174.5
General Compacted Soils	Shrubs and Grasses	32.80%	119.5
Highwall Benches	Woodland	56.40%	64.5
	Shrubs and Grasses	60.60%	69.2
Soil Backfill	Shrubs and Grasses	5.10%	92.8

Legend

- Well Location
- Surface Flow Drainage
- Permanente Creek
- Abandoned Conveyor Tunnel
- Road (Retained)
- Road (Reclaimed)
- Cross-Section
- Phase 4 - Reclamation Topography
- 100 ft Index Contour
- 20 ft Contour
- Stormwater Pond
- RPA Boundary
- Property Boundary
- Coarse Overburden (Woodland)
- Coarse Overburden (Shrubs and Grasses)
- General Compacted Soils (Shrubs and Grasses)
- Highwall Benches (Woodland)
- Highwall Benches (Shrubs and Grasses)
- Soil Backfill (Shrubs and Grasses)

N

0 1,000 2,000 Feet

(At original document size of 24x36)
1:6,000

REGISTERED PROFESSIONAL ENGINEER
NELSON KAWAMURA
GE 2868
EXP. 9/30/2019
GEOTECHNICAL
STATE OF CALIFORNIA

Nelson Kawamura
May 20, 2019

Notes

1. Coordinate System: NAD 1983 StatePlane California III FIPS 0403 Feet

2. Background: Phase 4 - Reclamation Topography

3. The planned surface disturbance boundary and depth are shown; however, the extent of operations may or may not reach these limits. Total acreage to be disturbed and reclaimed will be within the limits of the reclamation plan boundary. Facilities and configurations within this boundary are approximate. All acreages are approximate and not intended to reflect goals for any particular surface type. Variations are subject to actual mined conditions and will not affect success of postmining land uses.

4. Some mined materials will be unusable and varying market conditions may result in additional unsaleable materials (e.g., greenstone). Thus, the volumes of overburden and fill material and, therefore, the ultimate configuration of the reclaimed quarry may vary from the configuration shown. The graphic represents the types of surfaces that would be reclaimed (e.g., overburden, backfill, highwall benches). The final configuration of these surfaces has no bearing on the success of mine reclamation because reclamation would be completed according to plan surface treatment criteria.

Stantec

Project Location
T07S, R02W
Santa Clara County, CA

Review
Prepared by CBB on 2019-02-21
Final Review by PK on 2019-05-20

Client/Project
Lehigh Southwest Cement Company
Permanente Quarry Reclamation Plan Amendment

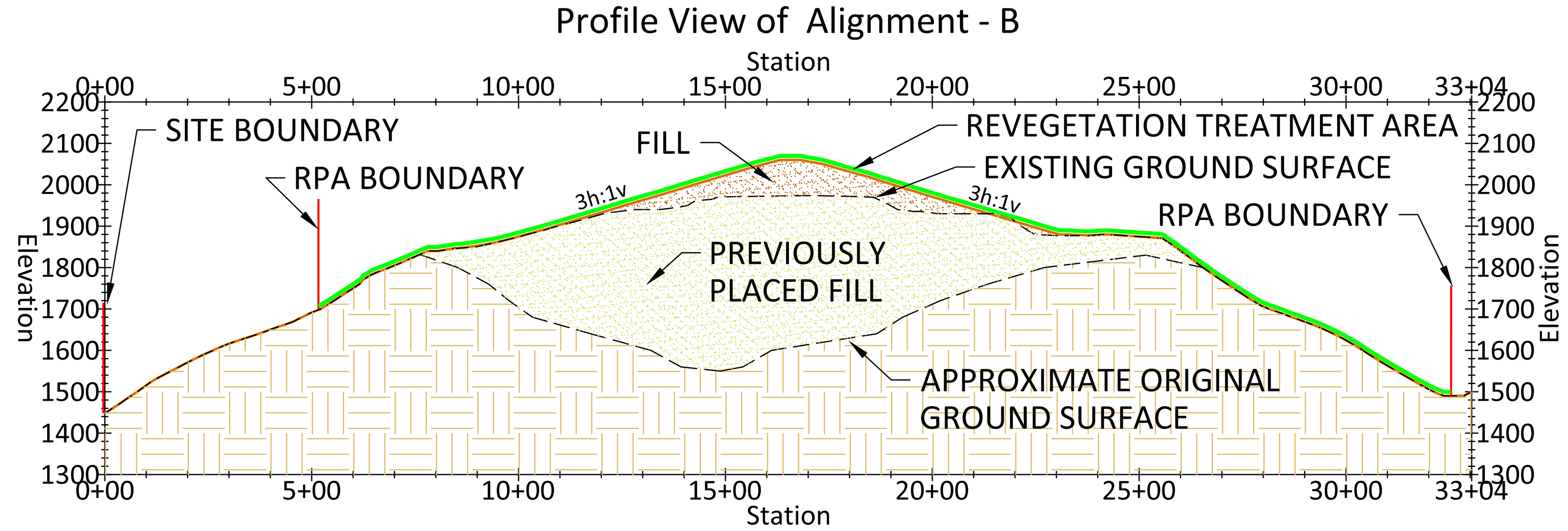
Figure No.
Sheet 4

Title
Reclamation Plan

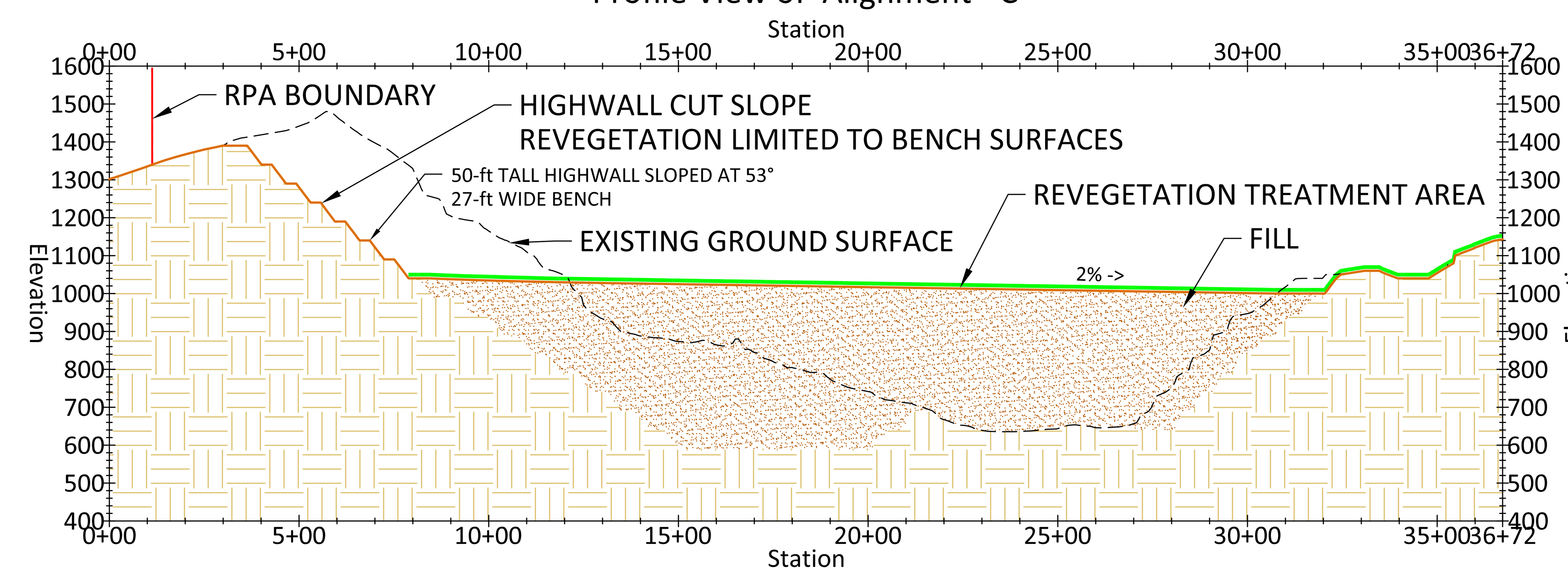
U:\233001289\gis_MXDs\Reclamation_Plan_Amendment\Lehigh_RPA_ReclamationPlan_24x36_L_20190520.mxd Revised: 2019-05-20 By: JaJarvis

Profile View of Alignment - A

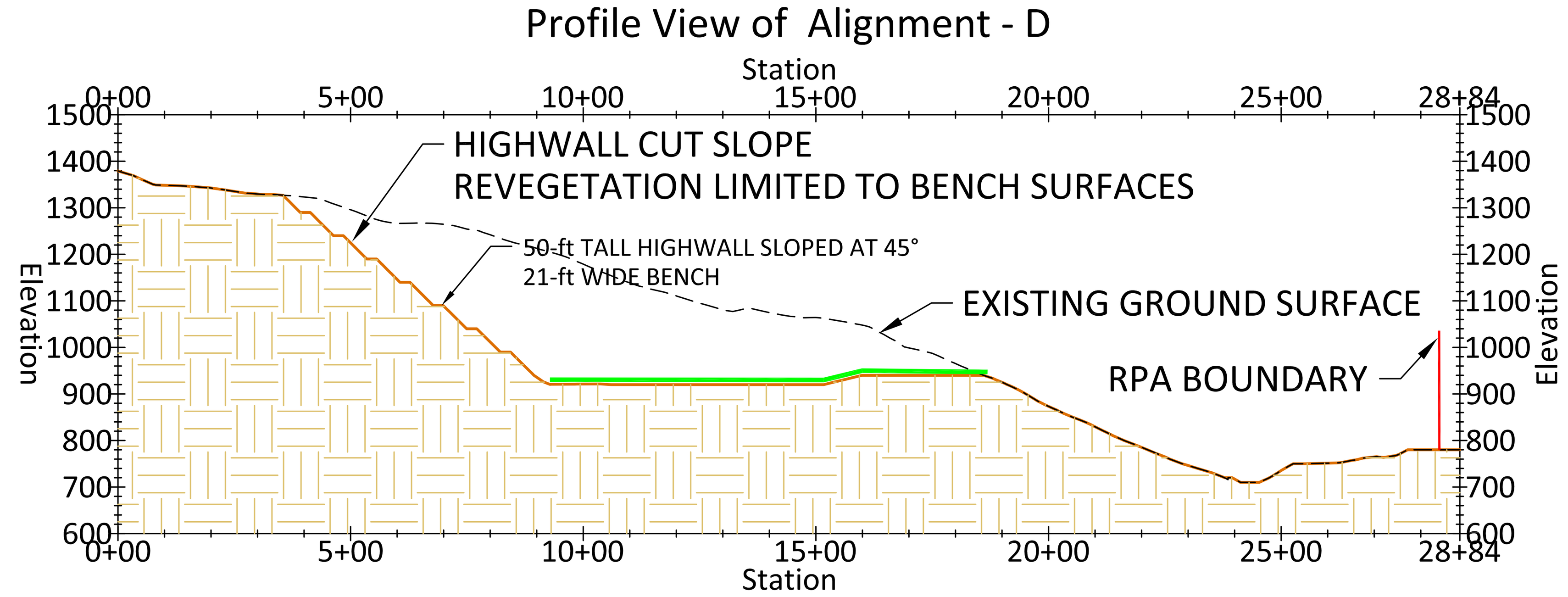
Profile View of Alignment - B



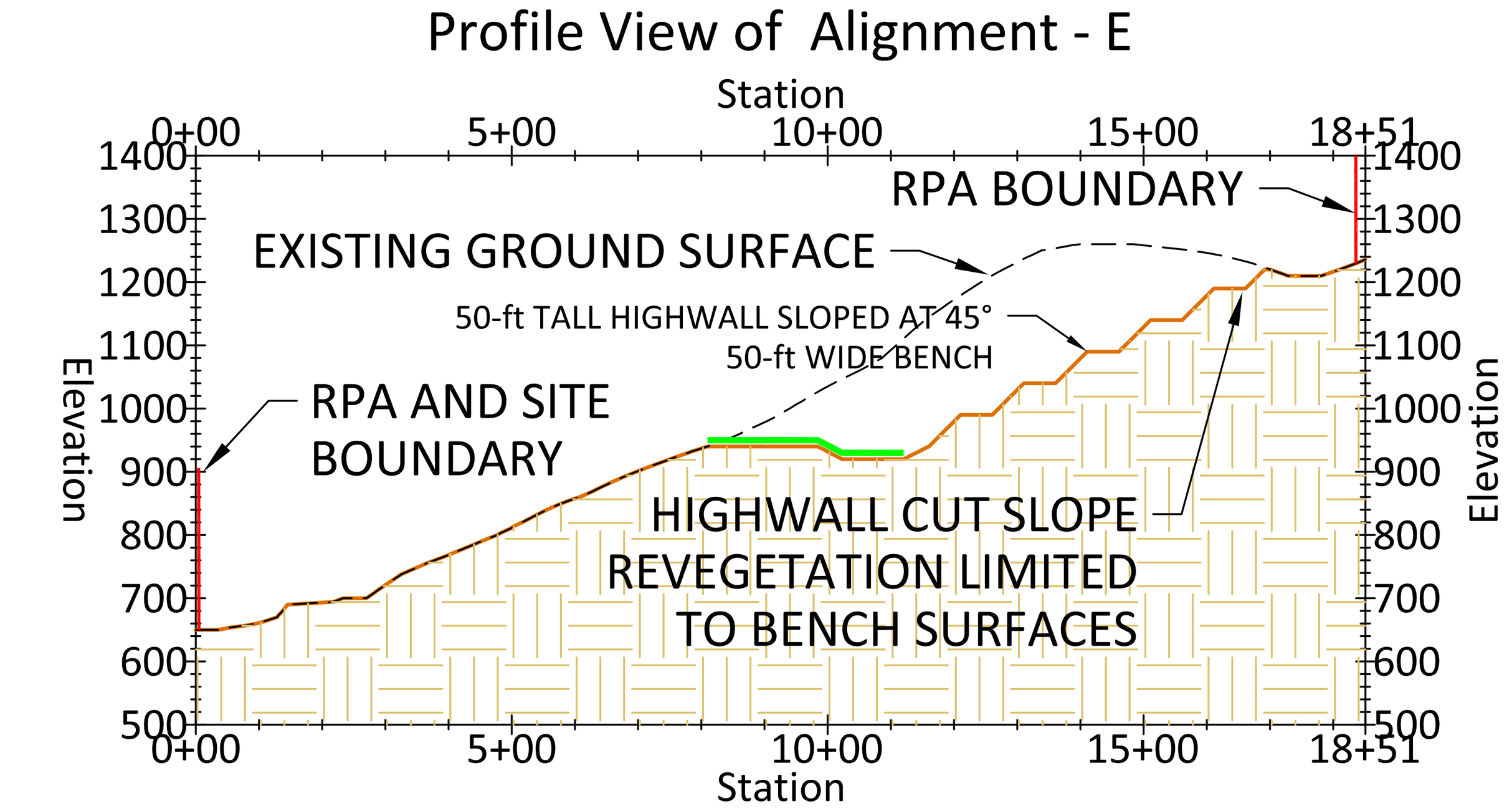
Profile View of Alignment - C



Profile View of Alignment - D



Profile View of Alignment - E



Stantec

Legend

- RPA or Property Boundary
- Revegetation Treatment Area
- Existing Ground Surface
- Proposed Ground Surface
- Native Ground
- Previously Placed Fill
- Proposed Fill

May 20, 2019

0 300' 600'
1:3,600 (At original document size of 24x36)

Project Location
T07S, R02W
Santa Clara County, CA

Review
Prepared by PK on 2019-05-20
Final Review by GG on 2019-05-20

Client/Project
Lehigh Southwest Cement Company
Permanente Quarry Reclamation Plan Amendment

Figure No.
Sheet 5

Title
Reclamation Plan Cross-Sections

ORIGINAL SHEET - ARCH D

REFERENCES AND RESOURCES

REFERENCES AND RESOURCES

California Department of Conservation. 2009a. Farmland Mapping and Monitoring Program (FMMP), 2006-2008 Land Use Conversion.

California Department of Toxic Substances Control. 2001 (October). Information Advisory, Clean Imported Fill Material. Available: https://www.dtsc.ca.gov/Schools/upload/ SMP_FS_Cleanfill-Schools.pdf. Accessed January 22, 2019.

California Oak Mortality Task Force. 2008 (May). List of P. ramorum regulated hosts and associated plants. Available at: http://www.suddenoakdeath.org/html/host_plant_lists.html.

Cal-IPC. 2006. California Invasive Plant Inventory. Cal-IPC Publication 2006-02. California Invasive Plant Council, Berkeley, CA. Available: www.cal-ipc.org/inventory.

City of Cupertino. 2018 (September 18). City of Cupertino Land Use Map. Adopted November 15, 2005. Cupertino, CA.

City of Palo Alto. 2017 (November 20). 2030 Comprehensive Plan and Comprehensive Plan Land Use Designation Map. Available: https://www.cityofpaloalto.org/gov/depts/pln/long_range_planning/ 2030_comprehensive_plan/default.asp. Accessed April 10, 2019.

COMTF. *See* California Oak Mortality Task Force.

DTSC. *See* California Department of Toxic Substances Control.

Kaiser Cement & Gypsum Corporation. 1972 (August 18). *Ridgeline Protection Easement Deed*. Provided to Santa Clara County, San Jose, CA.

Santa Clara County. 2007 (August 14). *Santa Clara County, California, Drainage Manual 2007*. San Jose, CA.

Santa Clara County. 2011a. Online Property Profile. Available: http://sccplanning.org/gisprofile/. Accessed October 6, 2011.

Santa Clara County. 2011b (December). *Lehigh Permanente Quarry Reclamation Plan Amendment Environmental Impact Report*. State Clearinghouse No. 2010042063.San Jose, CA.

Santa Clara County. 2016 (August 29). Zoning Maps, Department of Planning and Development. Available: https://www.sccgov.org/sites/dpd/PlansOrdinances/Zoning/Pages/Zoning.aspx. Accessed March 15, 2019.

Santa Clara County. 2019. Santa Clara County Online Property Profile. Available: http://www.sccpropertyinfo.org/. Accessed February 2019.

ParcelQuest. 2019. Database search. Available: parcelquest.com. Accessed February 2019.

U.S. Department of Agriculture, Natural Resources Conservation Service. 1968 (June). *Soils of Santa Clara County*.

U.S. Department of Agriculture, Natural Resources Conservation Service. 2011 (November 1). *Custom Soil Resource Report for Santa Clara Area, California, Western Part, Lehigh Permanente Quarry RPA*.

THIS PAGE
INTENTIONALLY
LEFT BLANK

GLOSSARY

GLOSSARY

ancillary facilities: Support structures and equipment.

backfill: Earth, overburden, mine waste, or imported material used to replace material removed during mining.

bedrock: A general term for the rock, usually solid, that underlies soil or other unconsolidated, bed material.

bench interval: The difference in vertical elevation between any two consecutive benches.

best management practices (BMPs): Methods or techniques found to be the most effective and practical means in preventing or reducing the amount of water pollution.

berm: An elongated earthen structure that acts as a barrier (e.g., to make it difficult for a vehicle to cross or to redirect the flow of water).

contamination: An impairment of the quality of waters of the state to a degree that creates a public health hazard through poisoning or the spread of disease.

cut and fill: The act of cutting into a slope and using the soil to backfill an area. A common example is the construction of a roadway on a slope, where earth is removed from the upper side of the cut into the hill and used to fill the lower or outer edge of the cut to widen the road.

drainage: A natural channel through which water flows at some time of the year. A natural or artificial system of surface and subsurface passages by which water discharges.

easement: A right to cross or use someone else's land for a specified purpose.

economic: Profitable under defined investment assumptions established, analytically demonstrated, or assumed with reasonable certainty.

entitlement: A permit or other instrument typically granted by local governments entitling the holder to develop or improve land and/or existing structures and facilities consistent with the terms granted.

environment: The physical conditions that exist within the area proposed to be affected by a project or alternative, including land, air, water, minerals, flora, fauna, ambient noise, and objects of historical or aesthetic significance (California Environmental Quality Act Section 21060.5). The environment includes both natural and artificial conditions.

ephemeral stream: A stream or portion of a stream that flows temporarily in direct response to nearby precipitation and has a channel that is above the water table at all times.

erosion: The wearing away of soil and rock by weathering, mass wasting, and the action of streams, glaciers, waves, wind, and underground water.

factor of safety: The ratio of resisting force to driving force in a slope stability problem. A factor of safety of 1.0 represents the minimum factor of safety for which a slope is stable.

financial assurance cost estimate: The amount of money necessary to conduct and complete reclamation on the mined lands in accordance with the approved reclamation plan, plus a reasonable estimate of the administrative costs and expenses that would be incurred by the lead agency or the California Department of Conservation, the total of which must be calculated in accordance with California Code of Regulations Section 3804, and constitutes an obligation to pay by the operator.

final treatment system: An innovative treatment system to treat water generated by and stored in the North Quarry and Cement Plant water from the Reclaim Water System, before the water is discharged to Permanente Creek under an existing discharge permit. The treatment system was installed to meet the surface water effluent limits provided by the National Pollution Discharge Elimination System permit. See Appendix H, "Hydrologic Investigation," for additional details.

greenstone: A term applied to metabasalts within the Franciscan Complex. Unweathered greenstone is dark green to black and weathered greenstone is reddish brown.

Greenstone Slide: A mass of greenstone rock located on the North Quarry's northwest highwall. The slide, which covers about 50 acres, occurred in the early 1980s and was was due to a combination of geologic conditions involving faulting and dipping limestone.

groundwater: Subsurface water that is below the water table.

groundwater recharge: Replenishment of groundwater by precipitation, runoff, or artificial methods.

growth media: Geologic and organic materials, including soils, that are suitable for use in growing plants.

habitat: The place where an organism or a community of organisms lives, including all living and nonliving factors or conditions of the surrounding environment.

haul road: A road used by large-capacity, off-road trucks to haul ore and overburden from the open pit to other locations.

hazardous material: Material that, because of its quantity, concentration, or physical/chemical characteristics, poses a significant present hazard to human health and safety or to the environment. Hazardous materials include hazardous substances, hazardous waste, radioactive materials, and any material that a handler or the administering agency has a reasonable basis for believing would be injurious to the health and safety of persons or harmful to the environment if released into the workplace or the environment (California Health and Safety Code Section 2550.1).

highwall: The unexcavated face of exposed overburden and ore in a surface mine.

hydrology: The study of the properties, distribution, and circulation of water on the surface of the land, in the soil, and in the atmosphere.

infrastructure: The basic framework or underlying foundation of a community or project, including road networks, electric and gas distribution, water and sanitation services, and facilities.

jurisdictional wetlands: A wetland area identified and delineated by specific technical criteria, field indicators, and other information for purposes of public agency jurisdiction. The public agencies that administer jurisdictional wetlands are the U.S. Army Corps of Engineers, U.S. Environmental Protection Agency, U.S. Fish and Wildlife Service, and U.S Natural Resources Conservation Service.

lead agency: The state, county, or city agency with the authority to approve projects. In this case, Santa Clara County is the lead agency for reclamation plan approval.

mine: An opening or excavation in the earth for extracting specific minerals.

mineral resource: A concentration of naturally occurring solid, liquid, or gaseous material in or on the Earth's crust in such form and amount that economic extraction of a commodity from the concentration is currently or potentially feasible. The terms "resource" and "mineral resource" are synonymous in this report.

mineral reserve: The part of the resource base that could be economically extracted or produced at the time of determination. For the purposes of this report, the term "reserves" has been further restricted to

include only those deposits for which a valid mining permit has been granted by the appropriate lead agency or mining is allowed pursuant to a vested right.

Mineral Resource Zone (MRZ) categories: The California Geological Survey (formerly the Division of Mines and Geology) has regions of the state classified according to the presence or absence of significant concrete-grade aggregate deposits. The land classification is presented in the form of Mineral Resource Zones, or MRZs. See Table 1, "California Mineral Land Classification Diagram."

mining: The process or business of taking mineral substances from a pit, quarry, or excavation in conjunction with other permitted construction activities.

monitor: To systematically and repeatedly watch, observe, or measure environmental conditions to track changes.

native species: Plant species indigenous to California, using pre-European as the historic time reference.

noxious weeds: Any species of plant that is or is likely to become destructive or difficult to control or eradicate and is termed to be so by the director of the California Department of Food and Agriculture, Section 4500, Title 3 of the California Code of Regulations, pursuant to the Food and Agriculture Code Section 5004 et seq.

National Pollution Discharge Elimination System (NPDES): The NPDES permit program addresses water pollution by regulating point sources that discharge pollutants to waters of the United States.

native soil: Unconsolidated material present at the surface before mining operations began.

North Highwall Reserve: Limestone and aggregate minerals on vested land in the north highwall of the North Quarry.

ore: Rock that can be mined for extraction of a mineral commonly under conditions that allow a profit to be made.

overburden: Rock that contains mineral resources in quantities that cannot be economically extracted. Because such rock either lies on top of ore or is mixed in with the ore, overburden must be before or at the same time the ore is mined.

Permanente Ridge: The crest of topography that extends from east to west nearly 4 miles along the northerly portion of the Permanente property.

permeability: A measure of the ease with which a porous medium can transmit a liquid; the property of a soil that permits the passage of water.

project: As defined in California Environmental Quality Act (Public Resources Code Section 21065), and as applicable to Permanente Reclamation Plan Amendment, "project" means an activity that may cause either a direct physical change in the environment, or a reasonably foreseeable indirect physical change in the environment that involves the issuance of a lease, permit, license, certificate, or other entitlement for use by one or more public agencies. In this instance, the project is approval of a reclamation plan amendment.

property: All parcels at this location owned by Hanson Permanente Cement, Inc.

pseudostatic slope-stability analysis: Assesses the effects of earthquake shaking on artificial or natural slopes and the equilibrium conditions. The "limit equilibrium method" is used to investigate the dynamic effects of earthquake loading on a soil or slope. The output of the analysis is a factor of safety.

pseudostatic analysis: Used in earthquake engineering to analyze the seismic response of soil embankments and slopes. It involves using the static analysis of slope stability and incorporating a simulated horizontal force equal to the horizontal acceleration of the design earthquake multiplied by the mass of the potential sliding material.

pseudostatic factor of safety: The ratio of forces contributing to slope stability (e.g., intergranular friction and cohesion) versus forces working against slope stability (e.g., gravity, seismic acceleration) for a simulated seismic load. A pseudostatic factor of safety equal to 1.0 indicates that these forces are equal and slope movement may occur.

quarry: An open pit, mine, or excavation where stone, sand, gravel or mineral is obtained from open faces. Permanente Quarry is named for this feature, although there are other components of the operation. The quarry itself is termed North Quarry.

reclamation plan: The operator's completed and approved plan for reclaiming the lands affected by surface mining operations conducted after January 1, 1976, as called for in Section 2772 of the California Surface Mining and Reclamation Act.

reclamation boundary: The reclamation boundary demarcates the area of operations for which reclamation under California Surface Mining and Reclamation Act (SMARA) is required. The requirement to delineate a “reclamation plan boundary” first appeared in SMARA effective January 1, 2017 (see CCR 2772 [c][5][B]). The term is not defined by law or regulation.

registered civil engineer or certified engineering geologist: A civil engineer or engineering geologist registered or certified in the state of California.

regulation: A rule or order prescribed by government.

reserve: Mineral reserves are resources known to be economically feasible for extraction.

resoiling: The process of artificially building or reconstructing a soil profile.

Ridgeline Protection Easement Deed: An agreement Kaiser Cement & Gypsum Corporation granted to Santa Clara County in August 18, 1972. The intent of the deed was to preclude mining such that the northeast slope remained and views from northerly communities into the quarry were not created. The easement lies along the rim of the North Quarry for a distance of approximately two-thirds mile.

riparian: Pertaining to or situated on the bank of a river, stream, or other body of water. Riparian is normally used to refer to plants that grow along streams, rivers, or at spring and seep sites.

riparian habitat: The area where land and a river or stream interface and provide habitats and communities for hydrophilic plants.

riparian vegetation: Hydrophilic plants along the river or stream margins and banks.

Rock Plant Reserve: Limestone and aggregate minerals on vested land at the southern extent of the Permanente property.

sediment: (1) Particles derived from rocks or biological materials that have been transported by a fluid. (2) Solid material (sludges) suspended in or settled from water. A collective term meaning an accumulation of soil, rock, and mineral particles transported or deposited by flowing water.

sedimentation: The process of settling or being deposited as a sediment.

sensitive species: A plant or animal species recognized by the federal or state government as threatened, endangered, or a species of special concern.

shall: That which is obligatory or necessary.

should: Signifies a directive to be honored if at all possible.

siltation: A process by which water becomes dirty as a result of fine mineral particles in the water. When sediment, or silt, is suspended in water, this is an example of siltation.

site: The area encompassed by the amended reclamation boundary.

slope ratio: The ratio of change in horizontal distance to the change in vertical elevation expressed as two numbers separated by a colon (e.g., 2:1, or 2H:1V)

soil erosion: Movement of soil through the action of natural physical processes primarily associated with the action of wind and water. Soil erosion includes detachment, transport, and subsequent deposition of soil particles.

special-status species: Special-status species include:

- designated (rare, threatened, or endangered) and candidate species listed by the California Department of Fish & Wildlife (CDFW);
- designated (threatened or endangered) and candidate species listed by the U.S. Fish and Wildlife Service (USFWS);
- species considered to be rare or endangered under the conditions of Section 15380 of the California Environmental Quality Act Guidelines, such as those identified on lists 1A, 1B, and 2 in the 2001 Inventory of Rare and Endangered Plants of California by the California Native Plant Society (CNPS); and
- possibly other species considered sensitive or of special concern because of limited distribution or lack of adequate information to permit listing or rejection for federal or state status, such as those included on list 3 in the CNPS Inventory or identified as animal “California Special Concern” (CSC) species by CDFW. Species designated as CSC have no legal protective status under the California Endangered Species Act but are of concern to CDFW.

species of special concern: Per the California Department of Fish and Wildlife: [A] species, subspecies, or distinct population of an animal [i.e., fish, amphibian, reptile, bird and mammal] native to California that currently satisfies one or more of the following (not necessarily mutually exclusive) criteria:

- is extirpated from the State or, in the case of birds, is extirpated in its primary season or breeding role;
- is listed as Federally-, but not State-, threatened or endangered; meets the State definition of threatened or endangered but has not formally been listed;
- is experiencing, or formerly experienced, serious (noncyclical) population declines or range retractions (not reversed) that, if continued or resumed, could qualify it for State threatened or endangered status;
- has naturally small populations exhibiting high susceptibility to risk from any factor(s), that if realized, could lead to declines that would qualify it for State threatened or endangered status.

static slope-stability analysis: Assesses the safe design of a human-made or natural slopes and the equilibrium conditions. The “limit equilibrium method” is used to investigate the equilibrium of a soil mass tending to slide down under the influence of gravity. The output of the analysis is a factor of safety.

stockpile: Material placed to create a reserve for loading, to use for sale, as topsoil, or other purposes.

topsoil: The upper part of the soil profile that is relatively rich in humus, which is technically known as the A-horizon of the soil profile.

vegetative cover: The vertical projection of the crown or shoot area of a species to the ground surface expressed as a percentage of the reference area.

vested: A vested mine is an operation that was established legally within the regulations in place at that time. These mines are "grandfathered" and do not require use permits for certain types of future expansions. The County Board of Supervisors recognized Permanente Quarry's vested rights at a public hearing on February 8, 2011. A vested operation is recognized under the California Surface Mining and Reclamation Act as having authorization to mine.

waste discharge requirements (WDRs): Waste discharges that can be exempted from the California Code of Regulations requirements are issued WDRs and are regulated by the WDR Program. Typical discharge types include domestic or municipal wastewater, food processing–related wastewater, and industrial wastewater.

waste rock: *See overburden.*

watershed: The geographic region from which water drains into a particular stream, river, or body of water. A watershed includes hills, lowlands, and the body of water into which the land drains. Watershed boundaries are defined by the ridges or divides separating them. Also called a "drainage area."

water table: The level below the surface of the ground where water can be found.

wetlands: Lands that may be covered periodically or permanently with shallow water and include saltwater marshes, freshwater marshes, open or closed brackish water marshes, swamps, mudflats, fens, and vernal pools (California Fish and Game Code, Section 2785, Subdivision g).

TABLE 1
CALIFORNIA MINERAL LAND CLASSIFICATION DIAGRAM

Increasing Economic Value →

	AREAS OF IDENTIFIED MINERAL RESOURCE SIGNIFICANCE		AREAS OF UNDETERMINED MINERAL RESOURCE SIGNIFICANCE		AREAS OF UNKNOWN MINERAL RESOURCE SIGNIFICANCE
	Demonstrated Measured/ Indicated	Inferred			
ECONOMIC	**MRZ-2a** Reserves	**MRZ-2b** Inferred Resources	**MRZ-3a** KNOWN MINERAL OCCURENCE	**MRZ-3b** INFERRED MINERAL OCCURENCE	**MRZ-4** NO KNOWN MINERAL OCCURENCE
MARGINALLY ECONOMIC	**MRZ-2a** Marginal Reserves	**MRZ2b** Inferred Marginal Resources			
SUB-ECONOMIC	**MRZ-2b** Demonstrated Subeconomic Resources	**MRZ-2b** Inferred Subeconomic Resources			
NON-ECONOMIC	AREAS OF NO MINERAL RESOURCE SIGNIFICANCE **MRZ-1**				

←Increasing Knowledge of Resources

Mineral Land Classification Diagram Nomenclature:

MINERAL DEPOSIT: A mass of naturally occurring mineral material, e.g. metal ores or nonmetallic minerals, usually of economic value, without regard to mode of origin. The mineral material may be of value for its chemical and/or physical characteristics.

MINERAL OCCURRENCE: Any ore or economic mineral in any concentration found in bedrock or as float; especially a valuable mineral in sufficient concentration to suggest further exploration.

ECONOMIC: This term implies that profitable extraction or production under defined investment assumptions has been established, analytically demonstrated, or assumed with reasonable certainty.

MINERAL RESOURCE: A concentration of naturally occurring solid, liquid, or gaseous material in or on the Earth's crust in such form and amount that economic extraction of a commodity from the concentration is currently or potentially feasible. The terms resource and mineral resource are synonymous in this report.

RESERVES: That part of the resource base which could be economically extracted or produced at the time of determination. For the purposes of this report, the term reserves has been further restricted to include only those deposits for which a valid mining permit has been granted by the appropriate lead agency.

IDENTIFIED MINERAL RESOURCES: Resources whose location, grade, quality, and quantity are known or estimated from specific geologic evidence. Identified mineral resources include economic, marginally economic, and subeconomic components. To reflect varying degrees of geologic certainty, these economic divisions can be subdivided into demonstrated and inferred.

DEMONSTRATED: A term for the sum of measured plus indicated.

MEASURED: Quantity is computed from dimensions revealed in outcrops, trench workings, or drill holes; grade and/or quality are computed from the results of detailed sampling. The sites for inspection, sampling, and measurement are spaced so closely and the geologic character is so well defined that size, shape, depth, and mineral content of the resource are well established.

INDICATED: Quantity and grade and/or quality are computed from information similar to that used for measured resources, but the sites for inspection, sampling, and measurement are farther apart or otherwise less adequately spaced. The degree of assurance, although lower than that for measured resources, is high enough to assume continuity between points of observation.

INFERRED: Estimates are based on an assumed continuity beyond measured and/or indicated resources, for which there is geologic evidence. Inferred resources may or may not be supported by samples or measurements.

MARGINAL RESERVES: That part of the demonstrated reserve base that, at the time of determination, borders on being economically producible. The essential characteristic of this term is economic uncertainty. Included are resources that would be producible, given postulated changes in economic or technologic factors.

MARGINAL RESOURCES: That part of the inferred resource base that, at the time of determination, would be economically producible, given postulated changes in economic or technologic factors.

SUBECONOMIC RESOURCES: The part of identified resources that does not meet the economic criteria of marginal reserves and marginal resources.

Source: California Mineral Land Classification Diagram. Diagrammatic relationship of mineral resource zone categories to the resource/reserve classification system. Adapted from U.S. Bureau of Mines/U.S. Geological Survey (1980).