SEQUOIA
Ecological Consulting, Inc.

Date: June 15, 2022

To: Amanda Musy-Verdel, PE, QSD
Hanna-Brunetti
7651 Eigleberry Street
Gilroy, CA 95020

From: Amanda Werrell, M.S.
Staff Biologist
Sequoia Ecological Consulting, Inc.

RE: **Asphalt Grindings Technical Memorandum**

Dear Ms. Musy-Verdel

Introduction

Sequoia Ecological Consulting, Inc. (Sequoia) is assisting the Bourdet Family with remediation and abatement for the Notice of Violations they received from the County of Santa Clara and various regulatory resource agencies. As an ecological consulting firm, Sequoia is providing biological support, including preparation of the Biological Resources Report, preparation of regulatory permits ahead of stream restoration work, and assisting with cultural resource and archaeological consultation and other coordination and consulting tasks. Sequoia has been asked by Hanna-Brunetti to provide a technical report that addresses environmental impacts from the "Asphalt Grindings" used for road construction, as detailed in the violation notice, "PLN20-139_Incomplete." Sequoia Ecological Consulting reviewed all "Notice of Violation" and "Incomplete Letters" provided by the County of Santa Clara and California Department of Fish and Wildlife (CDFW) and will address comments from each letter pertaining to placement of asphalt grindings on the ranch road at Bourdet Ranch.

Background

The existing comments to be addressed regarding asphalt grindings stem from four (4) documents, and are as follows:

1. **CDFW "Notice of Violation of Fish and Game Code Section 1602, Pacheco Pass Highway, City of Hollister, Santa Clara County" (Page 7, October 2020).**

"***Road Construction – Deposit of Crumbled Pavement Where it may Pass into a Stream (Figure 6 and Figure 7)***

During the site visit, CDFW staff observed a large stockpile of material near the entrance to the property and adjacent to the downstream end of Harper Canyon Creek floodplain (37.103600° N and

121.337111° W, WGS 84). The material appeared to be crumbled asphalt pavement. Based on Google Earth aerials, it appears that the material in the stockpile is the same material that was placed on the road adjacent to Harper Canyon Creek, after the road was widened. The color of the stockpile material is the same as the color of the road and the stockpile reduced in size as the material was added to the road.

Google Earth aerials show that the road had been widened and covered with what appears to be crumbled asphalt pavement along approximately 0.84 miles (4230 feet). The road was widened from approximately 13 feet wide to 16 feet wide between April 12, 2015 and March 13, 2017. The road was further widened from approximately 16 feet wide to 20 feet wide and covered with crumbled asphalt pavement between March 13, 2017 and March 28, 2018.

In the Google Earth aerial dated April 12, 2015, the road was the color as would be expected for native soils in the area (light brown or off white) and stockpiles of material was absent. On March 13, 2017, the stockpile can be seen in the aerial, measured in Google Earth to be approximately 49,650 square feet. This aerial shows that the road had been widened and in some places was still light brown or off-white color, but in other places the road was a slight dark grey color. The March 28, 2018 aerial shows that the stockpile had been reduced in size by less than half compared to March 13, 2017 (measured in Google Earth to be approximately 23,100 square feet). The March 28, 2018 aerial shows that the road is covered by the dark grey material. The August 28, 2020 aerial shows that the stockpile is smaller, measured to be a minimum of 12,800 square feet.

Heavy equipment typically used for road construction can be viewed adjacent to the stockpile in Google Earth aerials dated March 13, 2017, March 28, 2018, March 31, 2018, and September 20, 2018. In review of Google Earth aerials, CDFW staff determined the equipment is to likely be two bulldozers, one scraper, and two single drum smooth wheeled rollers."

2. CDFW "Notice of Violation of Fish and Game Code Section 1602, Pacheco Pass Highway, City of Hollister, Santa Clara County" (Page 11, October 2020).

*"**Road Construction***
Crumbled asphalt pavement (also known as reclaimed asphalt pavement) can release toxic leachate, but tends to be attenuated by the soils lying beneath it (Mehta et al. 2017). However, Mehta et al. 2017 concludes that there should be a sufficient depth of soil column to attenuate the toxic leachate to assure that the leachate does not reach groundwater aquifers. The road along Harper Canyon Creek was covered with crumbled asphalt pavement. The location of the water table under the road is unknown. Based on Google Earth aerials, the road may be located within the creek floodplain during very high flow events. The estimated downstream 0.3 miles of road may be located within the creek floodplain during relatively lower flow events.

CDFW recommends that the crumbled asphalt pavement be removed from the road along Harper Canyon Creek. However, this may not be necessary if analysis shows the road, or sections thereof, will not be inundated by flow events. A toxicologist should investigate the toxicity of the crumbled asphalt pavement in relation to groundwater and the geomorphologist should analyze the road location in relation to flood events (e.g. 20-year, 50-year, 100-year events). If the crumbled asphalt pavement is desired to remain on the road, or sections thereof, the LSA Notification should include reports from the toxicologist and geomorphologist showing that toxic leachate deleterious to fish and wildlife will not pass into any stream. Any crumbled asphalt pavement removal work should be included in the LSA Notification."

3. File #PLN20-139 2020- Grading Abatement Application (Page 7, November 2020)

"Road Construction
32. The road along Harper Canyon Creek had been widened, and crumbled asphalt had been placed on top of the road surface. Only a portion of the road was addressed (Area B). The NOV discusses concerns over crumbled asphalt toxins potentially being released into groundwater or channel water. The NOV recommends analysis and potential removal of crumbled asphalt. If the crumbled asphalt needs to be removed, please propose a grading design for the area of the existing road."

Response: Based on a review of the current literature, it is unlikely that the crumbled asphalt pavement would release leachate with trace chemicals at concentrations of environmental concern. In addition, any chemicals present in the leachate are likely to be attenuated in the soil prior to reaching groundwater. On-site sampling may be conducted to confirm toxin absence and chemical levels in runoff from the road that would discharge to the creek. Please see the "Overview response to toxic leachate concerns" section below for additional detail.

4. File #PLN20-139 2020- Grading Abatement Application (Page 4, October 2021)

"22. Design Basis Report and Designs: There was not discussion regarding road crumbled asphalt leaching or potential dislodging by channel water (see CDFW NOV for details). If there is a potential for leaching into groundwater or for crumbled asphalt material to be deposed into the creek during flooding, there may need to be grading to remove this material. The Design Basis Report (or other document) can explain the analysis and results. The designs should show any grading that would need to be done."

Response: Based on a review of the current literature, it is unlikely that the crumbled asphalt pavement would release leachate with trace chemicals at concentrations of environmental concern.

There is one section of road (1500-feet) that falls within an area of occasional flooding, during which there may be potential for crumbled asphalt to be deposed into the creek. The likelihood of this deposition would be related to velocity of water, and integrity/compaction level of the asphalt, and has not been assessed in this report. On-site monitoring for erosion of the asphalt placement or assessment of the asphalt integrity may be required in this location. Please see the "Overview response to toxic leachate concerns" section below for additional detail.

5. **File #PLN20-139 2020- Additional Information / Issues of Concerns for Grading Abatement Application (Page 4, October 2021)**

   "Land Development Engineering
   5. Justify the need for the asphalt grindings placement along the ranch roads in general. There is a large placement of grindings to expand the ranch road just before reaching the secondary dwelling unit proposed to be legalized.. "

Response: Asphalt grindings were placed along the ranch road to improve road stability, reduce dust, and provide safe all-weather access along the road. Figure 1 illustrates the approximate placement of the asphalt grindings along the ranch road.

Figure 1. Approximate location of crumbled asphalt placed on road at Bourdet Ranch.

Overview response to toxic leachate concerns:

The primary concern across these comments is over the placement of crumbled asphalt pavement on the road adjacent to Harper Canyon Creek, and related concerns as to the potential for leaching of toxins from the crumbled asphalt reaching Harper Canyon Creek or groundwater aquifers. In this report, we will review existing background research on leachate from crumbled asphalt. Then, based on this review, and the specific project site's settings, determine if removal of this material from this road should be recommended.

Crumbled asphalt, also known as reclaimed asphalt pavement, it the product of recycling asphalt pavement. Asphalt recycling is a common practice with a recycling rate of more than 99% for reclaimed materials (Yang et al. 2020, Williams et al. 2020). These materials are commonly used in paving and shingles and has been a common practice since the 1970s (Williams et al. 2020, Mehta et al. 2017). Toxicants typically found or of concern in recycled asphalt pavement include heavy metals, particularly Lead, Cadmium, Copper, Zinc and Aluminum- and Polycyclic Aromatic Hydrocarbons (PAHs) (Spreadbury et al. 2021, Mehta et al. 2017). Batch tests using acid-based leaching solutions are representative of a landfill conditions (Spreadbury et al. 2021, Mehta et al. 2017). Column tests are considered more representative of true conditions (Spreadbury et al. 2021). As such, more attention was given to results from column tests in the literature review. In general, studies on toxins in reclaimed asphalt pavement have found concentrations of metals and PAH contaminants to generally be below limits for environmental concern and below EPA guidelines (Spreadbury et al. 2021, Yang et al. 2020, Mehta et al. 2017, Brandt and Groot 2001). While overall there is leaching of trace chemicals from reclaimed asphalt pavement, this does not necessarily mean that these chemicals pose environmental or health risks (Spreadbury et al. 2021). Of primary concern in the comments related to the crumbled asphalt use on site has been identified as concerns for leachate reaching groundwater or channel water, and potential for deleterious effects of such on fish and wildlife species.

<u>Specific Site Characteristics for Consideration:</u>

FEMA National Flood Hazard Layer and NRCS Web Soil Survey data were collected as part of this analysis (Attachments A - E). The FEMA National Flood Hazard Layer classifies much of the area in question as Zone D- Area of Undetermined Flood Hazard, and a portion of the road where it runs adjacent to the creek as Zone A- 1% Annual Chance Flood Hazard (approximately 1500 feet; Attachments A & B). This data corresponds with the NRCS Web Soil Survey- Flood Frequency Class (Attachment C) which shows "Occasional" flooding for the area indicated as Zone A on the FEMA maps and "None" for the area indicated as Zone D on the FEMA maps (Attachment A). NRCS Web Soil Survey data was also assessed for the following soil characteristics: Depth to Water Table, and Soil pH (Attachment D and Attachment E). NRCS Web Soil Survey data on Depth to Water Table (Attachment D) showed that all soil types in the assessed area were rated as having water tables at

depths of greater than 200cm (78 inches). NRCS Web Soil Survey data on Soil pH (1 to 1 Water) ranged from moderately acidic (1.3%) to slightly alkaline (14%) for the selected area mapped (Attachment E). The road passing through this area falls within slightly alkaline to slightly acidic soils (pH 6.3-7.5).

Analysis of likelihood of impacts:

Studies found that under nonacidic conditions, reclaimed asphalt pavement did not cause leachate with metal concentrations above EPA Maximum Concentration Levels for drinking water (Yang et al. 2020, Mehta et al. 2017). No major trace elements in rainwater (pH 5.0) column experiments exceeded US EPA drinking water secondary Maximum Contaminant Levels (MCLs) (Yang et al. 2020). A 2001 study (Brandt and Groot) found equilibrium PAH concentrations in leachate from asphalt to be within limits for potable water for European Economic Community (EEC)-countries. A New Jersey based study found that in flow-through column experiments using “rainwater” (pH 5.0), that overall PAHs from leachate were detected at concentrations below EPA guidelines (Mehta et al. 2017). Spreadbury et al. (2021) conducted a literature review of 17 studies on the impacts of reclaimed asphalt pavement from 41 sources, and found that overall, the risks of leaching were limited and unlikely to cause contamination of underlying or adjacent water supplies. In addition, based on site specific research, the on-site conditions are unlikely to be acidic and soil pH was found to be well above pH levels that were found to increase the likelihood of trace chemical concentrations in leachate being at level of environmental concern (Yang et al. 2020, Mehta et al. 2017). Mehta et al. (2017) also conducted toxicity screening in marine bacteria and fish embryos, while the results of this screening were confounded by high toxicity of the extraction media used and fungal pathogen derived from the soil column, significant toxicity from aqueous solutions from reclaimed asphalt pavement was not detected.

Conclusions:

Based on current research, it is unlikely that leachate from the reclaimed asphalt pavement would contain levels of toxins of environmental concern. Trace chemicals in leachate would likely be attenuated by surrounding soils before intersecting with groundwater. In addition, current literature review did not demonstrate findings of toxicity to fish and wildlife species associate with reclaimed asphalt pavement. However, specific on-site sampling may be beneficial to confirm these literature-based findings. The recommended area of interest if additional on-site investigation were to occur would be the approximately 1500-foot stretch of the access road falling within Zone A on the FEMA National Flood Hazard Layer which overlaps the area identified to have “Occasional” flooding in the NRCS Web Soil Survey- Flood Frequency Class data and is also the location where the road is in closest proximity to the creek. If leachate were to have any environmental impact to water resources, this area would be the most likely location for these impacts.

If you have any questions or concerns, please do not hesitate to contact me at the email or phone number listed below. Thank you for the opportunity to support you on this project.

Sincerely,

Amanda Werrell | Staff Biologist
Sequoia Ecological Consulting, Inc.
awerrell@sequoiaeco.com
www.sequoiaeco.com

References

Brandt, H.C.A., De Groot, P.C., 2001. Aqueous leaching of polycyclic aromatic hydrocarbons from bitumen and asphalt. Water Res. 35, 4200–4207. https://doi.org/10.1016/S0043-1354(01)00216-0

Licbinsky, R., Huzlik, J., Jandova, V., 2012. Leaching of harmful compounds from reclaimed asphalt under real conditions 1–10.

Mehta, Y., Ayman, A., Yan, B., McElroy, A., 2017. Environmental Impacts of Reclaimed Asphalt Pavement (RAP) Federal Highway Administration: FHWA-NJ-2017-008

Spreadbury, C.J., Clavier, K.A., Lin, A.M., Townsend, T.G., 2021. A critical analysis of leaching and environmental risk assessment for reclaimed asphalt pavement management. Sci. Total Environ. 775, 145741. https://doi.org/10.1016/j.scitotenv.2021.145741

Williams, B.A., Willis, J.R., Shacat, J. 2020. Asphalt Pavement Industry Survey on Recycled Materials and Warm-Mix Asphalt Usage: 2019. TRID, 30 Nov. 2021, https://trid.trb.org/view/1944091.

Yang, Q., Yin, H., He, X., Chen, F., Ali, A., Mehta, Y., Yan, B., 2020. Environmental impacts of reclaimed asphalt pavement on leaching of metals into groundwater. Transp. Res. Part D Transp. Environ. 85, 1–20. https://doi.org/10.1016/j.trd.2020.102415

Attachments

Attachment A: FEMA Flood zone map for Bourdet Ranch.

Attachment B: FEMA Regional map of flood hazard zones in the vicinity of Bourdet Ranch.

Attachment C: Map of Bourdet Ranch's access road flooding frequency class.

Attachment D: NRCS Web Soil Survey and Depth to Water table data.

Attachment E: Map of Bourdet Ranch's access road soil pH.

National Flood Hazard Layer FIRMette

FEMA

121°20'25"W 37°0'59"N

121°19'47"W 37°0'30"N

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

1:6,000

Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 Cross Sections with 1% Annual Chance
- 17.5 Water Surface Elevation
- Coastal Transect
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 6/9/2022 at 4:56 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

121°22'31.76"W 37°7'56.37"N

121°14'58.33"W 36°59'33.66"N

FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR DRAFT FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS

- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD

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- 513 Base Flood Elevation Line (BFE)
- Limit of Study
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NOTES TO USERS

For information and questions about this Flood Insurance Rate Map (FIRM), available products associated with this FIRM, including historic versions, the current map date for each FIRM panel, how to order products, or the National Flood Insurance Program (NFIP) in general, please call the FEMA Map Information eXchange at 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA Flood Map Service Center website at https://msc.fema.gov. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the website.

Communities annexing land on adjacent FIRM panels must obtain a current copy of the adjacent panel as well as the current FIRM Index. These may be ordered directly from the Flood Map Service Center at the number listed above.

For community and countywide map dates, refer to the Flood Insurance Study Report for this jurisdiction.

To determine if flood insurance is available in this community, contact your Insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

Basemap information shown on this FIRM was provided in digital format by the United States Geological Survey (USGS). The basemap shown is the USGS National Map: Orthoimagery. Last refreshed October, 2020.

This map was exported from FEMA's National Flood Hazard Layer (NFHL) on **6/9/2022 5:33 PM** and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time. For additional information, please see the Flood Hazard Mapping Updates Overview Fact Sheet at https://www.fema.gov/media-library/assets/documents/118418

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards. This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date.

SCALE

Map Projection:
GCS, Geodetic Reference System 1980;
Vertical Datum: No elevation features on this FIRM
For information about the specific vertical datum for elevation features, datum conversions, or vertical monuments used to create this map, please see the Flood Insurance Study (FIS) Report for your community at https://msc.fema.gov

N

1 inch = 2,000 feet 1:24,000

0 1,000 2,000 4,000 6,000 8,000 Feet

0 210 420 840 1,260 1,680 Meters

NATIONAL FLOOD INSURANCE PROGRAM

FLOOD INSURANCE RATE MAP

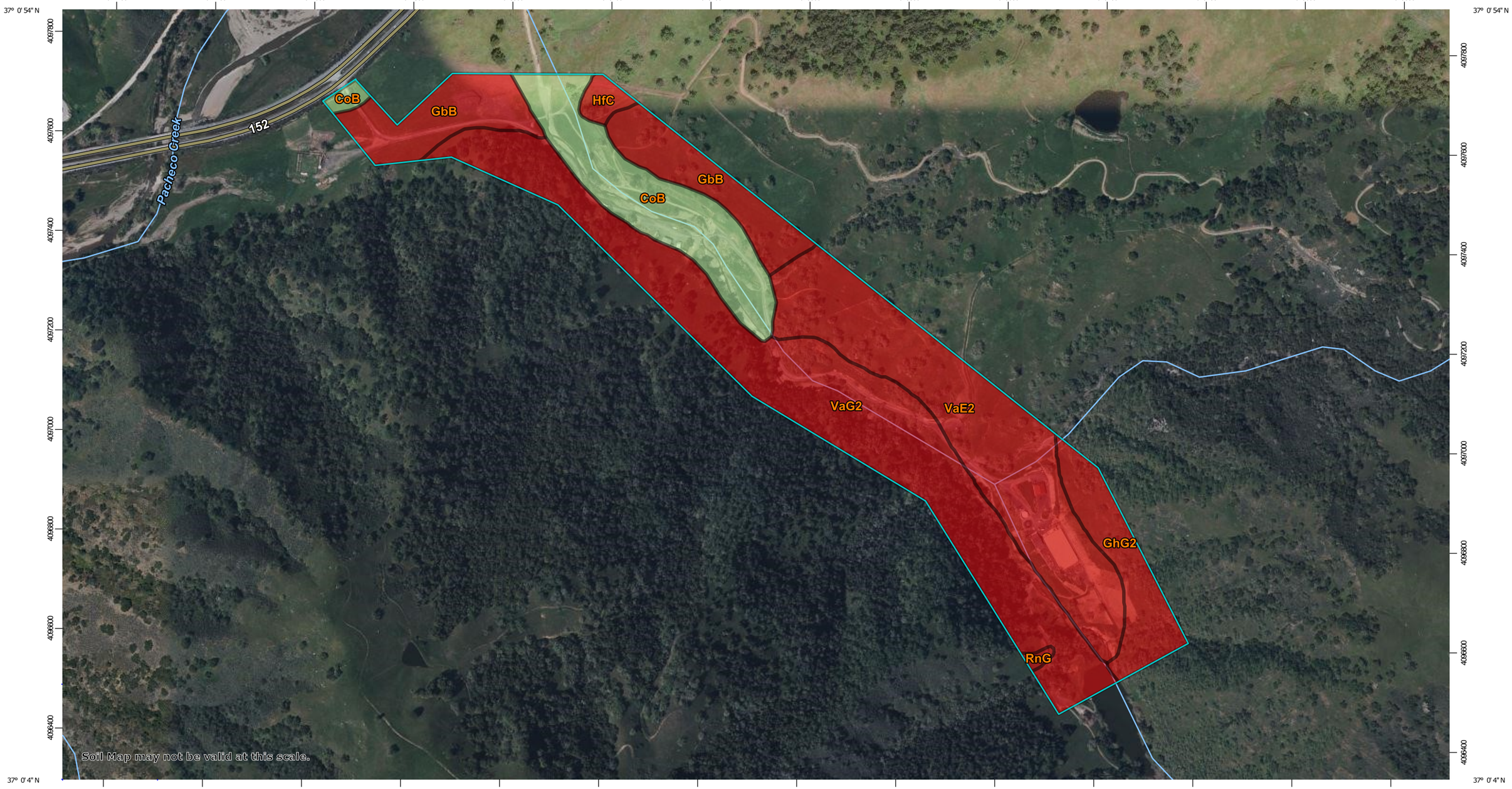
PANEL **700** OF **805**

Panel Contains:

COMMUNITY	NUMBER	PANEL
SANTA CLARA COUNTY UNINCORPORATED AREAS	060337	0700

MAP NUMBER
06085C0700H
EFFECTIVE DATE
May 18, 2009

Flooding Frequency Class—Eastern Santa Clara Area, California



Map Scale: 1:7,540 if printed on B landscape (17" x 11") sheet.

N

Meters
0 100 200 400 600

Feet
0 350 700 1400 2100

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils

Soil Rating Polygons
- None
- Very Rare
- Rare
- Occasional
- Common
- Frequent
- Very Frequent
- Not rated or not available

Soil Rating Lines
- None
- Very Rare
- Rare
- Occasional
- Common
- Frequent
- Very Frequent
- Not rated or not available

Soil Rating Points
- None
- Very Rare
- Rare
- Occasional
- Common
- Frequent
- Very Frequent
- Not rated or not available

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Eastern Santa Clara Area, California
Survey Area Data: Version 17, Sep 9, 2021

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Mar 29, 2015—Mar 31, 2019

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Flooding Frequency Class

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
CoB	Cortina very gravelly loam, 0 to 5 percent slopes, MLRA 15	Occasional	19.7	14.5%
GbB	Garretson gravelly loam, 0 to 5 percent slopes	None	19.4	14.2%
GhG2	Gaviota gravelly loam, 30 to 75 percent slopes, eroded, MLRA 15	None	10.0	7.4%
HfC	Hillgate silt loam, 2 to 9 percent slopes	None	1.7	1.3%
RnG	Rock land	None	0.4	0.3%
VaE2	Vallecitos rocky loam, 15 to 30 percent slopes, eroded	None	35.8	26.3%
VaG2	Vallecitos loam, 30 to 75 percent slopes, eroded, MLRA 15	None	49.2	36.1%
Totals for Area of Interest			**136.3**	**100.0%**

Description

Flooding is the temporary inundation of an area caused by overflowing streams, by runoff from adjacent slopes, or by tides. Water standing for short periods after rainfall or snowmelt is not considered flooding, and water standing in swamps and marshes is considered ponding rather than flooding.

Frequency is expressed as none, very rare, rare, occasional, frequent, and very frequent.

"None" means that flooding is not probable. The chance of flooding is nearly 0 percent in any year. Flooding occurs less than once in 500 years.

"Very rare" means that flooding is very unlikely but possible under extremely unusual weather conditions. The chance of flooding is less than 1 percent in any year.

"Rare" means that flooding is unlikely but possible under unusual weather conditions. The chance of flooding is 1 to 5 percent in any year.

"Occasional" means that flooding occurs infrequently under normal weather conditions. The chance of flooding is 5 to 50 percent in any year.

"Frequent" means that flooding is likely to occur often under normal weather conditions. The chance of flooding is more than 50 percent in any year but is less than 50 percent in all months in any year.

"Very frequent" means that flooding is likely to occur very often under normal weather conditions. The chance of flooding is more than 50 percent in all months of any year.

Rating Options

Aggregation Method: Dominant Condition

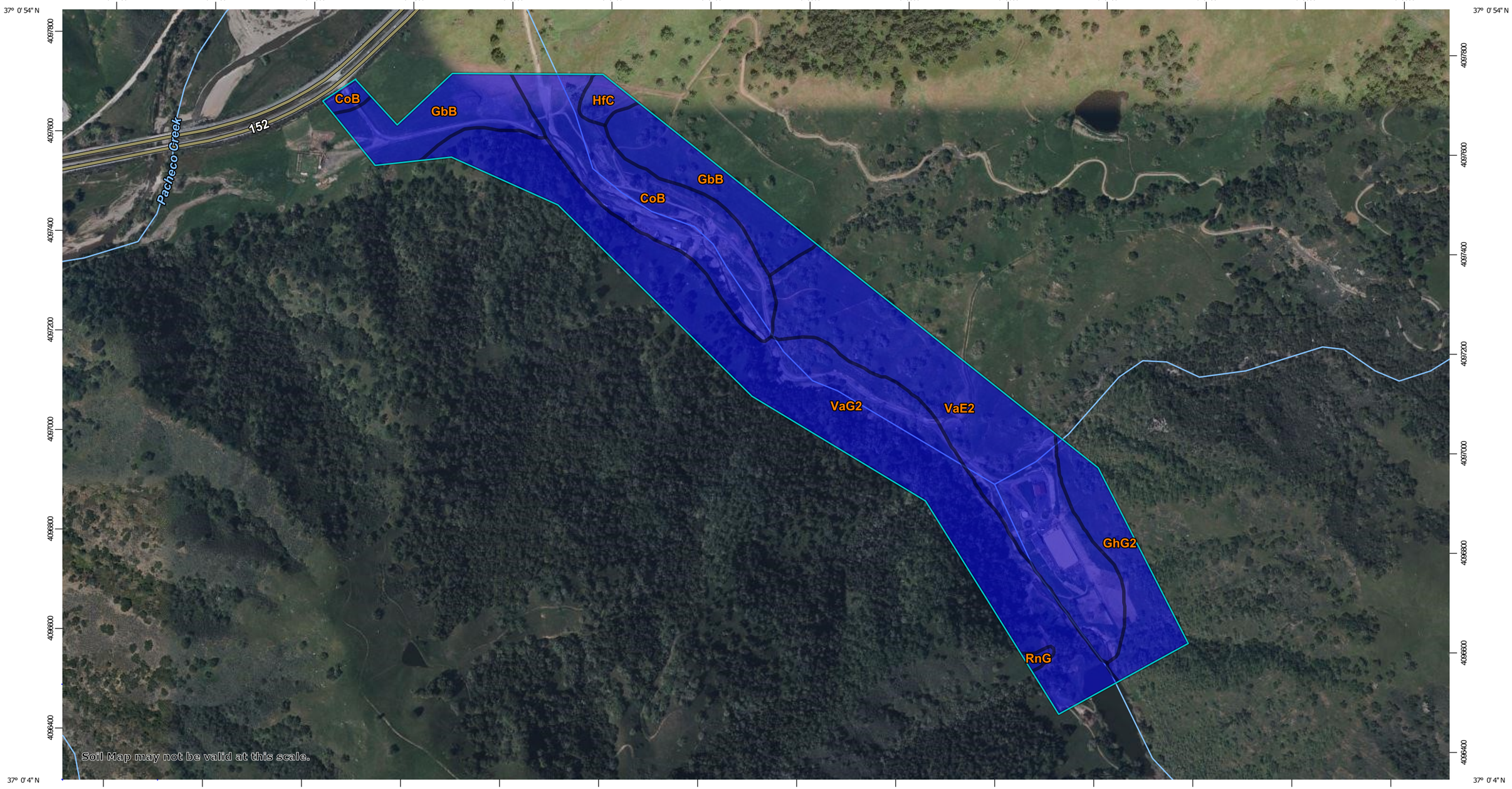
Component Percent Cutoff: None Specified

Tie-break Rule: More Frequent

Beginning Month: January

Ending Month: December

Depth to Water Table—Eastern Santa Clara Area, California



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25 - 50

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100 - 150

150 - 200

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Soil Rating Points

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25 - 50

50 - 100

100 - 150

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RnG	Rock land	>200	0.4	0.3%
VaE2	Vallecitos rocky loam, 15 to 30 percent slopes, eroded	>200	35.8	26.3%
VaG2	Vallecitos loam, 30 to 75 percent slopes, eroded, MLRA 15	>200	49.2	36.1%
Totals for Area of Interest			**136.3**	**100.0%**

Description

"Water table" refers to a saturated zone in the soil. It occurs during specified months. Estimates of the upper limit are based mainly on observations of the water table at selected sites and on evidence of a saturated zone, namely grayish colors (redoximorphic features) in the soil. A saturated zone that lasts for less than a month is not considered a water table.

This attribute is actually recorded as three separate values in the database. A low value and a high value indicate the range of this attribute for the soil component. A "representative" value indicates the expected value of this attribute for the component. For this soil property, only the representative value is used.

Rating Options

Units of Measure: centimeters

Aggregation Method: Dominant Component

Component Percent Cutoff: None Specified

Tie-break Rule: Lower

Interpret Nulls as Zero: No

Beginning Month: January

Ending Month: December

Map Scale: 1:7,540 if printed on B landscape (17" x 11") sheet.

N

Meters: 0 100 200 400 600

Feet: 0 350 700 1400 2100

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

- Ultra acid (ph < 3.5)
- Extremely acid (pH 3.5 - 4.4)
- Very strongly acid (pH 4.5 - 5.0)
- Strongly acid (pH 5.1 - 5.5)
- Moderately acid (pH 5.6 - 6.0)
- Slightly acid (pH 6.1 - 6.5)
- Neutral (pH 6.6 - 7.3)
- Slightly alkaline (pH 7.4 - 7.8)
- Moderately alkaline (pH 7.9 - 8.4)
- Strongly alkaline (pH 8.5 - 9.0)
- Very strongly alkaline (pH > 9.0)
- Not rated or not available

Soil Rating Lines

- Ultra acid (ph < 3.5)
- Extremely acid (pH 3.5 - 4.4)
- Very strongly acid (pH 4.5 - 5.0)
- Strongly acid (pH 5.1 - 5.5)
- Moderately acid (pH 5.6 - 6.0)
- Slightly acid (pH 6.1 - 6.5)
- Neutral (pH 6.6 - 7.3)
- Slightly alkaline (pH 7.4 - 7.8)
- Moderately alkaline (pH 7.9 - 8.4)
- Strongly alkaline (pH 8.5 - 9.0)
- Very strongly alkaline (pH > 9.0)
- Not rated or not available

Soil Rating Points

- Ultra acid (ph < 3.5)
- Extremely acid (pH 3.5 - 4.4)
- Very strongly acid (pH 4.5 - 5.0)
- Strongly acid (pH 5.1 - 5.5)
- Moderately acid (pH 5.6 - 6.0)
- Slightly acid (pH 6.1 - 6.5)
- Neutral (pH 6.6 - 7.3)
- Slightly alkaline (pH 7.4 - 7.8)
- Moderately alkaline (pH 7.9 - 8.4)
- Strongly alkaline (pH 8.5 - 9.0)
- Very strongly alkaline (pH > 9.0)
- Not rated or not available

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Eastern Santa Clara Area, California
Survey Area Data: Version 17, Sep 9, 2021

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Mar 29, 2015—Mar 31, 2019

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

pH (1 to 1 Water)

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
CoB	Cortina very gravelly loam, 0 to 5 percent slopes, MLRA 15	6.5	19.7	14.5%
GbB	Garretson gravelly loam, 0 to 5 percent slopes	7.5	19.4	14.2%
GhG2	Gaviota gravelly loam, 30 to 75 percent slopes, eroded, MLRA 15	6.5	10.0	7.4%
HfC	Hillgate silt loam, 2 to 9 percent slopes	5.8	1.7	1.3%
RnG	Rock land		0.4	0.3%
VaE2	Vallecitos rocky loam, 15 to 30 percent slopes, eroded	6.5	35.8	26.3%
VaG2	Vallecitos loam, 30 to 75 percent slopes, eroded, MLRA 15	6.3	49.2	36.1%
Totals for Area of Interest			**136.3**	**100.0%**

Description

Soil reaction is a measure of acidity or alkalinity. It is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion. In general, soils that are either highly alkaline or highly acid are likely to be very corrosive to steel. The most common soil laboratory measurement of pH is the 1:1 water method. A crushed soil sample is mixed with an equal amount of water, and a measurement is made of the suspension.

For each soil layer, this attribute is actually recorded as three separate values in the database. A low value and a high value indicate the range of this attribute for the soil component. A "representative" value indicates the expected value of this attribute for the component. For this soil property, only the representative value is used.

Rating Options

Aggregation Method: Weighted Average

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Interpret Nulls as Zero: No

Layer Options (Horizon Aggregation Method): Surface Layer (Not applicable)