Appendix A

Air Quality Technical Report

Construction and Operational Emissions Inventory Supporting Information

Health Risk Assessment Methodology, Assumptions, and Detailed Results

Air Quality Technical Report for the Monte Cresta Road Extension Project in Belmont, California

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Attachment A: Construction and Operational Emissions Inventory Supporting Information

Attachment B: Health Risk Assessment Methodology, Assumptions, and Detailed Results

1.0 INTRODUCTION

This document presents results of an air quality analysis associated with the proposed Monte Cresta Road Extension Project in the City of Belmont, California. This document provides an overview of the existing air quality conditions at the project site, the air quality regulatory framework, an analysis of potential air quality impacts that would result from implementation of the proposed project, and identification of applicable mitigation measures. Other issues related to air emissions covered in this document include the assessment of emissions related to air quality health impacts (health risk assessment or HRA). Issues related to climate change and greenhouse gas (GHG) emissions are also included.

The supporting information, methodology, and assumptions used in the construction air emissions inventory, operational air emissions inventory, and health risk assessment are provided in:

- **Attachment A: Emissions Inventory Supporting Data**
- **Attachment B: Health Risk Assessment Methodology, Assumptions, and Detailed Results**

The HRA focuses on health impacts on existing residences from emissions of toxic air contaminants (TAC)[1] such as diesel particulate matter (DPM)[2] from diesel equipment and haul truck emissions associated with the proposed project construction activities. The HRA was conducted to determine the health impacts, in terms of excess cancer risk and non-cancer hazards, using the significance levels[3] identified by the Bay Area Air Quality Management District (BAAQMD)'s *CEQA Air Quality Guidelines*.[4] In accordance with the BAAQMD *CEQA Air Quality Guidelines*, the HRA also evaluated concentrations of particulate matter equal to or less than 2.5 micrometers (fine particulate or $PM_{2.5}$ as combustion exhaust and fugitive dust). The HRA was prepared based on the California Office of Environmental Health Hazard Assessment (OEHHA)'s *Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments.*[5] For existing receptors, the HRA indicates less-than-significant exposures to the health impacts from the proposed

[1] Toxic air contaminants (TAC) are a broad class of compounds known to cause morbidity or mortality. TAC are found in ambient air, especially in urban areas, and are caused by industry, agriculture, fuel combustion, and commercial operations (e.g., gasoline service stations, dry cleaners). TAC are typically found in low concentrations, even near their source (e.g., diesel particulate matter near a freeway). Because chronic exposure can result in adverse health effects, TAC are regulated at the regional, state, and federal level.

[2] In 1998, the California Air Resources Board classified diesel particulate matter as a toxic air contaminant, citing its potential to cause cancer and other health problems. The US Environmental Protection Agency concluded that long-term exposure to diesel engine exhaust is likely to pose a lung cancer hazard to humans and can also contribute to other acute and chronic health effects.

[3] In June of 2010, the Air District's adopted thresholds of significance were challenged in a lawsuit (California Building Industry Association v Bay Area Air Quality Management District). On December 15, 2015, the California Supreme Court (S213478) concluded that agencies subject to CEQA generally are not required to analyze the impact of existing environmental conditions on a project's future users. The proposed project includes proposed sensitive receptors and thus, an analysis of the health impacts from existing sources such as stationary sources, rail activities, and major roadways is presented within this document.

[4] Bay Area Air Quality Management District, *CEQA Air Quality Guidelines*, May 2017, http://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/ceqa_guidelines_may2017-pdf.pdf?la=en

[5] Office of Environmental Health Hazard Assessment, *Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments*, February 2015, http://oehha.ca.gov/air/hot_spots/hotspots2015.html

project construction activities with the implementation of mitigation measures. The HRA also indicates less than significant exposures for proposed residences to nearby cumulative emission sources.

2.0 PROJECT OVERVIEW

The proposed project would extend Monte Cresta Drive by 335 feet (within 0.21 acres) from its existing terminus at Monte Cresta Drive and Sequoia Way. The Monte Cresta Drive extension would allow future development of single-family homes (an average of approximately 3,500 square feet) on four undeveloped parcels (within 0.76 acres). Project construction is anticipated to begin in 2023. Construction of the project would take approximately nine months to complete.

3.0 ANALYSIS METHODOLGY

Intermittent (short-term construction emissions that occur from activities, such as removal of structures, site-grading, and building construction) and long-term air quality impacts related to the operation of the proposed project were evaluated. The analysis focuses on daily and annual emissions from construction and operational (mobile, area, stationary, and fugitive sources) activities. The air quality analysis is consistent with the methods described in the BAAQMD *CEQA Air Quality Guidelines* (dated June 2010, updated in May 2011, revised in May 2012, and updated in May 2017).[6] Mitigation measures are presented to reduce impacts to less than significant.

The air quality analysis includes a review of criteria pollutant[7] emissions such as carbon monoxide (CO), nitrogen oxides (NO_x), sulfur dioxide (SO_2), volatile organic compounds (VOC) as reactive organic gases (ROG), particulate matter less than 10 micrometers (coarse particulate or PM_{10}), particulate matter less than 2.5 micrometers (fine particulate or $PM_{2.5}$).

Regulatory models used to estimate air quality impacts include:

- California Emissions Estimator Model[8] (CalEEMod) Version 2020.4.0 is a statewide land use emissions computer model designed to provide a uniform platform for government agencies, land use planners, and environmental professionals to quantify potential criteria pollutant and GHG emissions associated with both construction and operations from a variety of land use projects. The model quantifies direct emissions from construction and operation activities (including vehicle use), as well as indirect emissions, such as GHG emissions from energy use, solid waste disposal, vegetation planting and/or removal, and water use.

[6] The Air District's June 2010 adopted thresholds of significance were challenged in a lawsuit. Although the BAAQMD's adoption of significance thresholds for air quality analysis has been subject to judicial actions, the lead agency has determined that BAAQMD's Revised Draft Options and Justification Report (October 2009) provide substantial evidence to support the BAAQMD recommended thresholds. Therefore, the lead agency has determined the BAAQMD recommended thresholds are appropriate for use in this analysis.

[7] Criteria air pollutants refer to those air pollutants for which the USEPA and CARB has established National Ambient Air Quality Standards and California Ambient Air Quality Standards under the Federal Clean Air Act.

[8] California Air Pollution Control Officers Association. *California Emissions Estimator Model User's Guide Version 2020.4.0.* May 2021. http://www.caleemod.com/

- AERMOD (American Meteorological Society/USEPA Regulatory Model, Version 21112) is an atmospheric dispersion model which can simulate point, area, volume, and line emissions sources and has the capability to include simple, intermediate, and complex terrain along with meteorological conditions and multiple receptor locations.[9,10] AERMOD is commonly executed to yield 1-hour maximum and annual average concentrations (in µg/m^3) at each receptor.

4.0 EXISTING CONDITIONS

The project site is located within the San Francisco Bay Area Air Basin (Air Basin), which encompasses Alameda, Contra Costa, Santa Clara, San Francisco, San Mateo, Marin, and Napa Counties, and the southern portions of Solano and Sonoma Counties. The Air Basin is characterized by complex terrain which distorts normal wind flow patterns, consisting of coastal mountain ranges, inland valleys, and bays.

Regional Meteorology

Air quality is affected by the rate, amount, and location of pollutant emissions and the associated meteorological conditions that influence pollutant movement and dispersal. Atmospheric conditions, including wind speed, wind direction, stability, and air temperature, in combination with local surface topography (i.e., geographic features such as mountains, valleys, and San Francisco Bay), determine the effect of air pollutant emissions on local air quality.

The climate of the greater San Francisco Bay Area, including Belmont, is a Mediterranean-type climate characterized by warm, dry summers and mild, wet winters. The climate is determined largely by a high-pressure system that is often present over the eastern Pacific Ocean off the West Coast of North America. In winter, the Pacific high-pressure system shifts southward, allowing storms to pass through the region. During summer and fall, air emissions generated within the Bay Area can combine with abundant sunshine under the restraining influences of topography and subsidence inversions to create conditions that are favorable to the formation of photochemical pollutants, such as ozone and secondary particulates, such as sulfates and nitrates.

The proposed project lies in the Peninsula climatological sub-region of the Bay Area. The Peninsula sub-region extends from northwest of San Jose to the Golden Gate. The Santa Cruz Mountains run up the center of the peninsula, with elevations exceeding 2000 feet at the southern end, decreasing to 500 feet in South San Francisco. Coastal towns experience a high incidence of cool, foggy weather in the summer. Cities in the southeastern peninsula experience warmer temperatures and fewer foggy days because the marine layer is blocked by the ridgeline to the west. San Francisco lies at the northern end of the peninsula. Because most of San Francisco's topography is below 200 feet, marine air is able to flow easily across most of the city, making its climate cool and windy.

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[9] US Environmental Protection Agency Preferred/Recommended Models, *AERMOD Modeling System,* https://www.epa.gov/scram/air-quality-dispersion-modeling-preferred-and-recommended-models#aermod

[10] Title 40 CFR Part 51, *Revision to the Guideline on Air Quality Models: Adoption of a Preferred General Purpose (Flat and Complex Terrain) Dispersion Model and Other Revisions; Final Rule,* http://www.epa.gov/ttn/scram/guidance/guide/appw_05.pdf

The blocking effect of the Santa Cruz Mountains results in variations in summertime maximum temperatures in different parts of the peninsula. For example, in coastal areas and San Francisco the mean maximum summer temperatures are in the mid-60's, while in Redwood City the mean maximum summer temperatures are in the low-80's. Mean minimum temperatures during the winter months are in the high-30's to low-40's on the eastern side of the Peninsula and in the low 40's on the coast.

Two important gaps in the Santa Cruz Mountains occur on the peninsula. The larger of the two is the San Bruno Gap, extending from Fort Funston on the ocean to the San Francisco Airport. Because the gap is oriented in the same northwest to southeast direction as the prevailing winds, and because the elevations along the gap are under 200 feet, marine air is easily able to penetrate into the bay. The other gap is the Crystal Springs Gap, between Half Moon Bay and San Carlos. As the sea breeze strengthens on summer afternoons, the gap permits maritime air to pass across the mountains, and its cooling effect is commonly seen from San Mateo to Redwood City.

Annual average wind speeds range from five to ten mph throughout the peninsula, with higher wind speeds usually found along the coast. However, winds on the eastern side of the peninsula are often high in certain areas, such as near the San Bruno Gap and the Crystal Springs Gap.

The prevailing winds along the peninsula's coast are from the west, although individual sites can show significant differences. For example, Fort Funston in western San Francisco shows a southwest wind pattern while Pillar Point in San Mateo County shows a northwest wind pattern. On the east side of the mountain winds are generally from the west, although wind patterns in this area are often influenced greatly by local topographic features.

Air pollution potential is highest along the southeastern portion of the peninsula. This is the area most protected from the high winds and fog of the marine layer. Pollutant transport from upwind sites is common. In the southeastern portion of the peninsula, air pollutant emissions are relatively high due to motor vehicle traffic as well as stationary sources. At the northern end of the peninsula in San Francisco, pollutant emissions are high, especially from motor vehicle congestion. Localized pollutants, such as carbon monoxide, can build up in "urban canyons". However, winds are generally fast enough to carry the pollutants away before they can accumulate.[11]

Criteria Air Pollutants

The following provides a summary of the potential health and welfare effects and typical sources of each of the criteria air pollutants.

Ozone

Ozone (or O_3) is a respiratory irritant and an oxidant that increases susceptibility to respiratory infections and that can cause substantial damage to vegetation and other materials. O_3 is not emitted directly into the atmosphere but is a secondary air pollutant produced in the atmosphere through a complex series of photochemical reactions involving VOC and NO_x. VOC and NO_x are known as precursor compounds for O_3.

[11] Bay Area Air Quality Management District, *Appendix D – Climate, Topography and Air Pollution Potential,* http://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/ceqaguid.pdf

Substantial ozone production generally requires O_3 precursors to be present in a stable atmosphere with strong sunlight for approximately three hours. O_3 is a regional air pollutant because it is not emitted directly by sources but is formed downwind of sources of VOC and NO_x under the influence of wind and sunlight. O_3 concentrations tend to be higher in the late spring, summer, and fall, when long sunny days combine with regional air subsidence inversions to create conditions conducive to the formation and accumulation of secondary photochemical compounds.

Carbon Monoxide

CO is a nonreactive pollutant that is a product of incomplete combustion of organic material, and is mostly associated with motor vehicle traffic, and in wintertime, with wood–burning stoves and fireplaces. High CO concentrations develop primarily during winter when periods of light winds combine with the formation of ground–level temperature inversions (typically from the evening through early morning). These conditions result in reduced dispersion of vehicle emissions. Motor vehicles also exhibit increased CO emission rates at low air temperatures.

When inhaled at high concentrations, CO combines with hemoglobin in the blood and reduces its oxygen-carrying capacity, resulting in reduced levels of oxygen reaching the brain, heart, and other body tissues. This condition is especially critical for people with cardiovascular diseases, chronic lung disease, or anemia. CO measurements and modeling were important in the early 1980s when CO levels were regularly exceeded throughout California, but in more recent years, CO measurements and modeling are not a priority in most California air districts due to the retirement of older vehicles, fewer emissions from new vehicles, and improvements to fuels.

Nitrogen Oxides

When combustion temperatures are extremely high, as in aircraft, truck and automobile engines, atmospheric nitrogen combines with oxygen to form various oxides of nitrogen. Nitric oxide (NO) and nitrogen dioxide (NO_2) are the most significant air pollutants generally referred to as NO_x. Nitric oxide is a colorless and odorless gas that is relatively harmless to humans, quickly converts to NO_2 and can be measured. Nitrogen dioxide has been found to be a lung irritant capable of producing pulmonary edema. Inhaling NO_2 can lead to respiratory illnesses such as bronchitis and pneumonia.

Volatile Organic Compounds

VOC means any compound of carbon, excluding carbon monoxide, carbon dioxide (CO_2), carbonic acid, metallic carbides or carbonates, and ammonium carbonate, which participates in atmospheric photochemical reactions and thus, a precursor of ozone formation. VOC include a variety of chemicals, some of which may have short- and long-term adverse health effects. VOC are emitted by a wide array of products numbering in the thousands. Examples include paints and lacquers, paint strippers, cleaning supplies, building materials and furnishings, as well as fuel storage and use.

VOC can cause eye, nose, and throat irritation; headaches, loss of coordination, nausea; and damage to liver, kidney, and central nervous system. Some organics can cause cancer in animals; some are suspected or known to cause cancer in humans. The ability of organic chemicals to cause health effects varies greatly from those that are highly toxic, to those with no known health effect. As with other pollutants, the extent

and nature of the health effect will depend on many factors including level of exposure and length of time exposed. Eye and respiratory tract irritation, headaches, dizziness, visual disorders, and memory impairment are among the immediate symptoms that some people have experienced soon after exposure to some organics.

Particulate Matter

PM_{10} and $PM_{2.5}$ consist of airborne particles that measure 10 micrometers or less in diameter and 2.5 micrometers or less in diameter, respectively. PM_{10} and $PM_{2.5}$ represent fractions of particulate matter that can be inhaled into the air passages and the lungs, causing adverse health effects. Particulate matter in the atmosphere results from many kinds of dust- and fume-producing industrial and agricultural operations, fuel combustion, wood burning stoves and fireplaces, and atmospheric photochemical reactions. Some sources of particulate matter, such as demolition, construction activities and mining, are more local in nature, while others such as vehicular traffic and wood burning stoves and fireplaces, have a more regional effect.

Very small particles of certain substances (e.g., sulfates and nitrates) can cause lung damage directly, or can contain adsorbed gases (e.g., chlorides or ammonium) that may be injurious to health. Particulates can also damage materials and reduce visibility. Dust comprised of large particles (diameter greater than 10 micrometers) settles out rapidly and is easily filtered by human breathing passages. This dust is of concern more as a soiling nuisance rather than a health hazard. The remaining fractions, PM_{10} and $PM_{2.5}$, are a health concern particularly at levels above the federal and California ambient air quality standards. $PM_{2.5}$ (including diesel exhaust particles) is thought to have greater effects on health, because these particles are so small and thus penetrate to the deepest parts of the lungs.

Acute and chronic health effects associated with high particulate levels include the aggravation of chronic respiratory diseases, heart and lung disease, coughing, bronchitis, and respiratory illnesses in children. Mortality studies since the 1990s have shown a statistically significant direct association between mortality (premature deaths) and daily concentrations of particulate matter in the air. Despite important gaps in scientific knowledge and continued reasons for some skepticism, a comprehensive evaluation of the research findings provides persuasive evidence that exposure to fine particulate air pollution has adverse effects on cardiopulmonary health. The California Air Resources Board (CARB) has estimated that achieving the ambient air quality standards for PM_{10} could reduce premature mortality rates by 6,500 cases per year.

Sulfur Dioxide

SO_2 is a combustion product of sulfur or sulfur–containing fuels such as coal and diesel. SO_2 is also a precursor to the formation of atmospheric sulfate and particulate matter and contributes to potential atmospheric sulfuric acid formation that could precipitate downwind as acid rain.

Lead

Lead has a range of adverse neurotoxin health effects and was released into the atmosphere via leaded gasoline products. The phase-out of leaded gasoline in California has resulted in dramatically decreased levels of atmospheric lead. Metal processing is currently the primary source of lead emissions in the SCAB.

The highest concentrations of lead in air are generally found near lead smelters and general aviation airports; where piston aircraft use leaded fuel. Other stationary sources that generate lead emissions include waste incinerators, utilities, and lead-acid battery manufacturers. The maximum lead concentrations recorded in the project area is below federal and California standards. Notably, diesel fuel does not contain lead emissions and gasoline fuel is unleaded.

Sulfates

Sulfates are the fully oxidized ionic form of sulfur produced when sulfur dioxide is fully oxidized in the atmosphere. Sulfates are produced by emissions from automobiles, power plants, and industrial activity, and contribute to general atmospheric haziness. Typical health effects associated with exposure to sulfates include respiratory illness and an increased risk of cardio-pulmonary disease.

Vinyl Chloride

Vinyl chloride is an artificially created colorless gas with a mild, slightly sweet odor. The gas is used in the manufacture of vinyl products, including polyvinyl chloride plastic. Vinyl chloride emissions are produced from the vinyl manufacturing process as well as from the breakdown of vinyl products in landfills and hazardous waste sites. The health effects associated with vinyl chloride include dizziness, headaches, and drowsiness from short-term exposure, and liver damage and cancer resulting from long-term exposure.

Hydrogen Sulfide

H_2S is a naturally occurring, colorless gas that at low concentrations produces a distinctive rotten egg odor. At higher concentrations, olfactory fatigue prevents detection of odor. The gas is produced through the bacteriological breakdown of organic materials as well as during oil and gas production and geothermal power generation. Health effects associated with H_2S include exposure to a disagreeable odor, coughing, irritation to eyes, and impairment of the respiratory system.

Visibility Reducing Particles

Visibility reducing particles are particulate matter composed of many different substances that are suspended in the atmosphere and contribute to haze and diminished visibility.

Ambient Air Quality Standards

Regulation of air pollutants is achieved through both national and state ambient air quality standards (AAQS) and emissions limits for individual sources. Regulations implementing the federal Clean Air Act and its subsequent amendments established national ambient air quality standards (NAAQS) for the six criteria pollutants. California has adopted more stringent California ambient air quality standards (CAAQS) for most of the criteria air pollutants. In addition, California has established CAAQS for sulfates, hydrogen sulfide, vinyl chloride, and visibility-reducing particles. Because of the meteorological conditions in the state, there is considerable difference between state and federal standards in California.

The AAQS are intended to protect the public health and welfare, and they incorporate an adequate margin of safety. They are designed to protect those segments of the public most susceptible to respiratory distress, known as sensitive receptors, including asthmatics, the very young, elderly, people weak from other illness or disease, or persons engaged in strenuous work or exercise. Healthy adults can tolerate

occasional exposure to air pollution levels somewhat above the ambient air quality standards before adverse health effects are observed.

Under amendments to the federal Clean Air Act, USEPA has classified air basins or portions thereof, as either "attainment" or "non-attainment" for each criteria air pollutant, based on whether or not the NAAQS have been achieved. The California Clean Air Act, which is patterned after the federal Clean Air Act, also requires areas to be designated as "attainment" or "non-attainment" for the CAAQS. Thus, areas in California have two sets of attainment / non-attainment designations: one set with respect to the NAAQS and one set with respect to the CAAQS.

Toxic Air Contaminants

Toxic air contaminants (TACs) are regulated under both state and federal laws. Federal laws use the term "Hazardous Air Pollutants" (HAPs) to refer to the same types of compounds that are referred to as TACs under state law. Both terms encompass essentially the same compounds. Under the 1990 Federal Clean Air Act Amendments, 189 substances are regulated as HAPs.

With respect to state law, in 1983 the California legislature adopted Assembly Bill 1807 (AB 1807), which establishes a process for identifying TACs and provides the authority for developing retrofit air toxics control measures on a statewide basis. Air toxics in California may also be regulated because of another state law, the Air Toxics "Hot Spots" Information and Assessment Act of 1987, or Assembly Bill 2588 (AB 2588). Under AB 2588, TACs from individual facilities must be quantified and reported to the local air pollution control agency. The facilities are then prioritized by the local agencies based on the quantity and toxicity of these emissions, and on their proximity to areas where the public may be exposed. In establishing priorities, the air districts are to consider the potency, toxicity, quantity, and volume of hazardous materials released from the facility, the proximity of the facility to potential receptors, and any other factors that the air district determines may indicate that the facility may pose a significant risk. High priority facilities are required to perform a Health Risk Screening Assessment (HRSA), and if specific risk thresholds are exceeded, they are required to communicate the results to the public in the form of notices and public meetings. Depending on the health risk levels, emitting facilities can be required to implement varying levels of risk reduction measures. CARB identified approximately 200 TACs, including the 189 federal HAPs, under AB 2588.

Regional Clean Air Plan

BAAQMD adopted its *Bay Area 2010 Clean Air Plan* (CAP)[12] in accordance with the requirements of the California Clean Air Act (CCAA) to implement all feasible measures to reduce ozone; provide a control strategy to reduce ozone, particulate matter, air toxics, and GHG emissions in a single, integrated plan;

[12] Bay Area Air Quality Management District. *Bay Area 2010 Clean Air Plan*. September 15, 2010, http://www.baaqmd.gov/plans-and-climate/air-quality-plans/current-plans

and establish emission control measures to be adopted or implemented in the 2010 through 2012 timeframe.[13] The primary goals of the 2010 Bay Area CAP are to:

- Attain air quality standards;
- Reduce population exposure and protecting public health in the Bay Area; and
- Reduce GHG emissions and protect the climate.

On April 20, 2017, BAAQMD released the *2017 Clean Air Plan*.[14] The 2017 Clean Air Plan/Regional Climate Protection Strategy (CAP/RCPS) provides a roadmap for BAAQMD's efforts over the next few years to reduce air pollution and protect public health and the global climate. Measures of the 2017 CAP addressing the transportation sector are in direct support of *Plan Bay Area 2040*, which was prepared by the Association of Bay Area Governments (ABAG) and the Metropolitan Transportation Commission (MTC) and includes the region's Sustainable Communities Strategy and the 2040 Regional Transportation Plan.

When a public agency contemplates approving a project where an air quality plan consistency determination is required, BAAQMD recommends that the agency analyze the project with respect to the following questions: (1) Does the project support the primary goals of the air quality plan; (2) Does the project include applicable control measures from the air quality plan; and (3) Does the project disrupt or hinder implementation of any 2017 CAP control measures? If the first two questions are concluded in the affirmative and the third question concluded in the negative, the BAAQMD considers the project consistent with air quality plans prepared for the Bay Area.

Any project that would not support the 2017 CAP goals would not be considered consistent with the 2017 CAP. The recommended measure for determining project support of these goals is consistency with BAAQMD CEQA thresholds of significance. As presented in the subsequent impact discussions, the proposed project would not exceed the BAAQMD significance thresholds; therefore, the proposed project would support the primary goals of the 2017 CAP and would not hinder implementation of any of the CAP control measures.

Highlights of the *2017 Clean Air Plan* control strategy include:

- Limit Combustion: Develop a region-wide strategy to improve fossil fuel combustion efficiency at industrial facilities, beginning with the three largest sources of industrial emissions: oil refineries, power plants, and cement plants.

[13] In 2015, the BAAQMD initiated an update to the 2010 CAP. On February 28, 2014, the District held a public meeting to report progress on implementing the control measures in the 2010 CAP, to solicit ideas and strategies to further reduce ozone precursors, particulate matter, toxic air contaminants, and greenhouse gases, and to seek input on innovative strategies to reduce greenhouse gases, mechanisms for tracking progress in reducing GHG, and how the District may further support actions to reduce GHG. The culmination of this effort will be an updated CAP.

[14] Bay Area Air Quality Management District, *2017 Clean Air Plan*, April 20, 2017, http://www.baaqmd.gov/~/media/files/planning-and-research/plans/2017-clean-air-plan/attachment-a_-proposed-final-cap-vol-1-pdf.pdf?la=en

- Stop Methane Leaks: Reduce methane emissions from landfills, and oil and natural gas production and distribution.
- Reduce Exposure to Toxics: Reduce emissions of toxic air contaminants by adopting more stringent limits and methods for evaluating toxic risks at existing and new facilities.
- Put a Price on Driving: Implement pricing measures to reduce travel demand.
- Advance Electric Vehicles: Accelerate the widespread adoption of electric vehicles.
- Promote Clean Fuels: Promote the use of clean fuels and low or zero carbon technologies in trucks and heavy-duty vehicles.
- Accelerate Low-Carbon Buildings: Expand the production of low-carbon, renewable energy by promoting on-site technologies such as rooftop solar and ground-source heat pumps.
- Support More Energy Choices: Support of community choice energy programs throughout the Bay Area.
- Make Buildings More Efficient: Promote energy efficiency in both new and existing buildings.
- Make Space and Water Heating Cleaner: Promote the switch from natural gas to electricity for space and water heating in Bay Area buildings.

Local Air Quality

The BAAQMD maintains a network of monitoring stations within the Air Basin that monitor air quality and compliance with applicable ambient standards. The monitoring station closest to the project site is in Redwood City at 897 Barron Avenue, approximately six miles to the southeast of the project site; where levels of CO, ozone, NO_2, and $PM_{2.5}$ are measured. The closest monitoring station to the project site that monitors PM_{10} is in San Francisco at 10 Arkansas Street, approximately 18 miles to the north.

Table 1 summarizes the most recent three years of data (2017 through 2019) from the BAAQMD's Redwood City air monitoring station and San Francisco air monitoring station.[15] The state and national 8-hour ozone standards were exceeded twice in 2017 and twice in 2019. The national 24-hour PM_{10} standard was exceeded twice in 2017 and fourteen times in 2018 (due primarily to wildfires). The national 24-hour $PM_{2.5}$ standard was exceeded six times in 2017 and thirteen times in 2018 (due primarily to wildfires). No other standards were exceeded at the Redwood City air monitoring station during the three-year period. Reflective of the previous information, the Bay Area is currently designated "nonattainment" for state and national (1-hour and 8-hour) ozone standards, for the state PM_{10} standards, and for the state and national (annual average and 24-hour) $PM_{2.5}$ standards. The Bay Area is designated "attainment" or "unclassifiable" with respect to the other ambient air quality standards.

[15] As of March of 2022, the BAAQMD had not released the Annual Air Quality Summaries for 2020 or 2021.

Table 1: Air Quality Data Summary (2017 - 2019)

Pollutant	Monitoring Data by Year			
	Standard[a]	2017	2018	2019
Ozone				
Highest 1 Hour Average (ppm)[b]	0.090	**0.115**	0.067	0.083
Days over State Standard		**2**	0	0
Highest 8 Hour Average (ppm)[b]	0.070	**0.086**	0.049	**0.077**
Days over National Standard		**2**	0	**2**
Highest 8 Hour Average (ppm)[b]	0.070	**0.086**	0.049	**0.077**
Days over State Standard		**2**	0	**2**
Nitrogen Dioxide				
Highest 1 Hour Average (ppm)[b]	0.180/0.100	0.067	0.077	0.055
Days over State Standard		0	0	0
Annual Average (µg/m^3)[b]	0.030/0.053	0.011	0.011	0.009
Carbon Monoxide				
Highest 1 Hour Average (ppm)[b]	20	2.8	2.5	2.0
Days over State Standard		0	0	0
Highest 8 Hour Average (ppm)[b]	9	1.4	1.7	1.1
Days over State Standard		0	0	0
Particulate Matter (PM_{10})				
Highest 24-Hour Average (µg/m^3)[b]	50	**77.0**	**177**	42.0
Days over State Standard		**2**	**14**	0
State Annual Average (µg/m^3)[b]	20	**22.0**	11.7	14.7
Particulate Matter ($PM_{2.5}$)				
Highest 24-Hour Average (µg/m^3)[b]	35	**60.8**	**121**	29.5
Days over National Standard		**6**	**13**	0
State Annual Average (µg/m^3)[b]	12	9.1	10.3	7.0

NOTES: Values in **bold** are in excess of at least one applicable standard.

a. Generally, state standards and national standards are not to be exceeded more than once per year.
b. ppm = parts per million; µg/m^3 = micrograms per cubic meter.
c. PM_{10} is not measured every day of the year. Number of estimated days over the standard is based on 365 days per year.

Source: Bay Area Air Quality Management District, Annual Air Quality Summaries, http://www.baaqmd.gov/about-air-quality/air-quality-summaries

Community Air Risk Evaluation

The BAAQMD's Community Air Risk Evaluation (CARE) program was initiated in 2004 to evaluate and reduce health risks associated with exposure to outdoor air toxics in the Bay Area. Based on findings of the latest report, DPM was found to account for approximately 85 percent of the cancer risk from airborne toxics. Carcinogenic compounds from gasoline-powered cars and light duty trucks were also identified as significant contributors: 1,3-butadiene contributed four percent of the cancer risk-weighted emissions, and benzene contributed three percent. Collectively, five compounds—diesel PM, 1,3-butadiene, benzene, formaldehyde, and acetaldehyde—were found to be responsible for more than 90 percent of the cancer risk attributed to emissions. All these compounds are associated with emissions from internal combustion engines. The most important sources of cancer risk-weighted emissions were combustion-related sources of DPM, including on-road mobile sources (31 percent), construction equipment (29

percent), and ships and harbor craft (13 percent). A 75 percent reduction in DPM was predicted between 2005 and 2015 when the inventory accounted for CARB's diesel regulations. Overall, cancer risk from TAC dropped by more than 50 percent between 2005 and 2015, when emissions inputs accounted for state diesel regulations and other reductions.[16]

Modeled cancer risks from TAC were highest near sources of DPM: near core urban areas, along major roadways and freeways, and near maritime shipping terminals. Peak modeled risks were found to be located east of San Francisco, near West Oakland, and the maritime Port of Oakland. BAAQMD has identified seven impacted communities in the Bay Area:

- Western Contra Costa County and the cities of Richmond and San Pablo.
- Western Alameda County along the Interstate 880 corridor and the cities of Berkeley, Alameda, Oakland, and Hayward.
- San Jose.
- Eastern side of San Francisco.
- Concord.
- Vallejo.
- Pittsburgh and Antioch.

The proposed project is within the city of Belmont, which is not part of the seven CARE program impacted communities in the Bay Area.[17] The health impacts in the Bay Area, as determined both by pollution levels and by existing health vulnerabilities in a community, are approximately 160 cancer risk per million persons. In Belmont, including the project site, the health impact is approximately 92 cancer risk per million persons.[18]

Addressing Sources of Air Pollutants in Community Planning

In May of 2016, the BAAQMD published *Planning Health Places: A Guidebook for Addressing Local Sources of Air Pollutants in Community Planning*.[19] The BAAQMD's primary goal in providing the *Guidebook* is to

[16] Bay Area Air Quality Management District, *Improving Air Quality & Health in Bay Area Communities, Community Air Risk Program Retrospective & Path Forward (2004 – 2013)*, April 2014, http://www.baaqmd.gov/~/media/Files/Planning%20and%20Research/CARE%20Program/Documents/CARE_Retrospective_April2014.ashx?la=en

[17] Community Air Risk Evaluation Program, Identifying Areas with Cumulative Impacts from Air Pollution in the San Francisco Bay Area, March 2014, http://www.baaqmd.gov/community-health/community-health-protection-program/community-air-risk-evaluation-care-program

[18] Bay Area Air Quality Management District, *Identifying Areas with Cumulative Impacts from Air Pollution in the San Francisco Bay Area*, March 2014, http://www.baaqmd.gov/~/media/Files/Planning%20and%20Research/CARE%20Program/Documents/ImpactCommunities_2_Methodology.ashx?la=en

[19] Bay Area Air Quality Management District, *Planning Health Places: A Guidebook for Addressing Local Sources of Air Pollutants in Community Planning*, January 2016, http://www.baaqmd.gov/~/media/files/planning-and-research/planning-healthy-places/draft_planninghealthyplaces_marchworkshop-pdf.pdf?la=en

support and promote infill development; which is important to reducing vehicle miles traveled and the associated air emissions, while minimizing air pollution exposure for existing and future residents. The *Guidebook* provides developers and planners with the information and tools needed to create health-protective communities.

The *Guidebook* recommends Best Practices to Reduce Emissions and Reduce Exposure to Local Air Pollution. Implementing as many Best Practices to Reduce Emissions as is feasible will reduce potential health risks to the greatest extent. The *Guidebook* also lists examples of a variety of strategies to reduce exposure to, and emissions of, air pollution, including the adoption of air quality-specific ordinances, standard conditions of approval, and incorporation of policies into general plans and other planning documents. The BAAQMD recommends implementing all best practices to reduce exposure that are feasible and applicable to a project in areas that are likely to experience elevated levels of air pollution. To reduce exposure to pollutants, the *Guidebook* recommends practices like installing indoor air filtration systems, planting dense vegetation, implementing project design which provides a buffer between sensitive receptors and emission source, and developing alternative truck routes.

The *Guidebook* provides an interactive map of the Bay Area showing areas with estimated elevated levels of fine particulates and/or toxic air contaminants. The interactive map shows locations where further study is needed, such as a detailed health risk assessment; specifically, locations next to major roads and freeways and large industrial sites, as well as the downtown districts of cities.

Nearby Sensitive Receptors

Land uses such as schools, children's daycare centers, hospitals, and convalescent homes are considered to be more sensitive than the general public to poor air quality because the population groups associated with these uses have increased susceptibility to respiratory distress. Persons engaged in strenuous work or exercise also have increased sensitivity to poor air quality. The CARB has identified the following people as most likely to be affected by air pollution: children less than 14 years of age, the elderly over 65 years of age, athletes, and those with cardiovascular and chronic respiratory diseases. These groups are classified as sensitive population groups.

Residential areas are considered more sensitive to air quality conditions than commercial and industrial areas, because people generally spend longer periods of time at their residences, resulting in greater exposure to ambient air quality conditions. Recreational uses are also considered sensitive, due to the greater exposure to ambient air quality conditions and because the presence of pollution detracts from the recreational experience. According to the BAAQMD, workers are not considered sensitive receptors because all employers must follow regulations set forth by the Occupation Safety and Health Administration to ensure the health and well-being of their employees.

BAAQMD considers the relevant zone of influence for an assessment of air quality health risks to be within 1,000 feet of a project site. Numerous residential homes surround the project site include along Alhambra Drive and Sequoia Way. Cipriani Elementary School is located approximately 0.5 miles to the south of the project site.

According to the requirements under the California Public Resources Code, Division 13, Environmental Quality (§21000 – §21189.57), proposed projects located within ¼ mile of a school that involve the

construction or alteration of a facility that might reasonably be anticipated to emit hazardous air emissions, and that may impose a health or safety hazard to persons who would attend or would be employed at the school, must meet all requirements per CEQA Guidelines §15186 (b)(1)(2)[20]. The lead agency must consult with the affected school district or districts regarding the potential impact of the project on the school and notify the affected school district(s) of the project in writing, not less than 30 days prior to approval or certification of the negative declaration or environmental impact report.

City of Belmont General Plan

The City of Belmont has adopted a 2035 General Plan.[21] The Air Quality and Greenhouse Gas sections of the 2035 General Plan contains environmental and regulatory setting information, and information related to goals and policies to reduce emissions and implementation of the Climate Action Plan.[22] The following are goals and policies relevant to the proposed project:

Goal 5.10 Reduce emissions of ozone-producing pollutants and particulate matter to improve regional air quality and protect the health of Belmont and Bay Area residents.

> Policy 5.10-1 Coordinate air quality planning efforts with other local, regional, and State agencies.
>
> Policy 5.10-2 Require that new development with sensitive uses that is located adjacent to sources of toxic air contaminants be designed to minimize any potential health risks.
>
> Policy 5.10-3 Ensure that construction and grading activities minimize short-term impacts to air quality by employing approprimate mitigation measures and best practices.
>
> Policy 5.10-4 Support land use, transportation management, infrastructure, and environmental planning programs that reduce vehicle emissions and improve air quality.
>
> Policy 5.10-5 Provide information about non-toxic alternatives to construction, interior and exterior finishes and furnishings, and planting and landscaping maintenance to contractors, business owners and homeowners to enhance indoor and outdoor air quality and reduce exposure to toxins.
>
> Policy 5.10-6 Ensure compliance with the Bay Area Clean Air Plan by implementing the Plan's recommended Transportation Control Measures.

Goal 5.11 Reduce emissions of GHG to 15 percent below the 2005 baseline levels by 2020 and to 50 percent below the 2005 baseline levels by 2035.

> Policy 5.11-1 Adopt a Climate Action Plan that incorporates a GHG Emisions Reduction Plan, which quantifies current and anticipated future emissions and focuses on feasible actions the City can

[20] 2019 CEQA Statutes and Guidelines, http://resources.ca.gov/ceqa/docs/2019_CEQA_Statutes_and_Guidelines.pdf

[21] City of Belmont, *2035 General Plan*, Adopted November 2017, https://www.belmont.gov/city-hall/community-development/2035-general-plan-update-2070

[22] City of Belmont, *Climate Action Plan*, Adopted November 2017, https://www.belmont.gov/city-hall/community-development/climate-action-plan#ad-image-0

take to minimize the adverse impacts of General Plan implementation on climate change and air quality.

Policy 5.11-2 Support the Climate Action Plan's goals and implement the Climate Action Plan's reduction measures and strategies to reduce GHG emissions.

Policy 5.11-3 Support and implement the Climate Action Plan's adaptation strategies and measures that promote resiliency to climate change impacts, such as sea level rise, extreme heat events, regional drought, and increased flooding.

Policy 5.11-4 Support and participate in regional efforts to reduce GHG emissions and implement adaptation strategies.

5.0 THRESHOLDS OF SIGNIFCNCE

The significance of potential impacts was determined based on State CEQA Guidelines, Appendix G, and the BAAQMD *CEQA Air Quality Guidelines*. Using Appendix G evaluation thresholds, the proposed project would be considered to have significant air quality impacts if it were to:

A. Conflict with or obstruct implementation of the applicable air quality plan;

B. Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard;

C. Expose sensitive receptors to substantial pollutant concentrations; or

D. Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people.

The thresholds and methodologies from the BAAQMD's *CEQA Air Quality Guidelines* were used to evaluate the potential impacts of construction and operation of the proposed project. The thresholds of significance applied to assess project-level air quality impacts are:

- Average daily construction exhaust emissions of 54 pounds per day of ROG, NO_x, or $PM_{2.5}$ or 82 pounds per day of PM_{10};
- Average daily operation emissions of 54 pounds per day of ROG, NO_x, or $PM_{2.5}$ or 82 pounds per day of PM_{10}; or result in maximum annual emissions of 10 tons per year of ROG, NO_x, or $PM_{2.5}$ or 15 tons per year of PM_{10};
- Exposure of persons by siting a new source or a new sensitive receptor to substantial levels of TAC resulting in (a) a cancer risk level greater than 10 in one million, (b) a noncancerous risk (chronic or acute) hazard index greater than 1.0, or (c) an increase of annual average $PM_{2.5}$ of greater than 0.3 micrograms per cubic meter ($\mu g/m^3$). For this threshold, sensitive receptors include residential uses, schools, parks, daycare centers, nursing homes, and medical centers; or
- Frequently and for a substantial duration, create or expose sensitive receptors to substantial objectionable odors affecting a substantial number of people.

Assessment of a significant cumulative impact if it would result in:

- Exposure of persons, by siting a new source or a new sensitive receptor, to substantial levels of TAC during either construction or operation resulting in (a) a cancer risk level greater than 100 in a million, (b) a noncancer risk (chronic or acute) hazard index greater than 10.0, or (c) annual average $PM_{2.5}$ of greater than 0.8 µg/m^3.

The BAAQMD air quality significance thresholds are found in **Table 2**.

Table 2: BAAQMD Air Quality Significance Thresholds

Pollutant	Construction Thresholds	Daily Operational Thresholds	Annual Operational Thresholds
Criteria Air Pollutants			
ROG	54	54	10
NOx	54	54	10
PM10	82 (exhaust only)	82	15
PM2.5	54 (exhaust only)	54	10
CO	NA	9.0 ppm (8-hour) and 20.0 ppm (1-hour)	
Fugitive Dust	Best Management Practices	NA	
Project Health Risk and Hazards			
Excess Cancer Risk	10 per million		
Chronic Hazard Index	1.0		
Acute Hazard Index	1.0		
Incremental Annual Average $PM_{2.5}$	0.3 µg/m^3		
Cumulative Health Risk and Hazards			
Excess Cancer Risk	100 per million		
Chronic Hazard Index	10.0		
Acute Hazard Index	10.0		
Incremental Annual Average $PM_{2.5}$	0.8 µg/m^3		

SOURCE: BAAQMD Adopted Air Quality CEQA Thresholds of Significance – May 2017, https://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/tools/ceqa-guidelines-may-2017-thresholds-table-pdf.pdf?la=en

For projects that are considered new sources of TAC or $PM_{2.5}$ (such as construction activity, stationary sources, industrial sources, or roadway projects), it is generally appropriate to use the project-level thresholds because the project-level threshold identifies project's incremental contribution to health impacts. Project impacts which are below the project-level thresholds would be presumed to contribute a less than significant impact to the cumulative condition. However, for projects that consist of new receptors (such as proposed residences or schools), it is generally appropriate to use the project and cumulative-level thresholds because the project itself is a source of TAC or $PM_{2.5}$ and, the cumulative risk threshold accounts for all potential sources of TAC and $PM_{2.5}$ in proximity to the new receptors on the project site. Therefore, the project, which does include existing and proposed receptors, was compared to the project-level and cumulative health impact thresholds.

In 2017, BAAQMD established separate thresholds of significance for operational GHG emissions from stationary sources (such as generators, furnaces, and boilers) and non-stationary sources (such as on-road vehicles). As no threshold has been established for construction-related emissions, the operational emissions thresholds apply. The threshold for stationary sources is 10,000 metric tons of CO_2e per year (i.e., emissions above this level may be considered significant). For non-stationary sources, three separate thresholds were established:

- Compliance with a Qualified Greenhouse Gas Reduction Strategy (i.e., if a project is found to be out of compliance with a Qualified Greenhouse Gas Reduction Strategy, its GHG emissions may be considered significant); or
- 1,100 metric tons of CO_2e per year (i.e., emissions above this level may be considered significant), representing a bright line threshold; or
- 4.6 metric tons of CO_2e per service population per year (i.e., emissions above this level may be considered significant), representing an efficiency threshold. Service population is the sum of residents/students/employees expected for a development project.

These GHG significance thresholds were established to meet state GHG reduction goals through 2020.[23] Although BAAQMD has not published quantified thresholds for post-2020 yet, this assessment uses a "Substantial Progress" efficiency metric of 660 metric tons of CO_2e per year, representing a bright line threshold and 2.8 metric tons of CO_2e per service population per year based on the GHG reduction goals of EO B-30-15. The service population metric of 2.8 is calculated for 2030 based on the 1990 GHG emissions and the projected 2030 statewide population and employment levels.[24] The 2030 bright-line threshold is a 40 percent reduction of the 2020 1,100 MT CO_2e/year threshold or 660 MT CO_2e/year.

The State goals are to reduce GHG emissions by 40 percent below 1990 levels by 2030 and by 80 percent below 1990 levels by 2050. The proposed project would be required to meet these goals to have a less than significant impact on GHG emissions. Therefore, the proposed project would result in a significant impact if it would be in conflict with the State GHG emission goals, which is a Qualified Greenhouse Gas Reduction Strategy.

Notably, BAAQMD is currently updating its quantified GHG thresholds for post-2020.[25] Within the draft proposal, the Air District recommends that lead agencies use the design elements as the threshold of significance for land use projects under the Supreme Court's "fair share" approach:

A. Projects must include, at a minimum, the following project design elements:

1. Buildings

[23] AB 32 required that statewide GHG emissions be reduced to 1990 levels by 2020.

[24] Dave Vintze, Bay Area Air Quality Management District, *CLE International 12th Annual Super Conference CEQA Guidelines, Caw Law and Policy Update*. December 12, 2016.

[25] Bay Area Air Quality Management District, *Draft Justification Report: CEQA Thresholds for Evaluating the Significance of Climate Impacts From Land Use Projects and Plans*, February 2022, https://www.baaqmd.gov/plans-and-climate/california-environmental-quality-act-ceqa/~/media/ffb719cfa04a438d9c7be10007a5abdf.ashx

a. The project will not include natural gas appliances or natural gas plumbing (in both residential and nonresidential development).

b. The project will not result in any wasteful, inefficient, or unnecessary electrical usage as determined by the analysis required under CEQA Section 21100(b)(3) and Section 15126.2(b) of the State CEQA Guidelines.

2. Transportation

a. Achieve compliance with electric vehicle requirements in the most recently adopted version of CALGreen Tier 2.

b. Achieve a reduction in project-generated vehicle miles traveled (VMT) below the regional average consistent with the current version of the California Climate Change Scoping Plan (currently 15 percent) or meet a locally adopted Senate Bill 743 VMT target, reflecting the recommendations provided in the Governor's Office of Planning and Research's Technical Advisory on Evaluating Transportation Impacts in CEQA:

i. Residential projects: 15 percent below the existing VMT per capita

ii. Office projects: 15 percent below the existing VMT per employee

iii. Retail projects: no net increase in existing VMT

B. Be consistent with a local GHG reduction strategy that meets the criteria under State CEQA Guidelines Section 15183.5(b).

6.0 CONSTRUCTION EMISSIONS INVENTORY

Intermittent (short-term construction emissions that occur from activities, such as site-grading, paving, and building construction) and long-term air quality impacts related to the operation of the proposed project were evaluated. The analysis focuses on daily emissions from construction and operational (mobile, area, stationary, and fugitive sources) activities. CalEEMod was used to quantify construction-related pollutant emissions. CalEEMod output worksheets are included in **Attachment A: Emissions Inventory Supporting Data**. The emissions generated from these construction activities include:

- Dust (including PM_{10} and $PM_{2.5}$) primarily from "fugitive" sources (i.e., emissions released through means other than through a stack or tailpipe) such as material handling and travel on unpaved surfaces; and
- Combustion exhaust emissions of criteria air pollutants (ROG, NO_x, CO, PM_{10}, and $PM_{2.5}$) primarily from operation of heavy off-road construction equipment, haul trucks, (primarily diesel-operated), and construction worker automobile trips (primarily gasoline-operated).
- VOC as ROG primarily from "fugitive" sources such as architectural coating and paving.

Construction-related fugitive dust emissions would vary from day to day, depending on the level and type of activity, silt content of the soil, and the weather. High winds (greater than 10 miles per hour) occur infrequently in the area, less than two percent of the time. In the absence of mitigation, construction

activities may result in significant quantities of dust, and as a result, local visibility and PM_{10} concentrations may be adversely affected on a temporary and intermittent basis during construction. In addition, the fugitive dust generated by construction would include not only PM_{10}, but also larger particles, which would fall out of the atmosphere within several hundred feet of the site and could result in nuisance-type impacts.

Demolition/construction activities are estimated to begin in January 2022 and construction of the project is estimated to be completed in May 2023. **Table 3** provides the estimated construction schedule for each phase: demolition, site preparation, grading, building construction, paving, and architectural coating based on CalEEMod and adjusted to the applicants expected start/end dates. The extended roadway would be paved using aggregate base overtopped with asphalt concrete. Typical construction activities would occur between 8:00 a.m. to 5:00 p.m. Monday through Friday. If Saturday work is required, construction activities would occur between 10:00 a.m. to 5:00 p.m.

Table 3: Estimated Construction Schedule

Phase	Start	End	Working Days
Site Preparation	3/1/2023	5/2/2023	45
Grading	5/4/2023	6/14/2023	30
Building Construction	7/15/2023	10/6/2023	60
Paving	10/7/2023	11/17/2023	30
Architectural Coating	11/18/2023	11/24/2023	5

Approximately 815 cubic yards of material would be excavated from the area to construct a flat road surface. 225 cubic yards of aggregate and asphalt material and excavated soils would be imported for roadway construction. Approximately 590 cubic yards of excess soil material would be exported from the project site. Site preparation would require approximately 81 haul truck trips. Grading would require approximately 102 haul truck trips.

The estimated construction equipment associated with the proposed project along with the number of pieces of equipment, daily hours of operation, horsepower (hp), and load factor (i.e., percent of full throttle) are shown in **Table 4** based on CalEEMod defaults. All construction equipment is assumed to be diesel-fueled.

Table 4: Estimated Construction Equipment Usage

Phase	Equipment	Amount	Daily Hours	HP	Load Factor
Demolition	Concrete/Industrial Saws	1	8	81	0.73
Demolition	Rubber Tired Dozers	1	1	247	0.40
Demolition	Tractors/Loaders/Backhoes	2	6	97	0.37
Site Preparation	Graders	1	8	187	0.41
Site Preparation	Tractors/Loaders/Backhoes	1	8	97	0.37
Grading	Graders	1	6	187	0.41
Grading	Rubber Tired Dozers	1	6	247	0.40
Grading	Tractors/Loaders/Backhoes	1	7	97	0.37

Grading	Trenchers	1	6	78	0.50
Building Construction	Cranes	1	4	231	0.29
Building Construction	Forklifts	2	6	89	0.20
Building Construction	Tractors/Loaders/Backhoes	2	8	97	0.37
Paving	Cement and Mortar Mixers	4	6	9	0.56
Paving	Pavers	1	7	130	0.42
Paving	Rollers	1	7	80	0.38
Paving	Tractors/Loaders/Backhoes	1	7	97	0.37
Architectural Coating	Air Compressors	1	6	78	0.48

Table 5 provides the estimated short-term construction emissions that would be associated with the proposed project and compares those emissions to the BAAQMD's significance thresholds for construction exhaust emissions. The average daily construction period emissions (i.e., total construction period emissions divided by the number of construction days of 183) were compared to the BAAQMD significance thresholds. All construction-related emissions would be below the BAAQMD significance thresholds.

Based on the CalEEMod and using standard fuel consumption estimates, construction activities would require approximately 9,630 gallons of diesel fuel.[26]

Table 5: Estimated Construction Emissions

Condition	ROG	NOx	PM10	PM2.5	CO
	Unmitigated				
Total Construction Emissions (tons)	0.16	0.62	0.03	0.03	0.54
Average Daily Construction Emissions (pounds)	1.76	6.81	0.30	0.28	5.93
Significance Threshold	54	54	82	54	---
Significant (Yes or No)?	No	No	No	No	No
	Mitigated				
Total Construction Emissions (tons)	0.11	0.07	<0.01	<0.01	0.61
Average Daily Construction Emissions (pounds)	1.25	0.73	<0.01	<0.01	6.71
Significance Threshold	54	54	82	54	---
Significant (Yes or No)?	No	No	No	No	No

SOURCE: CalEEMod Version 2020.4.0

BAAQMD's *CEQA Air Quality Guidelines* require several best management practices to control fugitive dust and exhaust emissions. There would be a potential fugitive dust impact that is mitigated to less than significant with implementation of the erosion control measures that would be part of these best management practices. The following measures shall be implemented by the construction contractor:

[26] Fuel usage is estimated using the CalEEMod output for CO_2, and a 10.15 $kgCO_2$/gallon conversion factor for diesel fuel, https://www.epa.gov/sites/production/files/2018-03/documents/emission-factors_mar_2018_0.pdf

Mitigation Measure AQ-1: *BAAQMD Required Fugitive Dust Control Measures:* The applicant shall require their construction contractors to reduce construction-related fugitive dust by implementing BAAQMD's basic control measures at all construction and staging areas, including:

- All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered two times per day.
- All haul trucks transporting soil, sand, or other loose material off site shall be covered.
- All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited.
- All vehicle speeds on unpaved roads shall be limited to 15 miles per hour.
- All roadways, driveways, and sidewalks to be paved shall be completed as soon as possible. Building pads shall be laid as soon as possible after grading unless seeding or soil binders are used.
- A publicly visible sign shall be posted with the telephone number and person to contact at the Lead Agency regarding dust complaints. This person shall respond and take corrective action with 48 hours. The Air District's phone number shall also be visible to ensure compliance with applicable regulations.

Mitigation Measure AQ-2: *BAAQMD Required Basic Exhaust Emissions Reduction Measures.* The applicant shall require their construction contractors to implement the following measures during construction to reduce exhaust emissions:

- Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to five minutes (as required by the California airborne toxics control measure Title 13, Section 2485 of California Code of Regulations). Clear signage shall be provided for construction workers at all access points.
- All construction equipment shall be maintained and properly tuned in accordance with manufacturer's specifications. All equipment shall be checked by a certified mechanic and determined to be running in proper condition prior to operation.

The applicant shall encourage their contractors to reduce construction-related fugitive ROG emissions by ensuring that low-VOC coatings that have a VOC content of 50 grams/liter or less are used during the coating of the building's interiors and exterior surfaces. The project applicant shall submit evidence of the use of low-VOC coatings to BAAQMD prior to the start of construction.

7.0 OPERATIONAL EMISSIONS INVENTORY

CalEEMod was used to estimate emissions that would be associated with motor vehicle use, space and water heating, and landscape maintenance emissions expected to occur after the proposed project construction is complete and the project is operational. The proposed project land use types and size and other project-specific information were input to the model. CalEEMod provides emissions for transportation, areas sources, electricity consumption, natural gas combustion, electricity usage

associated with water usage and wastewater discharge, and solid waste land filling and transport. CalEEMod output worksheets are included in **Attachment A: Emissions Inventory Supporting Data**.

Based on CalEEMod, a daily weekday trip rate of 9.44 weekday trips per dwelling unit (or 38 daily weekday trips) was used to estimate mobile vehicle emissions. The estimated annual vehicle miles traveled for the proposed project would be 86,168 miles, requiring approximately 3,710 gallons of gasoline (based on standard fuel consumption estimates). [27]

Estimated daily and annual operational emissions that would be associated with the proposed project are presented in **Tables 6 and 7** and are compared to BAAQMD's thresholds of significance. As indicated in **Tables 6 and 7**, the estimated proposed project operational emissions would be below the BAAQMD's significance thresholds and would be less than significant.

Table 6: Estimated Daily Operational Emissions (pounds)

Condition	ROG	NOx	PM10	PM2.5	CO
Project Summer Daily Emissions	4.61	0.21	0.95	0.81	6.51
Project Winter Daily Emissions	4.60	0.23	0.95	0.81	6.57
Maximum Daily Emissions	**4.61**	**0.23**	**0.95**	**0.81**	**6.57**
Significance Threshold	54	54	82	54	---
Significant Impact?	No	No	No	No	No

SOURCE: CalEEMod Version 2020.4.0

Table 7: Estimated Annual Operational Emissions (tons)

Condition	ROG	NOx	PM10	PM2.5	CO
Project Annual Emissions	0.11	0.03	0.04	0.01	0.21
Significance Threshold	10	10	15	10	---
Significant (Yes or No)?	No	No	No	No	No

SOURCE: CalEEMod Version 2020.4.0

Cumulative Impacts

Cumulative impacts are defined in CEQA as "two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts" (CEQA Guidelines Section 15355). Stated in another way, "a cumulative impact consists of an impact which is created as a result of the combination of the project evaluated in the EIR together with other projects causing relating impacts" (CEQA Guidelines Section 15130 [a][1]).

Cumulative impacts would exist when either direct air quality impacts or multiple construction projects occur within the same area simultaneously. If a project were to produce air quality emissions simultaneously to a nearby construction project, the addition of both project emissions to the environment could exceed significance thresholds. For this project, the construction emissions were found to be less than significant. If a nearby project was to be under construction at the same time, that

[27] Fuel usage is estimated using the CalEEMod output for CO_2, and a 8.91 $kgCO_2$/gallon conversion factor for gasoline fuel, https://www.epa.gov/sites/production/files/2018-03/documents/emission-factors_mar_2018_0.pdf

project would need to produce an additive amount of emissions close to the project site such that emissions would exceed thresholds. No cumulatively considerable construction projects are within at least 0.5 mile of the project site. Given this, a less than significant cumulative air quality impact would be expected during construction.

The proposed project site is zoned residential, and the project has been designed to be consistent with this zoning designation. The project would generate less than significant direct and cumulative air quality impacts. Since the proposed project would not have any significant direct impacts and would not have any significant cumulative impacts, the project would not conflict with either the BAAQMD Clean Air Plan.

Odor Impacts

Though offensive odors from stationary and mobile sources rarely cause any physical harm, they remain unpleasant and can lead to public distress, generating citizen complaints to local governments. The occurrence and severity of odor impacts depend on the nature, frequency, and intensity of the source; wind speed and direction; and the sensitivity of receptors.

The BAAQMD's significance criteria for odors are subjective and are based on the number of odor complaints generated by a project. Generally, the BAAQMD considers any project with the potential to frequently expose members of the public to objectionable odors to cause a significant impact. With respect to the proposed project, diesel-fueled construction equipment exhaust would generate some odors. Generally, odor emissions are highly dispersive, especially in areas with higher average wind speeds. Therefore, odor impacts associated with the location of the proposed project would be less than significant.

8.0 HEALTH RISK ASSESSMENT

The proposed project would constitute a new emission source of DPM and $PM_{2.5}$ due to its construction activities. Studies have demonstrated that DPM from diesel-fueled engines is a human carcinogen and that chronic (long-term) inhalation exposure to DPM poses a chronic health risk. The proposed project would also locate sensitive receptors near existing permitted stationary sources.

Health effects from carcinogenic air toxics are usually described in terms of individual cancer risk. Individual cancer risk is the likelihood that a person exposed to air toxic concentrations over a 70-year lifetime will contract cancer, based on the use of standard risk-assessment methodology. The maximally exposed individual (MEI) represents the worst–case risk estimate, based on a theoretical person continuously exposed for a lifetime at the point of highest compound concentration in the air. This is a highly conservative assumption, since most people do not remain at home all day and on average residents change residences every 11 to 12 years. In addition, this assumption assumes that residents are experiencing outdoor concentrations for the entire exposure period.

The HRA analyzes the incremental cancer risks to sensitive receptors in the vicinity of the proposed project, using emission rates (in pounds per hour) from the CalEEMod emission model. DPM (reported as exhaust emissions of $PM_{2.5}$) emission rates were input into the USEPA's AERMOD atmospheric dispersion model to calculate ambient air concentrations at receptors in the proposed project vicinity. The HRA is intended to provide a worst–case estimate of the increased exposure by employing a standard emission

estimation program, an accepted pollutant dispersion model, approved toxicity factors, and conservative exposure parameters.

In accordance with OEHHA *Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments,* the HRA was accomplished by applying the highest estimated concentrations of TAC at the receptors analyzed to the established cancer potency factors and acceptable reference concentrations for non-cancer health effects. Increased cancer risks were calculated using the modeled DPM concentrations and OEHHA-recommended methodologies for both a child exposure (3rd trimester through two years of age) and adult exposure. The cancer risk calculations were based on applying the OEHHA-recommended age sensitivity factors and breathing rates, as well as fraction of time at home and an exposure duration of 30 years, to the DPM concentration exposures. Age-sensitivity factors reflect the greater sensitivity of infants and small children to cancer causing air pollutants. The supporting methodology and assumptions used in this HRA are provided in **Attachment B: Health Risk Assessment Methodology, Assumptions, and Detailed Results**.

These conservative methodologies overestimate both non-carcinogenic and carcinogenic health risk, possibly by an order of magnitude or more. Therefore, for carcinogenic risks, the actual probabilities of cancer formation in the populations of concern due to exposure to carcinogenic pollutants are likely to be lower than the risks derived using the HRA methodology. The extrapolation of toxicity data in animals to humans, the estimation of concentration prediction methods within dispersion models; and the variability in lifestyles, fitness and other confounding factors of the human population also contribute to the overestimation of health impacts. Therefore, the results of the HRA are highly overstated.

Health Impacts on Existing Residences

The following describes the HRA results associated with existing receptors due to unmitigated project construction activities. The maximum cancer risk from unmitigated project construction emissions for a residential-adult receptor would be 0.8 per million and for a residential-child receptor would be 17.4 per million.

Table 8: Estimated Unmitigated Health Impacts for Existing Receptors

Source	Cancer Risk (child/adult)	Hazard Impact	$PM_{2.5}$ Concentration
Unmitigated Proposed Project Construction	17.4/0.78	0.02	0.32
Total Proposed Project	**17.4/0.78**	**0.02**	**0.32**
Significance Threshold	10	1.0	0.3
Potentially Significant (Yes or No)?	**Yes**	No	**Yes**

The maximum concentrations would occur at a residential receptor (also known as the maximum exposed individual or MEI) to the east and within 100 feet of the project site; along Sequoia Way. Thus, the cancer risk due to construction activities and project operations are potentially above the BAAQMD threshold of 10 per million and would be potentially significant.

Therefore, the proposed project would be required to implement **Mitigation Measure AQ-3** BAAQMD's *Enhanced Exhaust Emission Reduction Measures*.

Mitigation Measure AQ-3: *BAAQMD Enhanced Exhaust Emissions Reduction Measures.* The applicant shall implement the following measures during construction to further reduce construction-related exhaust emissions:

All construction equipment larger than 50 horsepower used at the site for more than two continuous days or 20 hours total shall utilized diesel engines that are USEPA certified Tier 3 emission standards for particulate matter and be equipped with CARB-certified Level 3 Diesel Particulate Filters. Prior to the issuance of any demolition permits, the project applicant shall submit specifications of the equipment to be used during construction and confirmation this requirement is met.

Equipment such as concrete/industrial saws, pumps, aerial lifts, light stands, air compressors, and forklifts shall be electric or alternative-fueled (i.e., non-diesel), where feasible. Pole power shall be utilized at the earliest feasible point in time and shall be used to the maximum extent feasible in lieu of generators. If stationary construction equipment, such as diesel-powered generators, must be operated continuously, such equipment must be Tier 3 construction equipment or better and located at least 100 feet from air quality sensitive land uses (e.g., residences, schools, childcare centers, hospitals, parks, or similar uses), whenever possible.

As shown in **Table 9**, with the implementation of **Mitigation Measures AQ-1 through AQ-3**, the maximum cancer risk from mitigated project construction for a residential-adult receptor would be 0.1 per million and for a residential-child receptor would be 2.9 per million. Thus, the cancer risk due to construction activities and project operations would be below the BAAQMD threshold of 10 per million and would be less than significant with mitigation.

Table 9: Estimated Mitigated Health Impacts for Existing Receptors

Source	Cancer Risk (child/adult)	Hazard Impact	$PM_{2.5}$ Concentration
Mitigated Proposed Project Construction	2.90/0.13	<0.01	0.08
Total Proposed Project	**2.90/0.13**	**<0.01**	**0.08**
Significance Threshold	10	1.0	0.3
Potentially Significant (Yes or No)?	No	No	No

Non-Cancer Health Hazard at Existing Residences

Both acute (short-term) and chronic (long-term) adverse health impacts unrelated to cancer are measured against a hazard index (HI), which is defined as the ratio of the predicted incremental DPM exposure concentration from the proposed project to a reference exposure level (REL) that could cause adverse health effects. The REL are published by OEHHA based on epidemiological research. The ratio (referred to as the Hazard Quotient [HQ]) of each non-carcinogenic substance that affects a certain organ system is added to produce an overall HI for that organ system. The overall HI is calculated for each organ system. The impact is considered to be significant if the overall HI for the highest-impacted organ system is greater than 1.0.

There is no acute REL for DPM. The chronic reference exposure level for DPM was established by the California OEHHA[28] as 5 μg/m^3. Thus, the proposed project-related annual concentration of DPM cannot exceed 5.0 μg/m^3; resulting in a chronic HI of greater than 1.0 (i.e., DPM annual concentration/5.0 μg/m^3).

The unmitigated chronic HI would be 0.02, based on a proposed project-related maximum annual diesel concentration of 0.12 μg/m^3 (per dispersion modeling analysis) or 0.12 μg/m^3/5.0 μg/m^3, which is 0.02. The mitigated chronic HI would be less than 0.01. The chronic HI would be below the project-level threshold of 1 and the impact of the proposed project would therefore be less than significant.

$PM_{2.5}$ Concentration at Existing Residences

Dispersion modeling also estimated the exposure of sensitive receptors to project-related concentrations of $PM_{2.5}$. The BAAQMD *Air Quality Guidelines* requires inclusion of $PM_{2.5}$ exhaust and fugitive dust emissions in this analysis. The proposed project's unmitigated annual $PM_{2.5}$ concentration from construction activities would be 0.32 μg/m^3; a potentially significant impact. With implementation of **Mitigation Measure AQ-1 through AQ-3**, the annual unmitigated $PM_{2.5}$ concentration would be reduced to 0.08 μg/m^3. Thus, the annual $PM_{2.5}$ concentration due to project construction (combustion exhaust and fugitive dust) would be below the BAAQMD threshold of 0.3 μg/m^3 and would be considered less than significant.

Cumulative Health Impacts on Proposed Residences

The proposed project is not within 1,000 feet of existing cumulative sources such as permitted sources (i.e., diesel generators, boilers, gasoline stations), major roadways, and rail activities. Furthermore, the 2019 Building Energy Efficiency Standards, which became effective January 1, 2020, require minimum efficiency reporting value (MERV) 13, or equivalent, filters for heating/cooling and ventilation systems for low-rise residential buildings (three stories or less) per Title 24 (CalGreen), unless the project is found to be exempt. Studies have demonstrated that achieving a substantial removal of ultrafine particulates (greater than 50 percent) requires higher efficiency filters (MERV 13 or higher) than those typically used in residence. The proposed project's required compliance with the 2019 Building Energy Efficiency Standards would ensure potential health impacts of the proposed residences would be less than significant. Therefore, the proposed project would have a less-than-significant impact relative to cumulative health impacts.

9.0 GREENHOUSE GAS EMISSIONS

"Global warming" and "global climate change" are the terms used to describe the increase in the average temperature of the earth's near-surface air and oceans since the mid-20th century and its projected continuation. Warming of the climate system is now considered to be unequivocal, with global surface temperature increasing approximately 1.33 degrees Fahrenheit (°F) over the last 100 years. Continued warming is projected to increase global average temperature between 2 and 11°F over the next 100 years.

[28] California Office of Environmental Health Hazards Assessment - Acute, 8-hour, and Chronic Reference Exposure Levels, June 2014, http://www.oehha.ca.gov/air/allrels.html

Natural processes and human actions have been identified as the causes of this warming. The International Panel on Climate Change concludes that variations in natural phenomena such as solar radiation and volcanoes produced most of the warming from pre-industrial times to 1950 and had a small cooling effect afterward. After 1950, however, increasing GHG concentrations resulting from human activity such as fossil fuel burning and deforestation have been responsible for most of the observed temperature increase. These basic conclusions have been endorsed by more than 45 scientific societies and academies of science, including all of the national academies of science of the major industrialized countries. Since 2007, no scientific body of national or international standing has maintained a dissenting opinion.

Increases in GHG concentrations in the earth's atmosphere are thought to be the main cause of human-induced climate change. GHG naturally trap heat by impeding the exit of solar radiation that has hit the earth and is reflected back into space. Some GHG occur naturally and are necessary for keeping the earth's surface inhabitable. However, increases in the concentrations of these gases in the atmosphere during the last 100 years have decreased the amount of solar radiation that is reflected back into space, intensifying the natural greenhouse effect and resulting in the increase of global average temperature.

Gases that trap heat in the atmosphere are referred to as GHG because they capture heat radiated from the sun as it is reflected back into the atmosphere, much like a greenhouse does. The accumulation of GHG has been implicated as the driving force for global climate change. The primary GHG are carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O), ozone, and water vapor.

While the presence of the primary GHG in the atmosphere are naturally occurring, CO_2, CH_4, and N_2O are also emitted from human activities, accelerating the rate at which these compounds occur within earth's atmosphere. Emissions of CO_2 are largely by-products of fossil fuel combustion, whereas methane results from off-gassing associated with agricultural practices and landfills. Other GHG include hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride, and are generated in certain industrial processes.

CO_2 is the reference gas for climate change because it is the predominant GHG emitted. The effect that each of the aforementioned gases can have on global warming is a combination of the mass of their emissions and their global warming potential (GWP). GWP indicates, on a pound-for-pound basis, how much a gas is predicted to contribute to global warming relative to how much warming would be predicted to be caused by the same mass of CO_2. CH_4 and N_2O are substantially more potent GHG than CO_2, with GWP of 25 and 298 times that of CO_2, respectively.[29]

In emissions inventories, GHG emissions are typically reported in terms of pounds or metric tons (MT) of CO_2 equivalents (CO_2e). CO_2e are calculated as the product of the mass emitted of a given GHG and its specific GWP. While CH_4 and N_2O have much higher GWP than CO_2, CO_2 is emitted in such vastly higher quantities that it accounts for the majority of GHG emissions in CO_2e.

[29] Global warming potential values, https://www.ghgprotocol.org/sites/default/files/ghgp/Global-Warming-Potential-Values%20%28Feb%2016%202016%29_1.pdf

Fossil fuel combustion, especially for the generation of electricity and powering of motor vehicles, has led to substantial increases in CO_2 emissions (and thus substantial increases in atmospheric concentrations of CO_2). In pre-industrial times (c. 1860), concentrations of atmospheric CO_2 were approximately 280 parts per million (ppm). By February 2022, atmospheric CO_2 concentrations had increased to 419 ppm, 50 percent percent above pre-industrial concentrations.[30]

There is international scientific consensus that human-caused increases in GHG have and will continue to contribute to global warming. Potential global warming impacts in California may include, but are not limited to, loss in snow pack, sea level rise, more extreme heat days per year, more high ozone days, more large forest fires, and more drought years. Secondary effects are likely to include a global rise in sea level, impacts to agriculture, changes in disease vectors, and changes in habitat and biodiversity.[31]

California Green Building Standards Code

The energy consumption of new residential and nonresidential buildings in California is regulated by the state's Title 24, Part 6, Building Energy Efficiency Standards (California Energy Code). The California Energy Code was established by CEC in 1978 in response to a legislative mandate to create uniform building codes to reduce California's energy consumption and provide energy efficiency standards for residential and nonresidential buildings. CEC updates the California Energy Code every 3 years with more stringent design requirements for reduced energy consumption, which results in the generation of fewer GHG emissions.

The 2019 California Energy Code was adopted by the CEC on May 9, 2018 and will apply to projects constructed after January 1, 2020. Nonresidential buildings are anticipated to reduce energy consumption by 30 percent compared to the 2016 standards primarily through prescriptive requirements for high-efficacy lighting. The building efficiency standards are enforced through the local plan check and building permit process. Local government agencies may adopt and enforce additional energy standards for new buildings as reasonably necessary in response to local climatologic, geologic, or topographic conditions, provided that these standards exceed those in the California Energy Code.

The California Green Building Standards Code (CALGreen) is part 11 of Title 24, California Code of Regulations. CALGreen is the first-in-the-nation mandatory green building standards code, developed in an effort to meet the goals of California's landmark initiative AB 32, which established a comprehensive program of cost-effective reductions of GHG emissions to 1990 levels by 2020. CALGreen includes a waste diversion mandate, which requires that at least 65 percent of construction materials generated during new construction or demolition projects are diverted from landfills.

[30] Earth System Research Laboratory, *Recent Monthly Mean CO_2 at Mauna Lora*, www.esrl.noaa.gov/gmd/ccgg/trends/

[31] California Environmental Protection Agency, *2006 Final Climate Action Team Report to the Governor and Legislature*, March 2006, http://www.climatechange.ca.gov/climate_action_team/reports/2006report/2006-04-03_FINAL_CAT_REPORT.PDF

City of Belmont Climate Action Plan

Concurrent with the 2035 General Plan, the City of Belmont prepared and adopted a Climate Action Plan (CAP).[32] The City prepared the CAP to achieve compliance with State mandates and focus on feasible actions the City can take to minimize adverse impacts on growth and development on global climate change. The CAP contains the detailed strategies and measures that will be implemented in Belmont to reduce GHG emissions. The City's CAP proposes a 2020 emissions reduction target equivalent to 15 percent below 2005 emissions levels and a 2035 emissions reduction target equivalent to 50 percent below 2005 emissions levels.

The City's GHG Emissions Inventory shows transportation, commercial and industrial uses, residential uses, waste/wastewater and water use in the city generated 167,648 metric tons (MT) of CO_2e in 2005 and 159,051 MT of CO_2e in 2013. Of the sources in this total, the largest contributors include transportation sector and residential sector emissions, which contribute approximately 60 percent and 25 percent, respectively.

The CAP sets three goals below that seek to reduce GHG emissions from Belmont. Each goal includes a number of specific measures that are described in the CAP. Some measures aim to reduce emissions from the community at large, while other measures may specifically focus on the operations of the City of Belmont.

> **Energy:** Increase municipal, residential, and commercial energy efficiency; renewable energy; efficient water use; and green building practices (CAP contains 14 specific measures to address this goal).
>
> **Transportation and Land Use:** Reduce emissions from transportation through efficient land use, alternate modes of transportation, and operational innovations (CAP contains six specific measures to address this goal).
>
> **Waste Generation:** Reduce solid waste generated and sent to landfills (CAP contains three specific measures to address this goal).

Executive Order S-3-05

Governor Schwarzenegger established Executive Order S-3-05 in 2005, in recognition of California's vulnerability to the effects of climate change. Executive Order S-3-05 set forth a series of target dates by which statewide emissions of GHG would be progressively reduced, as follows:

- By 2010, reduce GHG emissions to 2000 levels;
- By 2020, reduce GHG emissions to 1990 levels; and
- By 2050, reduce GHG emissions to 80 percent below 1990 levels.

[32] City of Belmont, *Climate Action Plan*, Adopted November 2017, https://www.belmont.gov/city-hall/community-development/climate-action-plan#ad-image-0

The executive order directed the Secretary of the CalEPA to coordinate a multi-agency effort to reduce GHG emissions to the target levels. The Secretary will also submit biannual reports to the governor and California Legislature describing the progress made toward the emissions targets, the impacts of global climate change on California's resources, and mitigation and adaptation plans to combat these impacts. To comply with the executive order, the secretary of CalEPA created the California Climate Action Team, made up of members from various state agencies and commissions. The team released its first report in March 2006. The report proposed to achieve the targets by building on the voluntary actions of California businesses, local governments, and communities and through state incentive and regulatory programs.

Assembly Bill 32 (California Global Warming Solutions Act of 2006)

California passed the California Global Warming Solutions Act of 2006 (AB 32; California Health and Safety Code Division 25.5, Sections 38500 - 38599). AB 32 establishes regulatory, reporting, and market mechanisms to achieve quantifiable reductions in GHG emissions and establishes a cap on statewide GHG emissions. AB 32 requires that statewide GHG emissions be reduced to 1990 levels by 2020. This reduction will be accomplished by enforcing a statewide cap on GHG emissions that will be phased in starting in 2012. To effectively implement the cap, AB 32 directs CARB to develop and implement regulations to reduce statewide GHG emissions from stationary sources. AB 32 specifies that regulations adopted in response to AB 1493 should be used to address GHG emissions from vehicles. However, AB 32 also includes language stating that if the AB 1493 regulations cannot be implemented, then CARB should develop new regulations to control vehicle GHG emissions under the authorization of AB 32.

AB 32 requires CARB to adopt a quantified cap on GHG emissions representing 1990 emissions levels and disclose how it arrived at the cap; institute a schedule to meet the emissions cap; and develop tracking, reporting, and enforcement mechanisms to ensure that the state reduces GHG emissions enough to meet the cap. AB 32 also includes guidance on instituting emissions reductions in an economically efficient manner, along with conditions to ensure that businesses and consumers are not unfairly affected by the reductions. Using these criteria to reduce statewide GHG emissions to 1990 levels by 2020 would represent an approximate 25 to 30 percent reduction in current emissions levels. However, CARB has discretionary authority to seek greater reductions in more significant and growing GHG sectors, such as transportation, as compared to other sectors that are not anticipated to significantly increase emissions. Under AB 32, CARB must adopt regulations to achieve reductions in GHG to meet the 1990 emissions cap by 2020.

Climate Change Scoping Plan

AB 32 required CARB to develop a Scoping Plan that describes the approach California will take to reduce GHG to achieve the goal of reducing emissions to 1990 levels by 2020. The Scoping Plan was first approved by CARB in 2008 and must be updated every five years. The initial AB 32 Scoping Plan contains the main strategies California will use to reduce the GHG that cause climate change. The initial Scoping Plan has a range of GHG reduction actions which include direct regulations, alternative compliance mechanisms, monetary and non-monetary incentives, voluntary actions, market-based mechanisms such as a cap-and-trade system, and an AB 32 program implementation fee regulation to fund the program. In August 2011, the initial Scoping Plan was approved by CARB.

The 2013 Scoping Plan Update builds upon the initial Scoping Plan with new strategies and recommendations. The 2013 Update identifies opportunities to leverage existing and new funds to further drive GHG emission reductions through strategic planning and targeted low carbon investments. The 2013 Update defines CARB climate change priorities for the next five years and sets the groundwork to reach California's long-term climate goals set forth in Executive Orders S-3-05 and B-16-2012. The 2013 Update highlights California progress toward meeting the near-term 2020 GHG emission reduction goals defined in the initial Scoping Plan. In the 2013 Update, nine key focus areas were identified (energy, transportation, agriculture, water, waste management, and natural and working lands), along with short-lived climate pollutants, green buildings, and the cap-and-trade program. On May 22, 2014, the First Update to the Climate Change Scoping Plan was approved by the Board, along with the finalized environmental documents.

Executive Order No. B-30-15

On April 29, 2015, Executive Order No. B-30-15 was issued to establish a California GHG reduction target of 40 percent below 1990 levels by 2030. Executive Order No. B-30-15 sets a new, interim, 2030 reduction goal intended to provide a smooth transition to the existing ultimate 2050 reduction goal set by Executive Order No. S-3-05 (signed by Governor Schwarzenegger in June 2005). It is designed so State agencies do not fall behind the pace of reductions necessary to reach the existing 2050 reduction goal. Executive Order No. B-30-15 orders "All State agencies with jurisdiction over sources of GHG emissions shall implement measures, pursuant to statutory authority, to achieve reductions of GHG emissions to meet the 2030 and 2050 targets." The Executive Order also states that "CARB shall update the Climate Change Scoping Plan to express the 2030 target in terms of million metric tons of carbon dioxide equivalent." The CARB is currently moving forward with a second update to the Climate Change Scoping Plan to reflect the 2030 reduction target. The updated Scoping Plan will provide a framework for achieving the 2030 target. In September of 2016, the AB 32 was extended to achieve reductions in GHG of 40 percent below 1990 levels by 2030. The new plan, outlined in SB 32, involves increasing renewable energy use, putting more electric cars on the road, improving energy efficiency, and curbing emissions from key industries.

Senate Bill 32

On September 8, 2016, the governor signed Senate Bill 32 (SB 32) into law, extending AB 32 by requiring the State to further reduce GHGs to 40 percent below 1990 levels by 2030 (the other provisions of AB 32 remain unchanged). On December 14, 2017, CARB adopted the 2017 Scoping Plan, which provides a framework for achieving the 2030 target. The 2017 Scoping Plan relies on the continuation and expansion of existing policies and regulations, such as the Cap-and-Trade Program, as well as implementation of recently adopted policies and policies, such as SB 350 and SB 1383 (see below). The 2017 Scoping Plan also puts an increased emphasis on innovation, adoption of existing technology, and strategic investment to support its strategies. As with the 2013 Scoping Plan Update, the 2017 Scoping Plan does not provide project-level thresholds for land use development. Instead, it recommends that local governments adopt policies and locally appropriate quantitative thresholds consistent with a statewide per capita goal of 6 metric tons of CO_2e by 2030 and 2 metric tons of CO_2e by 2050. As stated in the 2017 Scoping Plan, these goals may be appropriate for plan-level analyses (city, county, subregional, or regional level), but not for specific individual projects because they include all emissions sectors in the state.

Executive Order B-55-18

On September 10, 2018, the governor issued Executive Order B-55-18, which established a new statewide goal of achieving carbon neutrality by 2045 and maintaining net negative emissions thereafter. This goal is in addition to the existing statewide GHG reduction targets established by SB 375, SB 32, SB 1383, and SB 100.

Greenhouse Gas Regional Emission Estimates

In 2019, the United States emitted about 6,558 million metric tons of CO_2e. Emissions increased from 2018 to 2019 by 1.7 percent. This decrease was driven largely by a decrease in emissions from fossil fuel combustion resulting from a decrease in total energy use in 2019 compared to 2018 and a continued shift from coal to natural gas and renewables in the electric power sector.[33] GHG emissions in 2018 (after accounting for sequestration from the land sector) were 10.2 percent below 2005 levels. GHG emissions in 2019 (after accounting for sequestration from the land sector) were 13 percent below 2005 levels.

In 2019, California emitted approximately 418.2 million metric tons of CO_2e, 7.0 million metric tons of CO_2e lower than 2018 levels and 12.8 million metric tons of CO_2e below the 2020 GHG Limit of 431 million metric tons of CO_2e).[34] Consistent with recent years, these reductions have occurred while California's economy has continued to grow and generate jobs. The transportation sector remains the largest source of GHG emissions in the state with 40 percent of the emissions in 2019 but saw a decrease in emissions compared to 2018.[35]

Emissions from the electricity sector account for 14 percent of the inventory and showed a decrease. California in 2019 used more electricity from zero-GHG sources (for the purpose of the GHG inventory, these include hydro, solar, wind, and nuclear energy) than from GHG-emitting sources for both in-state generation and total (in-state plus imports) generation. The industrial sector has seen steady emissions in the past few years and remains at 21 percent of the inventory.[36]

In the San Francisco Bay Area, the GHG emissions inventory prepared by the BAAQMD indicates that the transportation and industrial/commercial sectors represent the largest sources of GHG emissions, accounting for 39.7 percent and 35.7 percent, respectively, of the Bay Area's 86.6 million tons of CO_2e emissions in 2011. Electricity/co-generation sources account for approximately 14 percent of the Bay Area's GHG emissions, followed by residential fuel usage at approximately 7.7 percent. Off-road equipment sources currently account for approximately 1.5 percent of total Bay Area GHG emissions.[37]

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[33] United States Environmental Protection Agency, *Inventory of U.S. Greenhouse Gas Emissions and Sinks*, April 2021, https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks-1990-2019

[34] California Air Resources Board, *Emissions Trends Report 2000-2019 (2021 Edition)*, https://ww2.arb.ca.gov/ghg-inventory-data

[35] California Air Resources Board, *Emissions Trends Report 2000-2019 (2021 Edition)*, https://ww2.arb.ca.gov/ghg-inventory-data

[36] California Air Resources Board, *Emissions Trends Report 2000-2019 (2021 Edition)*, https://ww2.arb.ca.gov/ghg-inventory-data

[37] Bay Area Air Quality Management District, *Bay Area Emissions Inventory*, Adopted June 2011, Updated January 2015, http://www.baaqmd.gov/~/media/files/planning-and-research/emission-inventory/ by2011_ghgsummary.pdf

Thresholds of Significance

CEQA Guidelines Appendix G includes a list of potentially significant project impacts. The Project would have a GHG emissions impact if it would:

- Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment.
- Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing emissions of GHG.

CEQA Guidelines Section 15064.4 provides guidance to lead agencies for determining the significance of environmental impacts pertaining to GHG emissions. Section 15064.4(a) states that a lead agency should make a good-faith effort that is based, to the extent possible, on scientific and factual data to describe, calculate, or estimate the amount of GHG emissions that would result from implementation of a project. CEQA Guidelines Section 15064.4(b) also states that, when assessing the significance of impacts from GHG emissions, a lead agency should consider (1) the extent to which the project may increase or reduce GHG emissions compared with existing conditions, (2) whether the project's GHG emissions would exceed a threshold of significance that the lead agency has determined to be applicable to the project, and (3) the extent to which the project would comply with regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of GHG emissions.

Project Greenhouse Gas Emissions

CalEEMod was used to quantify GHG emissions associated with construction activities, as well as long-term operational emissions produced by motor vehicles, natural gas combustion for space and water heating, electricity use, and landscape maintenance equipment. CalEEMod incorporates GHG emission factors for the central electric utility serving the Bay Area and mitigation measures based on the California Air Pollution Control Officer's Association (CAPCOA) *Quantifying Greenhouse Gas Mitigation Measures*[38] and the *California Climate Action Registry General Reporting Protocol.*[39]

The BAAQMD CEQA Guidelines do not identify a GHG emissions threshold for construction-related emissions; however, they do recommend that GHG emissions from construction be quantified and disclosed and a determination regarding the significance of the GHG emissions be made with respect to whether the project in question is consistent with state goals regarding reductions in GHG emissions.

The proposed project would ensure that GHG emissions during construction would be minimized through implementation of BAAQMD's Best Management Practices. Best management practices may include but are not limited to using alternative fueled (e.g., biodiesel, electric) construction vehicles/equipment of at least 15 percent of the fleet; using local building materials of at least 10 percent; and recycling or reusing at least 50 percent of construction waste or demolition materials.

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[38] California Air Pollution Control Officer's Association *Quantifying Greenhouse Gas Mitigation Measures*, August 2010, http://www.capcoa.org/wp-content/uploads/2010/11/CAPCOA-Quantification-Report-9-14-Final.pdf

[39] California Climate Action Registry General Reporting Protocol, April 2008, http://www.climateactionreserve.org/wp-content/uploads/videos/GRP_V3_April%202008_FINAL.pdf

The estimated construction GHG emissions are 98 metric tons of CO_2e. As indicated, 30-year amortized annual construction related GHG emissions would be approximately 3 metric tons of CO_2e.

Operational GHG emissions sources associated with operation of the proposed project include on-road vehicles, landscaping equipment, landfill waste, electricity for building energy and water, and changes to land uses. The estimated annual construction and operational GHG emissions are 46 metric tons of CO_2e per year, which is below the 2030 bright line GHG significance threshold of 660 metric tons per year.

On January 1 of 2020, the California Solar Mandate went into effect requiring all new residential development (single-family and multi-family development) up to three stories in height to install an individual solar panel system for each residential unit. The proposed project would meet the applicable requirements related to California Solar Mandate and CalGreen; including all-electric (no natural gas) with solar panels and prewiring for EV charging per Title 24, unless the project is found to be exempt.[40] Implementation of these requirements would further reduce GHG emissions associated with the project. Approximately 19 trees would be removed for project construction; reducing slightly the amount of GGHG emissions sequestration.

Consistency with State and Local GHG Reduction Plans

California passed the California Global Warming Solutions Act of 2006 (AB 32; California Health and Safety Code Division 25.5, Sections 38500 - 38599). AB 32 establishes regulatory, reporting, and market mechanisms to achieve quantifiable reductions in GHG emissions and establishes a cap on statewide GHG emissions. AB 32 requires that statewide GHG emissions be reduced to 1990 levels by 2020. This reduction will be accomplished by enforcing a statewide cap on GHG emissions that was phased in starting in 2012. To effectively implement the cap, AB 32 directs CARB to develop and implement regulations to reduce statewide GHG emissions from stationary sources. AB 32 specifies that regulations adopted in response to AB 1493 should be used to address GHG emissions from vehicles. However, AB 32 also includes language stating that if the AB 1493 regulations cannot be implemented, then CARB should develop new regulations to control vehicle GHG emissions under the authorization of AB 32.

AB 32 requires CARB to adopt a quantified cap on GHG emissions representing 1990 emissions levels and disclose how it arrived at the cap; institute a schedule to meet the emissions cap; and develop tracking, reporting, and enforcement mechanisms to ensure that the state reduces GHG emissions enough to meet the cap. AB 32 also includes guidance on instituting emissions reductions in an economically efficient manner, along with conditions to ensure that businesses and consumers are not unfairly affected by the reductions. Using these criteria to reduce statewide GHG emissions to 1990 levels by 2020 would represent an approximate 25 to 30 percent reduction in current emissions levels. However, CARB has discretionary authority to seek greater reductions in more significant and growing GHG sectors, such as transportation, as compared to other sectors that are not anticipated to significantly increase emissions. In September of 2016, SB 32 extended the goals of AB 32 and set a goal to achieve reductions in GHG of

[40] As of January 1, 2020, solar panels are required on all new structures built in the state of California per Assembly Bill 178, which outlines the new photovoltaic requirements. The California solar mandate enforces that solar panels are required on all single-family residences and multi-family residences up to three stories high.

40 percent below 1990 levels by 2030. The new plan, outlined in SB 32, involves increasing renewable energy use, putting more electric cars on the road, improving energy efficiency, and curbing emissions from key industries.

The proposed project has been reviewed relative to the climate change policies and measures in CARB's *2017 Climate Change Scoping Plan* and it has been determined that the proposed project would not conflict with State GHG reduction goals. The proposed project has also been reviewed relative to the GHG emission reduction measures in the 2030 CAP update and it has been determined that the proposed project would not conflict with the 2030 CAP. Therefore, impacts would be less than significant.

Since the proposed project will be operational post 2020, the principal State plan and policy adopted for the purpose of reducing GHG emissions is SB 32. The quantitative goal of SB 32 is to reduce GHG emissions to 40 percent below 1990 levels by 2030. Statewide plans and regulations such as GHG emissions standards for vehicles and the low carbon fuel standard are being implemented at the statewide level, and compliance at the specific plan or project level is not addressed.

The assumption is that AB 32 and other regulations will be successful in reducing GHG emissions and reducing the cumulative GHG emissions statewide. The State has taken these measures, because no project individually could have a major impact (either positively or negatively) on the global concentration of GHG. Therefore, the proposed project would result in a significant impact if it would be in conflict with the State regulations such as AB 32 and SB 32. Since the proposed project would not conflict with the City's CAP and is below the BAAQMD's bright line GHG significance threshold, the proposed project would not conflict with State regulations for reducing GHG emissions.

The project would comply with Title 24. Therefore, the proposed project would have a less-than-significant impact related to a conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHG.

10.0 SUMMARY

In summary, daily construction emissions would not exceed the significance thresholds, as described in **Section 6**. These impacts are largely due to off-road construction equipment and to a much lesser degree due to off-site construction haul trucks. Unmitigated construction emissions would be potentially significant, but mitigation measures would reduce impacts to less than significant. Once operational, the proposed project would result in less than significant impacts of criteria air pollutant emissions (**Section 7**). The health impacts due to construction activities at nearby existing residences would also be less than significant with mitigation (**Section 8**). GHG emissions would also be less than significant (**Section 9**). Therefore, the proposed project would have a less than significant impact on air quality and GHG emissions.

Appendix A

Air Quality Technical Report

Construction and Operational Emissions Inventory Supporting Information

Health Risk Assessment Methodology, Assumptions, and Detailed Results

Attachment A

Construction and Operational Emissions Inventory Supporting Data

CalEEMod Output Files

Monte Cresta Road Extension - Bay Area AQMD Air District, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Monte Cresta Road Extension

Bay Area AQMD Air District, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Asphalt Surfaces	0.21	Acre	0.21	9,147.60	0
Single Family Housing	4.00	Dwelling Unit	0.76	13,976.00	11

1.2 Other Project Characteristics

Urbanization	Rural	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	64
Climate Zone	5			**Operational Year**	2024
Utility Company	Pacific Gas and Electric Company				
CO2 Intensity (lb/MWhr)	203.98	**CH4 Intensity (lb/MWhr)**	0.033	**N2O Intensity (lb/MWhr)**	0.004

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Project Description

Construction Phase - Project Description

Off-road Equipment - Project Description

Off-road Equipment -

Off-road Equipment - Project Description

Off-road Equipment -

Off-road Equipment -

Trips and VMT - Project Description

Grading - Project Description

Construction Off-road Equipment Mitigation - BAAQMD Basic and Enhanced Emission Reduction Measures

Monte Cresta Road Extension - Bay Area AQMD Air District, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Area Mitigation -

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	4.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	7.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstructionPhase	NumDays	10.00	0.00
tblConstructionPhase	NumDays	1.00	45.00
tblConstructionPhase	NumDays	2.00	30.00
tblConstructionPhase	NumDays	100.00	60.00
tblConstructionPhase	NumDays	5.00	30.00
tblGrading	AcresOfGrading	22.50	1.00
tblGrading	AcresOfGrading	22.50	1.00
tblGrading	MaterialExported	0.00	590.00
tblGrading	MaterialExported	0.00	815.00
tblGrading	MaterialImported	0.00	225.00
tblLandUse	LandUseSquareFeet	7,200.00	13,976.00
tblLandUse	LotAcreage	1.30	0.76
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural
tblTripsAndVMT	WorkerTripNumber	10.00	0.00
tblTripsAndVMT	WorkerTripNumber	5.00	10.00
tblTripsAndVMT	WorkerTripNumber	5.00	6.00
tblTripsAndVMT	WorkerTripNumber	18.00	8.00

2.0 Emissions Summary

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2023	0.1611	0.6228	0.5422	1.1000e-003	0.0761	0.0278	0.1039	0.0393	0.0257	0.0650	0.0000	96.6824	96.6824	0.0275	1.1400e-003	97.7096
Maximum	**0.1611**	**0.6228**	**0.5422**	**1.1000e-003**	**0.0761**	**0.0278**	**0.1039**	**0.0393**	**0.0257**	**0.0650**	**0.0000**	**96.6824**	**96.6824**	**0.0275**	**1.1400e-003**	**97.7096**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2023	0.1259	0.5091	0.6474	1.1000e-003	0.0341	4.3000e-003	0.0384	0.0165	4.2900e-003	0.0208	0.0000	96.6823	96.6823	0.0275	1.1400e-003	97.7095
Maximum	**0.1259**	**0.5091**	**0.6474**	**1.1000e-003**	**0.0341**	**4.3000e-003**	**0.0384**	**0.0165**	**4.2900e-003**	**0.0208**	**0.0000**	**96.6823**	**96.6823**	**0.0275**	**1.1400e-003**	**97.7095**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**21.85**	**18.26**	**-19.41**	**0.00**	**55.18**	**84.54**	**63.04**	**57.98**	**83.28**	**67.95**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	1-1-2023	3-31-2023	0.0778	0.0599
2	4-1-2023	6-30-2023	0.2944	0.1999
3	7-1-2023	9-30-2023	0.1994	0.1815
		Highest	0.2944	0.1999

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.0897	8.6000e-004	0.0640	7.0000e-005		5.1100e-003	5.1100e-003		5.1100e-003	5.1100e-003	0.5084	0.1734	0.6818	1.0100e-003	3.0000e-005	0.7156
Energy	8.3000e-004	7.1100e-003	3.0300e-003	5.0000e-005		5.8000e-004	5.8000e-004		5.8000e-004	5.8000e-004	0.0000	11.1281	11.1281	6.3000e-004	2.1000e-004	11.2057
Mobile	0.0156	0.0174	0.1441	3.0000e-004	0.0318	2.2000e-004	0.0320	8.4800e-003	2.1000e-004	8.6900e-003	0.0000	27.7965	27.7965	1.8500e-003	1.3500e-003	28.2443
Waste						0.0000	0.0000		0.0000	0.0000	0.9378	0.0000	0.9378	0.0554	0.0000	2.3234
Water						0.0000	0.0000		0.0000	0.0000	0.0827	0.1837	0.2664	8.5200e-003	2.0000e-004	0.5402
Total	**0.1061**	**0.0254**	**0.2111**	**4.2000e-004**	**0.0318**	**5.9100e-003**	**0.0377**	**8.4800e-003**	**5.9000e-003**	**0.0144**	**1.5289**	**39.2816**	**40.8106**	**0.0674**	**1.7900e-003**	**43.0292**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.0897	8.6000e-004	0.0640	7.0000e-005		5.1100e-003	5.1100e-003		5.1100e-003	5.1100e-003	0.5084	0.1734	0.6818	1.0100e-003	3.0000e-005	0.7156
Energy	8.3000e-004	7.1100e-003	3.0300e-003	5.0000e-005		5.8000e-004	5.8000e-004		5.8000e-004	5.8000e-004	0.0000	11.1281	11.1281	6.3000e-004	2.1000e-004	11.2057
Mobile	0.0156	0.0174	0.1441	3.0000e-004	0.0318	2.2000e-004	0.0320	8.4800e-003	2.1000e-004	8.6900e-003	0.0000	27.7965	27.7965	1.8500e-003	1.3500e-003	28.2443
Waste						0.0000	0.0000		0.0000	0.0000	0.9378	0.0000	0.9378	0.0554	0.0000	2.3234
Water						0.0000	0.0000		0.0000	0.0000	0.0827	0.1837	0.2664	8.5200e-003	2.0000e-004	0.5402
Total	**0.1061**	**0.0254**	**0.2111**	**4.2000e-004**	**0.0318**	**5.9100e-003**	**0.0377**	**8.4800e-003**	**5.9000e-003**	**0.0144**	**1.5289**	**39.2816**	**40.8106**	**0.0674**	**1.7900e-003**	**43.0292**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	1/1/2023	12/30/2022	5	0	
2	Site Preparation	Site Preparation	3/1/2023	5/2/2023	5	45	
3	Grading	Grading	5/4/2023	6/14/2023	5	30	

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

4	Building Construction	Building Construction	7/15/2023	10/6/2023	5	60	
5	Paving	Paving	10/7/2023	11/17/2023	5	30	
6	Architectural Coating	Architectural Coating	11/18/2023	11/24/2023	5	5	

Acres of Grading (Site Preparation Phase): 1

Acres of Grading (Grading Phase): 1

Acres of Paving: 0.21

Residential Indoor: 28,301; Residential Outdoor: 9,434; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 549 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Rubber Tired Dozers	1	1.00	247	0.40
Demolition	Tractors/Loaders/Backhoes	2	6.00	97	0.37
Site Preparation	Graders	1	8.00	187	0.41
Site Preparation	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Grading	Graders	1	6.00	187	0.41
Grading	Rubber Tired Dozers	1	6.00	247	0.40
Grading	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Grading	Trenchers	1	6.00	78	0.50
Building Construction	Cranes	1	4.00	231	0.29
Building Construction	Forklifts	2	6.00	89	0.20
Building Construction	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Paving	Cement and Mortar Mixers	4	6.00	9	0.56
Paving	Pavers	1	7.00	130	0.42
Paving	Rollers	1	7.00	80	0.38
Paving	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Architectural Coating	Air Compressors	1	6.00	78	0.48

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	4	0.00	0.00	0.00	10.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	2	10.00	0.00	81.00	10.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Grading	4	10.00	0.00	102.00	10.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	5	6.00	2.00	0.00	10.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Paving	7	8.00	0.00	0.00	10.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	1.00	0.00	0.00	10.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Use DPF for Construction Equipment

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.3 Site Preparation - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					5.3000e-004	0.0000	5.3000e-004	6.0000e-005	0.0000	6.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0120	0.1393	0.0883	2.2000e-004		5.1000e-003	5.1000e-003		4.6900e-003	4.6900e-003	0.0000	19.2366	19.2366	6.2200e-003	0.0000	19.3921
Total	**0.0120**	**0.1393**	**0.0883**	**2.2000e-004**	**5.3000e-004**	**5.1000e-003**	**5.6300e-003**	**6.0000e-005**	**4.6900e-003**	**4.7500e-003**	**0.0000**	**19.2366**	**19.2366**	**6.2200e-003**	**0.0000**	**19.3921**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	8.0000e-005	5.4900e-003	1.2900e-003	2.0000e-005	6.8000e-004	4.0000e-005	7.3000e-004	1.9000e-004	4.0000e-005	2.3000e-004	0.0000	2.4170	2.4170	8.0000e-005	3.8000e-004	2.5331
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.8000e-004	3.9000e-004	4.9900e-003	2.0000e-005	1.7800e-003	1.0000e-005	1.7900e-003	4.7000e-004	1.0000e-005	4.8000e-004	0.0000	1.3934	1.3934	4.0000e-005	4.0000e-005	1.4058
Total	**6.6000e-004**	**5.8800e-003**	**6.2800e-003**	**4.0000e-005**	**2.4600e-003**	**5.0000e-005**	**2.5200e-003**	**6.6000e-004**	**5.0000e-005**	**7.1000e-004**	**0.0000**	**3.8104**	**3.8104**	**1.2000e-004**	**4.2000e-004**	**3.9390**

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.3 Site Preparation - 2023

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					2.1000e-004	0.0000	2.1000e-004	2.0000e-005	0.0000	2.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	5.3600e-003	0.1096	0.1318	2.2000e-004		8.1000e-004	8.1000e-004		8.1000e-004	8.1000e-004	0.0000	19.2366	19.2366	6.2200e-003	0.0000	19.3921
Total	**5.3600e-003**	**0.1096**	**0.1318**	**2.2000e-004**	**2.1000e-004**	**8.1000e-004**	**1.0200e-003**	**2.0000e-005**	**8.1000e-004**	**8.3000e-004**	**0.0000**	**19.2366**	**19.2366**	**6.2200e-003**	**0.0000**	**19.3921**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	8.0000e-005	5.4900e-003	1.2900e-003	2.0000e-005	6.8000e-004	4.0000e-005	7.3000e-004	1.9000e-004	4.0000e-005	2.3000e-004	0.0000	2.4170	2.4170	8.0000e-005	3.8000e-004	2.5331
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.8000e-004	3.9000e-004	4.9900e-003	2.0000e-005	1.7800e-003	1.0000e-005	1.7900e-003	4.7000e-004	1.0000e-005	4.8000e-004	0.0000	1.3934	1.3934	4.0000e-005	4.0000e-005	1.4058
Total	**6.6000e-004**	**5.8800e-003**	**6.2800e-003**	**4.0000e-005**	**2.4600e-003**	**5.0000e-005**	**2.5200e-003**	**6.6000e-004**	**5.0000e-005**	**7.1000e-004**	**0.0000**	**3.8104**	**3.8104**	**1.2000e-004**	**4.2000e-004**	**3.9390**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.4 Grading - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0683	0.0000	0.0683	0.0373	0.0000	0.0373	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0179	0.1891	0.1124	2.5000e-004		8.8200e-003	8.8200e-003		8.1200e-003	8.1200e-003	0.0000	21.9108	21.9108	7.0900e-003	0.0000	22.0880
Total	**0.0179**	**0.1891**	**0.1124**	**2.5000e-004**	**0.0683**	**8.8200e-003**	**0.0771**	**0.0373**	**8.1200e-003**	**0.0454**	**0.0000**	**21.9108**	**21.9108**	**7.0900e-003**	**0.0000**	**22.0880**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.1000e-004	6.9200e-003	1.6300e-003	3.0000e-005	8.6000e-004	6.0000e-005	9.2000e-004	2.4000e-004	5.0000e-005	2.9000e-004	0.0000	3.0437	3.0437	1.0000e-004	4.8000e-004	3.1899
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.8000e-004	2.6000e-004	3.3300e-003	1.0000e-005	1.1900e-003	1.0000e-005	1.1900e-003	3.2000e-004	1.0000e-005	3.2000e-004	0.0000	0.9290	0.9290	3.0000e-005	3.0000e-005	0.9372
Total	**4.9000e-004**	**7.1800e-003**	**4.9600e-003**	**4.0000e-005**	**2.0500e-003**	**7.0000e-005**	**2.1100e-003**	**5.6000e-004**	**6.0000e-005**	**6.1000e-004**	**0.0000**	**3.9726**	**3.9726**	**1.3000e-004**	**5.1000e-004**	**4.1271**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.4 Grading - 2023

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0267	0.0000	0.0267	0.0146	0.0000	0.0146	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	6.1000e-003	0.1247	0.1499	2.5000e-004		9.2000e-004	9.2000e-004		9.2000e-004	9.2000e-004	0.0000	21.9108	21.9108	7.0900e-003	0.0000	22.0880
Total	**6.1000e-003**	**0.1247**	**0.1499**	**2.5000e-004**	**0.0267**	**9.2000e-004**	**0.0276**	**0.0146**	**9.2000e-004**	**0.0155**	**0.0000**	**21.9108**	**21.9108**	**7.0900e-003**	**0.0000**	**22.0880**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.1000e-004	6.9200e-003	1.6300e-003	3.0000e-005	8.6000e-004	6.0000e-005	9.2000e-004	2.4000e-004	5.0000e-005	2.9000e-004	0.0000	3.0437	3.0437	1.0000e-004	4.8000e-004	3.1899
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.8000e-004	2.6000e-004	3.3300e-003	1.0000e-005	1.1900e-003	1.0000e-005	1.1900e-003	3.2000e-004	1.0000e-005	3.2000e-004	0.0000	0.9290	0.9290	3.0000e-005	3.0000e-005	0.9372
Total	**4.9000e-004**	**7.1800e-003**	**4.9600e-003**	**4.0000e-005**	**2.0500e-003**	**7.0000e-005**	**2.1100e-003**	**5.6000e-004**	**6.0000e-005**	**6.1000e-004**	**0.0000**	**3.9726**	**3.9726**	**1.3000e-004**	**5.1000e-004**	**4.1271**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.5 Building Construction - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0190	0.1926	0.2129	3.4000e-004		9.6100e-003	9.6100e-003		8.8400e-003	8.8400e-003	0.0000	30.0625	30.0625	9.7200e-003	0.0000	30.3056
Total	**0.0190**	**0.1926**	**0.2129**	**3.4000e-004**		**9.6100e-003**	**9.6100e-003**		**8.8400e-003**	**8.8400e-003**	**0.0000**	**30.0625**	**30.0625**	**9.7200e-003**	**0.0000**	**30.3056**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	6.0000e-005	2.4800e-003	8.0000e-004	1.0000e-005	3.6000e-004	1.0000e-005	3.7000e-004	1.0000e-004	1.0000e-005	1.2000e-004	0.0000	1.0789	1.0789	2.0000e-005	1.6000e-004	1.1270
Worker	4.6000e-004	3.2000e-004	3.9900e-003	1.0000e-005	1.4200e-003	1.0000e-005	1.4300e-003	3.8000e-004	1.0000e-005	3.9000e-004	0.0000	1.1147	1.1147	3.0000e-005	3.0000e-005	1.1247
Total	**5.2000e-004**	**2.8000e-003**	**4.7900e-003**	**2.0000e-005**	**1.7800e-003**	**2.0000e-005**	**1.8000e-003**	**4.8000e-004**	**2.0000e-005**	**5.1000e-004**	**0.0000**	**2.1936**	**2.1936**	**5.0000e-005**	**1.9000e-004**	**2.2517**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.5 Building Construction - 2023

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	8.3800e-003	0.1839	0.2389	3.4000e-004		1.7300e-003	1.7300e-003		1.7300e-003	1.7300e-003	0.0000	30.0625	30.0625	9.7200e-003	0.0000	30.3056
Total	**8.3800e-003**	**0.1839**	**0.2389**	**3.4000e-004**		**1.7300e-003**	**1.7300e-003**		**1.7300e-003**	**1.7300e-003**	**0.0000**	**30.0625**	**30.0625**	**9.7200e-003**	**0.0000**	**30.3056**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	6.0000e-005	2.4800e-003	8.0000e-004	1.0000e-005	3.6000e-004	1.0000e-005	3.7000e-004	1.0000e-004	1.0000e-005	1.2000e-004	0.0000	1.0789	1.0789	2.0000e-005	1.6000e-004	1.1270
Worker	4.6000e-004	3.2000e-004	3.9900e-003	1.0000e-005	1.4200e-003	1.0000e-005	1.4300e-003	3.8000e-004	1.0000e-005	3.9000e-004	0.0000	1.1147	1.1147	3.0000e-005	3.0000e-005	1.1247
Total	**5.2000e-004**	**2.8000e-003**	**4.7900e-003**	**2.0000e-005**	**1.7800e-003**	**2.0000e-005**	**1.8000e-003**	**4.8000e-004**	**2.0000e-005**	**5.1000e-004**	**0.0000**	**2.1936**	**2.1936**	**5.0000e-005**	**1.9000e-004**	**2.2517**

Monte Cresta Road Extension - Bay Area AQMD Air District, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.6 Paving - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	9.1700e-003	0.0826	0.1053	1.7000e-004		3.9600e-003	3.9600e-003		3.7000e-003	3.7000e-003	0.0000	14.0989	14.0989	4.1100e-003	0.0000	14.2015
Paving	2.8000e-004					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**9.4500e-003**	**0.0826**	**0.1053**	**1.7000e-004**		**3.9600e-003**	**3.9600e-003**		**3.7000e-003**	**3.7000e-003**	**0.0000**	**14.0989**	**14.0989**	**4.1100e-003**	**0.0000**	**14.2015**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.1000e-004	2.1000e-004	2.6600e-003	1.0000e-005	9.5000e-004	0.0000	9.5000e-004	2.5000e-004	0.0000	2.6000e-004	0.0000	0.7432	0.7432	2.0000e-005	2.0000e-005	0.7498
Total	**3.1000e-004**	**2.1000e-004**	**2.6600e-003**	**1.0000e-005**	**9.5000e-004**	**0.0000**	**9.5000e-004**	**2.5000e-004**	**0.0000**	**2.6000e-004**	**0.0000**	**0.7432**	**0.7432**	**2.0000e-005**	**2.0000e-005**	**0.7498**

Monte Cresta Road Extension - Bay Area AQMD Air District, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.6 Paving - 2023

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	3.3600e-003	0.0714	0.1035	1.7000e-004		6.5000e-004	6.5000e-004		6.5000e-004	6.5000e-004	0.0000	14.0988	14.0988	4.1100e-003	0.0000	14.2015
Paving	2.8000e-004					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**3.6400e-003**	**0.0714**	**0.1035**	**1.7000e-004**		**6.5000e-004**	**6.5000e-004**		**6.5000e-004**	**6.5000e-004**	**0.0000**	**14.0988**	**14.0988**	**4.1100e-003**	**0.0000**	**14.2015**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.1000e-004	2.1000e-004	2.6600e-003	1.0000e-005	9.5000e-004	0.0000	9.5000e-004	2.5000e-004	0.0000	2.6000e-004	0.0000	0.7432	0.7432	2.0000e-005	2.0000e-005	0.7498
Total	**3.1000e-004**	**2.1000e-004**	**2.6600e-003**	**1.0000e-005**	**9.5000e-004**	**0.0000**	**9.5000e-004**	**2.5000e-004**	**0.0000**	**2.6000e-004**	**0.0000**	**0.7432**	**0.7432**	**2.0000e-005**	**2.0000e-005**	**0.7498**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.7 Architectural Coating - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.1003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	4.8000e-004	3.2600e-003	4.5300e-003	1.0000e-005		1.8000e-004	1.8000e-004		1.8000e-004	1.8000e-004	0.0000	0.6383	0.6383	4.0000e-005	0.0000	0.6393
Total	**0.1008**	**3.2600e-003**	**4.5300e-003**	**1.0000e-005**		**1.8000e-004**	**1.8000e-004**		**1.8000e-004**	**1.8000e-004**	**0.0000**	**0.6383**	**0.6383**	**4.0000e-005**	**0.0000**	**0.6393**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.0000e-005	0.0000	6.0000e-005	0.0000	2.0000e-005	0.0000	2.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0155	0.0155	0.0000	0.0000	0.0156
Total	**1.0000e-005**	**0.0000**	**6.0000e-005**	**0.0000**	**2.0000e-005**	**0.0000**	**2.0000e-005**	**1.0000e-005**	**0.0000**	**1.0000e-005**	**0.0000**	**0.0155**	**0.0155**	**0.0000**	**0.0000**	**0.0156**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.7 Architectural Coating - 2023

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.1003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.5000e-004	3.3900e-003	4.5800e-003	1.0000e-005		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005	0.0000	0.6383	0.6383	4.0000e-005	0.0000	0.6393
Total	**0.1004**	**3.3900e-003**	**4.5800e-003**	**1.0000e-005**		**4.0000e-005**	**4.0000e-005**		**4.0000e-005**	**4.0000e-005**	**0.0000**	**0.6383**	**0.6383**	**4.0000e-005**	**0.0000**	**0.6393**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.0000e-005	0.0000	6.0000e-005	0.0000	2.0000e-005	0.0000	2.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0155	0.0155	0.0000	0.0000	0.0156
Total	**1.0000e-005**	**0.0000**	**6.0000e-005**	**0.0000**	**2.0000e-005**	**0.0000**	**2.0000e-005**	**1.0000e-005**	**0.0000**	**1.0000e-005**	**0.0000**	**0.0155**	**0.0155**	**0.0000**	**0.0000**	**0.0156**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0156	0.0174	0.1441	3.0000e-004	0.0318	2.2000e-004	0.0320	8.4800e-003	2.1000e-004	8.6900e-003	0.0000	27.7965	27.7965	1.8500e-003	1.3500e-003	28.2443
Unmitigated	0.0156	0.0174	0.1441	3.0000e-004	0.0318	2.2000e-004	0.0320	8.4800e-003	2.1000e-004	8.6900e-003	0.0000	27.7965	27.7965	1.8500e-003	1.3500e-003	28.2443

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Other Asphalt Surfaces	0.00	0.00	0.00		
Single Family Housing	37.76	38.16	34.20	86,168	86,168
Total	37.76	38.16	34.20	86,168	86,168

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Other Asphalt Surfaces	14.70	6.60	6.60	0.00	0.00	0.00	0	0	0
Single Family Housing	10.80	4.80	5.70	31.00	15.00	54.00	86	11	3

4.4 Fleet Mix

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Other Asphalt Surfaces	0.553342	0.058522	0.188738	0.121080	0.023016	0.005623	0.010412	0.007562	0.000987	0.000568	0.026444	0.000834	0.002871
Single Family Housing	0.553342	0.058522	0.188738	0.121080	0.023016	0.005623	0.010412	0.007562	0.000987	0.000568	0.026444	0.000834	0.002871

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	2.8906	2.8906	4.7000e-004	6.0000e-005	2.9192
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	2.8906	2.8906	4.7000e-004	6.0000e-005	2.9192
NaturalGas Mitigated	8.3000e-004	7.1100e-003	3.0300e-003	5.0000e-005		5.8000e-004	5.8000e-004		5.8000e-004	5.8000e-004	0.0000	8.2375	8.2375	1.6000e-004	1.5000e-004	8.2864
NaturalGas Unmitigated	8.3000e-004	7.1100e-003	3.0300e-003	5.0000e-005		5.8000e-004	5.8000e-004		5.8000e-004	5.8000e-004	0.0000	8.2375	8.2375	1.6000e-004	1.5000e-004	8.2864

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Single Family Housing	154365	8.3000e-004	7.1100e-003	3.0300e-003	5.0000e-005		5.8000e-004	5.8000e-004		5.8000e-004	5.8000e-004	0.0000	8.2375	8.2375	1.6000e-004	1.5000e-004	8.2864
Total		**8.3000e-004**	**7.1100e-003**	**3.0300e-003**	**5.0000e-005**		**5.8000e-004**	**5.8000e-004**		**5.8000e-004**	**5.8000e-004**	**0.0000**	**8.2375**	**8.2375**	**1.6000e-004**	**1.5000e-004**	**8.2864**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Single Family Housing	154365	8.3000e-004	7.1100e-003	3.0300e-003	5.0000e-005		5.8000e-004	5.8000e-004		5.8000e-004	5.8000e-004	0.0000	8.2375	8.2375	1.6000e-004	1.5000e-004	8.2864
Total		**8.3000e-004**	**7.1100e-003**	**3.0300e-003**	**5.0000e-005**		**5.8000e-004**	**5.8000e-004**		**5.8000e-004**	**5.8000e-004**	**0.0000**	**8.2375**	**8.2375**	**1.6000e-004**	**1.5000e-004**	**8.2864**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Single Family Housing	31242.1	2.8906	4.7000e-004	6.0000e-005	2.9192
Total		**2.8906**	**4.7000e-004**	**6.0000e-005**	**2.9192**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Single Family Housing	31242.1	2.8906	4.7000e-004	6.0000e-005	2.9192
Total		**2.8906**	**4.7000e-004**	**6.0000e-005**	**2.9192**

6.0 Area Detail

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

6.1 Mitigation Measures Area

Use Low VOC Paint - Residential Interior

Use Low VOC Paint - Residential Exterior

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0897	8.6000e-004	0.0640	7.0000e-005		5.1100e-003	5.1100e-003		5.1100e-003	5.1100e-003	0.5084	0.1734	0.6818	1.0100e-003	3.0000e-005	0.7156
Unmitigated	0.0897	8.6000e-004	0.0640	7.0000e-005		5.1100e-003	5.1100e-003		5.1100e-003	5.1100e-003	0.5084	0.1734	0.6818	1.0100e-003	3.0000e-005	0.7156

Monte Cresta Road Extension - Bay Area AQMD Air District, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0100					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0552					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	0.0236	5.2000e-004	0.0343	7.0000e-005		4.9400e-003	4.9400e-003		4.9400e-003	4.9400e-003	0.5084	0.1248	0.6333	9.6000e-004	3.0000e-005	0.6660
Landscaping	8.9000e-004	3.4000e-004	0.0297	0.0000		1.6000e-004	1.6000e-004		1.6000e-004	1.6000e-004	0.0000	0.0485	0.0485	5.0000e-005	0.0000	0.0497
Total	**0.0897**	**8.6000e-004**	**0.0640**	**7.0000e-005**		**5.1000e-003**	**5.1000e-003**		**5.1000e-003**	**5.1000e-003**	**0.5084**	**0.1734**	**0.6818**	**1.0100e-003**	**3.0000e-005**	**0.7156**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0100					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0552					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	0.0236	5.2000e-004	0.0343	7.0000e-005		4.9400e-003	4.9400e-003		4.9400e-003	4.9400e-003	0.5084	0.1248	0.6333	9.6000e-004	3.0000e-005	0.6660
Landscaping	8.9000e-004	3.4000e-004	0.0297	0.0000		1.6000e-004	1.6000e-004		1.6000e-004	1.6000e-004	0.0000	0.0485	0.0485	5.0000e-005	0.0000	0.0497
Total	**0.0897**	**8.6000e-004**	**0.0640**	**7.0000e-005**		**5.1000e-003**	**5.1000e-003**		**5.1000e-003**	**5.1000e-003**	**0.5084**	**0.1734**	**0.6818**	**1.0100e-003**	**3.0000e-005**	**0.7156**

7.0 Water Detail

7.1 Mitigation Measures Water

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	0.2664	8.5200e-003	2.0000e-004	0.5402
Unmitigated	0.2664	8.5200e-003	2.0000e-004	0.5402

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Other Asphalt Surfaces	0 / 0	0.0000	0.0000	0.0000	0.0000
Single Family Housing	0.260616 / 0.164301	0.2664	8.5200e-003	2.0000e-004	0.5402
Total		**0.2664**	**8.5200e-003**	**2.0000e-004**	**0.5402**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Other Asphalt Surfaces	0 / 0	0.0000	0.0000	0.0000	0.0000
Single Family Housing	0.260616 / 0.164301	0.2664	8.5200e-003	2.0000e-004	0.5402
Total		**0.2664**	**8.5200e-003**	**2.0000e-004**	**0.5402**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	0.9378	0.0554	0.0000	2.3234
Unmitigated	0.9378	0.0554	0.0000	2.3234

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Single Family Housing	4.62	0.9378	0.0554	0.0000	2.3234
Total		**0.9378**	**0.0554**	**0.0000**	**2.3234**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Single Family Housing	4.62	0.9378	0.0554	0.0000	2.3234
Total		**0.9378**	**0.0554**	**0.0000**	**2.3234**

9.0 Operational Offroad

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Monte Cresta Road Extension - Bay Area AQMD Air District, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Monte Cresta Road Extension

Bay Area AQMD Air District, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Asphalt Surfaces	0.21	Acre	0.21	9,147.60	0
Single Family Housing	4.00	Dwelling Unit	0.76	13,976.00	11

1.2 Other Project Characteristics

Urbanization	Rural	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	64
Climate Zone	5			**Operational Year**	2024
Utility Company	Pacific Gas and Electric Company				
CO2 Intensity (lb/MWhr)	203.98	**CH4 Intensity (lb/MWhr)**	0.033	**N2O Intensity (lb/MWhr)**	0.004

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Project Description

Construction Phase - Project Description

Off-road Equipment - Project Description

Off-road Equipment -

Off-road Equipment - Project Description

Off-road Equipment -

Off-road Equipment -

Trips and VMT - Project Description

Grading - Project Description

Construction Off-road Equipment Mitigation - BAAQMD Basic and Enhanced Emission Reduction Measures

Monte Cresta Road Extension - Bay Area AQMD Air District, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Area Mitigation -

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	4.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	7.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstructionPhase	NumDays	10.00	0.00
tblConstructionPhase	NumDays	1.00	45.00
tblConstructionPhase	NumDays	2.00	30.00
tblConstructionPhase	NumDays	100.00	60.00
tblConstructionPhase	NumDays	5.00	30.00
tblGrading	AcresOfGrading	22.50	1.00
tblGrading	AcresOfGrading	22.50	1.00
tblGrading	MaterialExported	0.00	590.00
tblGrading	MaterialExported	0.00	815.00
tblGrading	MaterialImported	0.00	225.00
tblLandUse	LandUseSquareFeet	7,200.00	13,976.00
tblLandUse	LotAcreage	1.30	0.76
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural
tblTripsAndVMT	WorkerTripNumber	10.00	0.00
tblTripsAndVMT	WorkerTripNumber	5.00	10.00
tblTripsAndVMT	WorkerTripNumber	5.00	6.00
tblTripsAndVMT	WorkerTripNumber	18.00	8.00

2.0 Emissions Summary

Monte Cresta Road Extension - Bay Area AQMD Air District, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2023	40.3108	13.0636	7.8427	0.0194	4.6966	0.5925	5.2891	2.5250	0.5452	3.0702	0.0000	1,906.6370	1,906.6370	0.5300	0.0372	1,930.9592
Maximum	**40.3108**	**13.0636**	**7.8427**	**0.0194**	**4.6966**	**0.5925**	**5.2891**	**2.5250**	**0.5452**	**3.0702**	**0.0000**	**1,906.6370**	**1,906.6370**	**0.5300**	**0.0372**	**1,930.9592**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2023	40.1785	8.7759	10.3398	0.0194	1.9181	0.0656	1.9836	1.0080	0.0654	1.0734	0.0000	1,906.6370	1,906.6370	0.5300	0.0372	1,930.9592
Maximum	**40.1785**	**8.7759**	**10.3398**	**0.0194**	**1.9181**	**0.0656**	**1.9836**	**1.0080**	**0.0654**	**1.0734**	**0.0000**	**1,906.6370**	**1,906.6370**	**0.5300**	**0.0372**	**1,930.9592**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.33**	**32.82**	**-31.84**	**0.00**	**59.16**	**88.93**	**62.50**	**60.08**	**88.01**	**65.04**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	4.5125	0.0836	5.6910	0.0101		0.7599	0.7599		0.7599	0.7599	81.5134	25.3001	106.8135	0.1014	5.7500e-003	111.0615
Energy	4.5600e-003	0.0390	0.0166	2.5000e-004		3.1500e-003	3.1500e-003		3.1500e-003	3.1500e-003		49.7549	49.7549	9.5000e-004	9.1000e-004	50.0506
Mobile	0.0973	0.0901	0.8064	1.7600e-003	0.1855	1.2400e-003	0.1867	0.0494	1.1600e-003	0.0506		181.4995	181.4995	0.0107	7.9200e-003	184.1266
Total	**4.6143**	**0.2127**	**6.5140**	**0.0121**	**0.1855**	**0.7643**	**0.9498**	**0.0494**	**0.7642**	**0.8136**	**81.5134**	**256.5545**	**338.0678**	**0.1130**	**0.0146**	**345.2386**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	4.5125	0.0836	5.6910	0.0101		0.7599	0.7599		0.7599	0.7599	81.5134	25.3001	106.8135	0.1014	5.7500e-003	111.0615
Energy	4.5600e-003	0.0390	0.0166	2.5000e-004		3.1500e-003	3.1500e-003		3.1500e-003	3.1500e-003		49.7549	49.7549	9.5000e-004	9.1000e-004	50.0506
Mobile	0.0973	0.0901	0.8064	1.7600e-003	0.1855	1.2400e-003	0.1867	0.0494	1.1600e-003	0.0506		181.4995	181.4995	0.0107	7.9200e-003	184.1266
Total	**4.6143**	**0.2127**	**6.5140**	**0.0121**	**0.1855**	**0.7643**	**0.9498**	**0.0494**	**0.7642**	**0.8136**	**81.5134**	**256.5545**	**338.0678**	**0.1130**	**0.0146**	**345.2386**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	1/1/2023	12/30/2022	5	0	
2	Site Preparation	Site Preparation	3/1/2023	5/2/2023	5	45	
3	Grading	Grading	5/4/2023	6/14/2023	5	30	
4	Building Construction	Building Construction	7/15/2023	10/6/2023	5	60	
5	Paving	Paving	10/7/2023	11/17/2023	5	30	
6	Architectural Coating	Architectural Coating	11/18/2023	11/24/2023	5	5	

Acres of Grading (Site Preparation Phase): 1

Acres of Grading (Grading Phase): 1

Acres of Paving: 0.21

Residential Indoor: 28,301; Residential Outdoor: 9,434; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 549 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Rubber Tired Dozers	1	1.00	247	0.40
Demolition	Tractors/Loaders/Backhoes	2	6.00	97	0.37
Site Preparation	Graders	1	8.00	187	0.41
Site Preparation	Tractors/Loaders/Backhoes	1	8.00	97	0.37

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Grading	Graders	1	6.00	187	0.41
Grading	Rubber Tired Dozers	1	6.00	247	0.40
Grading	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Grading	Trenchers	1	6.00	78	0.50
Building Construction	Cranes	1	4.00	231	0.29
Building Construction	Forklifts	2	6.00	89	0.20
Building Construction	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Paving	Cement and Mortar Mixers	4	6.00	9	0.56
Paving	Pavers	1	7.00	130	0.42
Paving	Rollers	1	7.00	80	0.38
Paving	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Architectural Coating	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	4	0.00	0.00	0.00	10.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	2	10.00	0.00	81.00	10.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Grading	4	10.00	0.00	102.00	10.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	5	6.00	2.00	0.00	10.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Paving	7	8.00	0.00	0.00	10.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	1.00	0.00	0.00	10.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Use DPF for Construction Equipment

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

Monte Cresta Road Extension - Bay Area AQMD Air District, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.3 Site Preparation - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0236	0.0000	0.0236	2.5400e-003	0.0000	2.5400e-003			0.0000			0.0000
Off-Road	0.5348	6.1887	3.9239	9.7300e-003		0.2266	0.2266		0.2084	0.2084		942.4317	942.4317	0.3048		950.0517
Total	**0.5348**	**6.1887**	**3.9239**	**9.7300e-003**	**0.0236**	**0.2266**	**0.2501**	**2.5400e-003**	**0.2084**	**0.2110**		**942.4317**	**942.4317**	**0.3048**		**950.0517**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	3.8500e-003	0.2352	0.0571	1.0900e-003	0.0315	1.9700e-003	0.0335	8.6300e-003	1.8900e-003	0.0105		118.3666	118.3666	3.9000e-003	0.0188	124.0534
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0271	0.0155	0.2391	7.1000e-004	0.0822	4.1000e-004	0.0826	0.0218	3.8000e-004	0.0222		72.8845	72.8845	1.8400e-003	1.7300e-003	73.4457
Total	**0.0309**	**0.2508**	**0.2962**	**1.8000e-003**	**0.1136**	**2.3800e-003**	**0.1160**	**0.0304**	**2.2700e-003**	**0.0327**		**191.2510**	**191.2510**	**5.7400e-003**	**0.0205**	**197.4992**

Monte Cresta Road Extension - Bay Area AQMD Air District, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.3 Site Preparation - 2023

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					9.1900e-003	0.0000	9.1900e-003	9.9000e-004	0.0000	9.9000e-004			0.0000			0.0000
Off-Road	0.2382	4.8716	5.8579	9.7300e-003		0.0361	0.0361		0.0361	0.0361	0.0000	942.4317	942.4317	0.3048		950.0517
Total	**0.2382**	**4.8716**	**5.8579**	**9.7300e-003**	**9.1900e-003**	**0.0361**	**0.0453**	**9.9000e-004**	**0.0361**	**0.0371**	**0.0000**	**942.4317**	**942.4317**	**0.3048**		**950.0517**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	3.8500e-003	0.2352	0.0571	1.0900e-003	0.0315	1.9700e-003	0.0335	8.6300e-003	1.8900e-003	0.0105		118.3666	118.3666	3.9000e-003	0.0188	124.0534
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0271	0.0155	0.2391	7.1000e-004	0.0822	4.1000e-004	0.0826	0.0218	3.8000e-004	0.0222		72.8845	72.8845	1.8400e-003	1.7300e-003	73.4457
Total	**0.0309**	**0.2508**	**0.2962**	**1.8000e-003**	**0.1136**	**2.3800e-003**	**0.1160**	**0.0304**	**2.2700e-003**	**0.0327**		**191.2510**	**191.2510**	**5.7400e-003**	**0.0205**	**197.4992**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.4 Grading - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					4.5550	0.0000	4.5550	2.4870	0.0000	2.4870			0.0000			0.0000
Off-Road	1.1936	12.6037	7.4957	0.0166		0.5883	0.5883		0.5413	0.5413		1,610.1712	1,610.1712	0.5208		1,623.1903
Total	**1.1936**	**12.6037**	**7.4957**	**0.0166**	**4.5550**	**0.5883**	**5.1433**	**2.4870**	**0.5413**	**3.0282**		**1,610.1712**	**1,610.1712**	**0.5208**		**1,623.1903**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	7.2800e-003	0.4443	0.1079	2.0500e-003	0.0595	3.7300e-003	0.0632	0.0163	3.5700e-003	0.0199		223.5813	223.5813	7.3700e-003	0.0354	234.3232
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0271	0.0155	0.2391	7.1000e-004	0.0822	4.1000e-004	0.0826	0.0218	3.8000e-004	0.0222		72.8845	72.8845	1.8400e-003	1.7300e-003	73.4457
Total	**0.0343**	**0.4599**	**0.3470**	**2.7600e-003**	**0.1416**	**4.1400e-003**	**0.1458**	**0.0381**	**3.9500e-003**	**0.0420**		**296.4658**	**296.4658**	**9.2100e-003**	**0.0372**	**307.7689**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.4 Grading - 2023

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					1.7764	0.0000	1.7764	0.9699	0.0000	0.9699			0.0000			0.0000
Off-Road	0.4069	8.3160	9.9929	0.0166		0.0615	0.0615		0.0615	0.0615	0.0000	1,610.1712	1,610.1712	0.5208		1,623.1903
Total	**0.4069**	**8.3160**	**9.9929**	**0.0166**	**1.7764**	**0.0615**	**1.8379**	**0.9699**	**0.0615**	**1.0314**	**0.0000**	**1,610.1712**	**1,610.1712**	**0.5208**		**1,623.1903**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	7.2800e-003	0.4443	0.1079	2.0500e-003	0.0595	3.7300e-003	0.0632	0.0163	3.5700e-003	0.0199		223.5813	223.5813	7.3700e-003	0.0354	234.3232
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0271	0.0155	0.2391	7.1000e-004	0.0822	4.1000e-004	0.0826	0.0218	3.8000e-004	0.0222		72.8845	72.8845	1.8400e-003	1.7300e-003	73.4457
Total	**0.0343**	**0.4599**	**0.3470**	**2.7600e-003**	**0.1416**	**4.1400e-003**	**0.1458**	**0.0381**	**3.9500e-003**	**0.0420**		**296.4658**	**296.4658**	**9.2100e-003**	**0.0372**	**307.7689**

Monte Cresta Road Extension - Bay Area AQMD Air District, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.5 Building Construction - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.6322	6.4186	7.0970	0.0114		0.3203	0.3203		0.2946	0.2946		1,104.6089	1,104.6089	0.3573		1,113.5402
Total	**0.6322**	**6.4186**	**7.0970**	**0.0114**		**0.3203**	**0.3203**		**0.2946**	**0.2946**		**1,104.6089**	**1,104.6089**	**0.3573**		**1,113.5402**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	2.0800e-003	0.0797	0.0264	3.7000e-004	0.0123	4.7000e-004	0.0127	3.5300e-003	4.5000e-004	3.9800e-003		39.6153	39.6153	8.1000e-004	5.8600e-003	41.3818
Worker	0.0162	9.3200e-003	0.1434	4.3000e-004	0.0493	2.4000e-004	0.0495	0.0131	2.3000e-004	0.0133		43.7307	43.7307	1.1000e-003	1.0400e-003	44.0674
Total	**0.0183**	**0.0890**	**0.1698**	**8.0000e-004**	**0.0615**	**7.1000e-004**	**0.0623**	**0.0166**	**6.8000e-004**	**0.0173**		**83.3460**	**83.3460**	**1.9100e-003**	**6.9000e-003**	**85.4492**

Monte Cresta Road Extension - Bay Area AQMD Air District, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.5 Building Construction - 2023

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.2793	6.1296	7.9624	0.0114		0.0578	0.0578		0.0578	0.0578	0.0000	1,104.6089	1,104.6089	0.3573		1,113.5402
Total	**0.2793**	**6.1296**	**7.9624**	**0.0114**		**0.0578**	**0.0578**		**0.0578**	**0.0578**	**0.0000**	**1,104.6089**	**1,104.6089**	**0.3573**		**1,113.5402**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	2.0800e-003	0.0797	0.0264	3.7000e-004	0.0123	4.7000e-004	0.0127	3.5300e-003	4.5000e-004	3.9800e-003		39.6153	39.6153	8.1000e-004	5.8600e-003	41.3818
Worker	0.0162	9.3200e-003	0.1434	4.3000e-004	0.0493	2.4000e-004	0.0495	0.0131	2.3000e-004	0.0133		43.7307	43.7307	1.1000e-003	1.0400e-003	44.0674
Total	**0.0183**	**0.0890**	**0.1698**	**8.0000e-004**	**0.0615**	**7.1000e-004**	**0.0623**	**0.0166**	**6.8000e-004**	**0.0173**		**83.3460**	**83.3460**	**1.9100e-003**	**6.9000e-003**	**85.4492**

Monte Cresta Road Extension - Bay Area AQMD Air District, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.6 Paving - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.6112	5.5046	7.0209	0.0113		0.2643	0.2643		0.2466	0.2466		1,036.0878	1,036.0878	0.3018		1,043.6331
Paving	0.0183					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.6295**	**5.5046**	**7.0209**	**0.0113**		**0.2643**	**0.2643**		**0.2466**	**0.2466**		**1,036.0878**	**1,036.0878**	**0.3018**		**1,043.6331**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0216	0.0124	0.1912	5.7000e-004	0.0657	3.3000e-004	0.0660	0.0174	3.0000e-004	0.0177		58.3076	58.3076	1.4700e-003	1.3800e-003	58.7566
Total	**0.0216**	**0.0124**	**0.1912**	**5.7000e-004**	**0.0657**	**3.3000e-004**	**0.0660**	**0.0174**	**3.0000e-004**	**0.0177**		**58.3076**	**58.3076**	**1.4700e-003**	**1.3800e-003**	**58.7566**

Monte Cresta Road Extension - Bay Area AQMD Air District, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.6 Paving - 2023

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.2239	4.7579	6.9028	0.0113		0.0436	0.0436		0.0436	0.0436	0.0000	1,036.0878	1,036.0878	0.3018		1,043.6331
Paving	0.0183					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.2422**	**4.7579**	**6.9028**	**0.0113**		**0.0436**	**0.0436**		**0.0436**	**0.0436**	**0.0000**	**1,036.0878**	**1,036.0878**	**0.3018**		**1,043.6331**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0216	0.0124	0.1912	5.7000e-004	0.0657	3.3000e-004	0.0660	0.0174	3.0000e-004	0.0177		58.3076	58.3076	1.4700e-003	1.3800e-003	58.7566
Total	**0.0216**	**0.0124**	**0.1912**	**5.7000e-004**	**0.0657**	**3.3000e-004**	**0.0660**	**0.0174**	**3.0000e-004**	**0.0177**		**58.3076**	**58.3076**	**1.4700e-003**	**1.3800e-003**	**58.7566**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.7 Architectural Coating - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	40.1164					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.1917	1.3030	1.8111	2.9700e-003		0.0708	0.0708		0.0708	0.0708		281.4481	281.4481	0.0168		281.8690
Total	**40.3081**	**1.3030**	**1.8111**	**2.9700e-003**		**0.0708**	**0.0708**		**0.0708**	**0.0708**		**281.4481**	**281.4481**	**0.0168**		**281.8690**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.7000e-003	1.5500e-003	0.0239	7.0000e-005	8.2100e-003	4.0000e-005	8.2600e-003	2.1800e-003	4.0000e-005	2.2200e-003		7.2885	7.2885	1.8000e-004	1.7000e-004	7.3446
Total	**2.7000e-003**	**1.5500e-003**	**0.0239**	**7.0000e-005**	**8.2100e-003**	**4.0000e-005**	**8.2600e-003**	**2.1800e-003**	**4.0000e-005**	**2.2200e-003**		**7.2885**	**7.2885**	**1.8000e-004**	**1.7000e-004**	**7.3446**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.7 Architectural Coating - 2023

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	40.1164					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.0594	1.3570	1.8324	2.9700e-003		0.0143	0.0143		0.0143	0.0143	0.0000	281.4481	281.4481	0.0168		281.8690
Total	**40.1758**	**1.3570**	**1.8324**	**2.9700e-003**		**0.0143**	**0.0143**		**0.0143**	**0.0143**	**0.0000**	**281.4481**	**281.4481**	**0.0168**		**281.8690**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.7000e-003	1.5500e-003	0.0239	7.0000e-005	8.2100e-003	4.0000e-005	8.2600e-003	2.1800e-003	4.0000e-005	2.2200e-003		7.2885	7.2885	1.8000e-004	1.7000e-004	7.3446
Total	**2.7000e-003**	**1.5500e-003**	**0.0239**	**7.0000e-005**	**8.2100e-003**	**4.0000e-005**	**8.2600e-003**	**2.1800e-003**	**4.0000e-005**	**2.2200e-003**		**7.2885**	**7.2885**	**1.8000e-004**	**1.7000e-004**	**7.3446**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0973	0.0901	0.8064	1.7600e-003	0.1855	1.2400e-003	0.1867	0.0494	1.1600e-003	0.0506		181.4995	181.4995	0.0107	7.9200e-003	184.1266
Unmitigated	0.0973	0.0901	0.8064	1.7600e-003	0.1855	1.2400e-003	0.1867	0.0494	1.1600e-003	0.0506		181.4995	181.4995	0.0107	7.9200e-003	184.1266

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Other Asphalt Surfaces	0.00	0.00	0.00		
Single Family Housing	37.76	38.16	34.20	86,168	86,168
Total	37.76	38.16	34.20	86,168	86,168

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Other Asphalt Surfaces	14.70	6.60	6.60	0.00	0.00	0.00	0	0	0
Single Family Housing	10.80	4.80	5.70	31.00	15.00	54.00	86	11	3

4.4 Fleet Mix

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Other Asphalt Surfaces	0.553342	0.058522	0.188738	0.121080	0.023016	0.005623	0.010412	0.007562	0.000987	0.000568	0.026444	0.000834	0.002871
Single Family Housing	0.553342	0.058522	0.188738	0.121080	0.023016	0.005623	0.010412	0.007562	0.000987	0.000568	0.026444	0.000834	0.002871

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	4.5600e-003	0.0390	0.0166	2.5000e-004		3.1500e-003	3.1500e-003		3.1500e-003	3.1500e-003		49.7549	49.7549	9.5000e-004	9.1000e-004	50.0506
NaturalGas Unmitigated	4.5600e-003	0.0390	0.0166	2.5000e-004		3.1500e-003	3.1500e-003		3.1500e-003	3.1500e-003		49.7549	49.7549	9.5000e-004	9.1000e-004	50.0506

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Single Family Housing	422.917	4.5600e-003	0.0390	0.0166	2.5000e-004		3.1500e-003	3.1500e-003		3.1500e-003	3.1500e-003		49.7549	49.7549	9.5000e-004	9.1000e-004	50.0506
Total		**4.5600e-003**	**0.0390**	**0.0166**	**2.5000e-004**		**3.1500e-003**	**3.1500e-003**		**3.1500e-003**	**3.1500e-003**		**49.7549**	**49.7549**	**9.5000e-004**	**9.1000e-004**	**50.0506**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Single Family Housing	0.422917	4.5600e-003	0.0390	0.0166	2.5000e-004		3.1500e-003	3.1500e-003		3.1500e-003	3.1500e-003		49.7549	49.7549	9.5000e-004	9.1000e-004	50.0506
Total		**4.5600e-003**	**0.0390**	**0.0166**	**2.5000e-004**		**3.1500e-003**	**3.1500e-003**		**3.1500e-003**	**3.1500e-003**		**49.7549**	**49.7549**	**9.5000e-004**	**9.1000e-004**	**50.0506**

6.0 Area Detail

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

6.1 Mitigation Measures Area

Use Low VOC Paint - Residential Interior

Use Low VOC Paint - Residential Exterior

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	4.5125	0.0836	5.6910	0.0101		0.7599	0.7599		0.7599	0.7599	81.5134	25.3001	106.8135	0.1014	5.7500e-003	111.0615
Unmitigated	4.5125	0.0836	5.6910	0.0101		0.7599	0.7599		0.7599	0.7599	81.5134	25.3001	106.8135	0.1014	5.7500e-003	111.0615

Monte Cresta Road Extension - Bay Area AQMD Air District, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0550					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.3023					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	4.1453	0.0798	5.3612	0.0101		0.7581	0.7581		0.7581	0.7581	81.5134	24.7059	106.2192	0.1008	5.7500e-003	110.4530
Landscaping	9.9200e-003	3.8000e-003	0.3299	2.0000e-005		1.8300e-003	1.8300e-003		1.8300e-003	1.8300e-003		0.5943	0.5943	5.7000e-004		0.6085
Total	**4.5125**	**0.0836**	**5.6910**	**0.0101**		**0.7599**	**0.7599**		**0.7599**	**0.7599**	**81.5134**	**25.3001**	**106.8135**	**0.1014**	**5.7500e-003**	**111.0615**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0550					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.3023					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	4.1453	0.0798	5.3612	0.0101		0.7581	0.7581		0.7581	0.7581	81.5134	24.7059	106.2192	0.1008	5.7500e-003	110.4530
Landscaping	9.9200e-003	3.8000e-003	0.3299	2.0000e-005		1.8300e-003	1.8300e-003		1.8300e-003	1.8300e-003		0.5943	0.5943	5.7000e-004		0.6085
Total	**4.5125**	**0.0836**	**5.6910**	**0.0101**		**0.7599**	**0.7599**		**0.7599**	**0.7599**	**81.5134**	**25.3001**	**106.8135**	**0.1014**	**5.7500e-003**	**111.0615**

7.0 Water Detail

7.1 Mitigation Measures Water

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Monte Cresta Road Extension - Bay Area AQMD Air District, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Monte Cresta Road Extension

Bay Area AQMD Air District, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Asphalt Surfaces	0.21	Acre	0.21	9,147.60	0
Single Family Housing	4.00	Dwelling Unit	0.76	13,976.00	11

1.2 Other Project Characteristics

Urbanization	Rural	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	64
Climate Zone	5			**Operational Year**	2024
Utility Company	Pacific Gas and Electric Company				
CO2 Intensity (lb/MWhr)	203.98	**CH4 Intensity (lb/MWhr)**	0.033	**N2O Intensity (lb/MWhr)**	0.004

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Project Description

Construction Phase - Project Description

Off-road Equipment - Project Description

Off-road Equipment -

Off-road Equipment - Project Description

Off-road Equipment -

Off-road Equipment -

Trips and VMT - Project Description

Grading - Project Description

Construction Off-road Equipment Mitigation - BAAQMD Basic and Enhanced Emission Reduction Measures

Monte Cresta Road Extension - Bay Area AQMD Air District, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Area Mitigation -

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	4.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	7.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3

Monte Cresta Road Extension - Bay Area AQMD Air District, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstructionPhase	NumDays	10.00	0.00
tblConstructionPhase	NumDays	1.00	45.00
tblConstructionPhase	NumDays	2.00	30.00
tblConstructionPhase	NumDays	100.00	60.00
tblConstructionPhase	NumDays	5.00	30.00
tblGrading	AcresOfGrading	22.50	1.00
tblGrading	AcresOfGrading	22.50	1.00
tblGrading	MaterialExported	0.00	590.00
tblGrading	MaterialExported	0.00	815.00
tblGrading	MaterialImported	0.00	225.00
tblLandUse	LandUseSquareFeet	7,200.00	13,976.00
tblLandUse	LotAcreage	1.30	0.76
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural
tblTripsAndVMT	WorkerTripNumber	10.00	0.00
tblTripsAndVMT	WorkerTripNumber	5.00	10.00
tblTripsAndVMT	WorkerTripNumber	5.00	6.00
tblTripsAndVMT	WorkerTripNumber	18.00	8.00

2.0 Emissions Summary

Monte Cresta Road Extension - Bay Area AQMD Air District, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2023	40.3108	13.0928	7.8339	0.0193	4.6966	0.5925	5.2891	2.5250	0.5452	3.0702	0.0000	1,901.6814	1,901.6814	0.5302	0.0375	1,926.0976
Maximum	**40.3108**	**13.0928**	**7.8339**	**0.0193**	**4.6966**	**0.5925**	**5.2891**	**2.5250**	**0.5452**	**3.0702**	**0.0000**	**1,901.6814**	**1,901.6814**	**0.5302**	**0.0375**	**1,926.0976**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2023	40.1786	8.8051	10.3311	0.0193	1.9181	0.0656	1.9837	1.0080	0.0654	1.0734	0.0000	1,901.6814	1,901.6814	0.5302	0.0375	1,926.0976
Maximum	**40.1786**	**8.8051**	**10.3311**	**0.0193**	**1.9181**	**0.0656**	**1.9837**	**1.0080**	**0.0654**	**1.0734**	**0.0000**	**1,901.6814**	**1,901.6814**	**0.5302**	**0.0375**	**1,926.0976**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.33**	**32.75**	**-31.88**	**0.00**	**59.16**	**88.93**	**62.50**	**60.08**	**88.01**	**65.04**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Monte Cresta Road Extension - Bay Area AQMD Air District, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	4.5125	0.0836	5.6910	0.0101		0.7599	0.7599		0.7599	0.7599	81.5134	25.3001	106.8135	0.1014	5.7500e-003	111.0615
Energy	4.5600e-003	0.0390	0.0166	2.5000e-004		3.1500e-003	3.1500e-003		3.1500e-003	3.1500e-003		49.7549	49.7549	9.5000e-004	9.1000e-004	50.0506
Mobile	0.0876	0.1037	0.8645	1.6600e-003	0.1855	1.2400e-003	0.1867	0.0494	1.1600e-003	0.0506		171.3891	171.3891	0.0121	8.6900e-003	174.2806
Total	**4.6046**	**0.2263**	**6.5721**	**0.0120**	**0.1855**	**0.7643**	**0.9498**	**0.0494**	**0.7642**	**0.8136**	**81.5134**	**246.4442**	**327.9575**	**0.1144**	**0.0154**	**335.3927**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	4.5125	0.0836	5.6910	0.0101		0.7599	0.7599		0.7599	0.7599	81.5134	25.3001	106.8135	0.1014	5.7500e-003	111.0615
Energy	4.5600e-003	0.0390	0.0166	2.5000e-004		3.1500e-003	3.1500e-003		3.1500e-003	3.1500e-003		49.7549	49.7549	9.5000e-004	9.1000e-004	50.0506
Mobile	0.0876	0.1037	0.8645	1.6600e-003	0.1855	1.2400e-003	0.1867	0.0494	1.1600e-003	0.0506		171.3891	171.3891	0.0121	8.6900e-003	174.2806
Total	**4.6046**	**0.2263**	**6.5721**	**0.0120**	**0.1855**	**0.7643**	**0.9498**	**0.0494**	**0.7642**	**0.8136**	**81.5134**	**246.4442**	**327.9575**	**0.1144**	**0.0154**	**335.3927**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	1/1/2023	12/30/2022	5	0	
2	Site Preparation	Site Preparation	3/1/2023	5/2/2023	5	45	
3	Grading	Grading	5/4/2023	6/14/2023	5	30	
4	Building Construction	Building Construction	7/15/2023	10/6/2023	5	60	
5	Paving	Paving	10/7/2023	11/17/2023	5	30	
6	Architectural Coating	Architectural Coating	11/18/2023	11/24/2023	5	5	

Acres of Grading (Site Preparation Phase): 1

Acres of Grading (Grading Phase): 1

Acres of Paving: 0.21

Residential Indoor: 28,301; Residential Outdoor: 9,434; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 549 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Rubber Tired Dozers	1	1.00	247	0.40
Demolition	Tractors/Loaders/Backhoes	2	6.00	97	0.37
Site Preparation	Graders	1	8.00	187	0.41
Site Preparation	Tractors/Loaders/Backhoes	1	8.00	97	0.37

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Grading	Graders	1	6.00	187	0.41
Grading	Rubber Tired Dozers	1	6.00	247	0.40
Grading	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Grading	Trenchers	1	6.00	78	0.50
Building Construction	Cranes	1	4.00	231	0.29
Building Construction	Forklifts	2	6.00	89	0.20
Building Construction	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Paving	Cement and Mortar Mixers	4	6.00	9	0.56
Paving	Pavers	1	7.00	130	0.42
Paving	Rollers	1	7.00	80	0.38
Paving	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Architectural Coating	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	4	0.00	0.00	0.00	10.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	2	10.00	0.00	81.00	10.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Grading	4	10.00	0.00	102.00	10.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	5	6.00	2.00	0.00	10.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Paving	7	8.00	0.00	0.00	10.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	1.00	0.00	0.00	10.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Use DPF for Construction Equipment

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

Monte Cresta Road Extension - Bay Area AQMD Air District, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.3 Site Preparation - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0236	0.0000	0.0236	2.5400e-003	0.0000	2.5400e-003			0.0000			0.0000
Off-Road	0.5348	6.1887	3.9239	9.7300e-003		0.2266	0.2266		0.2084	0.2084		942.4317	942.4317	0.3048		950.0517
Total	**0.5348**	**6.1887**	**3.9239**	**9.7300e-003**	**0.0236**	**0.2266**	**0.2501**	**2.5400e-003**	**0.2084**	**0.2110**		**942.4317**	**942.4317**	**0.3048**		**950.0517**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	3.6200e-003	0.2488	0.0579	1.0900e-003	0.0315	1.9800e-003	0.0335	8.6300e-003	1.8900e-003	0.0105		118.4780	118.4780	3.8900e-003	0.0188	124.1702
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0277	0.0192	0.2290	6.6000e-004	0.0822	4.1000e-004	0.0826	0.0218	3.8000e-004	0.0222		67.7183	67.7183	2.0900e-003	1.9900e-003	68.3637
Total	**0.0314**	**0.2680**	**0.2868**	**1.7500e-003**	**0.1136**	**2.3900e-003**	**0.1160**	**0.0304**	**2.2700e-003**	**0.0327**		**186.1963**	**186.1963**	**5.9800e-003**	**0.0208**	**192.5338**

Monte Cresta Road Extension - Bay Area AQMD Air District, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.3 Site Preparation - 2023

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					9.1900e-003	0.0000	9.1900e-003	9.9000e-004	0.0000	9.9000e-004			0.0000			0.0000
Off-Road	0.2382	4.8716	5.8579	9.7300e-003		0.0361	0.0361		0.0361	0.0361	0.0000	942.4317	942.4317	0.3048		950.0517
Total	**0.2382**	**4.8716**	**5.8579**	**9.7300e-003**	**9.1900e-003**	**0.0361**	**0.0453**	**9.9000e-004**	**0.0361**	**0.0371**	**0.0000**	**942.4317**	**942.4317**	**0.3048**		**950.0517**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	3.6200e-003	0.2488	0.0579	1.0900e-003	0.0315	1.9800e-003	0.0335	8.6300e-003	1.8900e-003	0.0105		118.4780	118.4780	3.8900e-003	0.0188	124.1702
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0277	0.0192	0.2290	6.6000e-004	0.0822	4.1000e-004	0.0826	0.0218	3.8000e-004	0.0222		67.7183	67.7183	2.0900e-003	1.9900e-003	68.3637
Total	**0.0314**	**0.2680**	**0.2868**	**1.7500e-003**	**0.1136**	**2.3900e-003**	**0.1160**	**0.0304**	**2.2700e-003**	**0.0327**		**186.1963**	**186.1963**	**5.9800e-003**	**0.0208**	**192.5338**

Monte Cresta Road Extension - Bay Area AQMD Air District, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.4 Grading - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					4.5550	0.0000	4.5550	2.4870	0.0000	2.4870			0.0000			0.0000
Off-Road	1.1936	12.6037	7.4957	0.0166		0.5883	0.5883		0.5413	0.5413		1,610.1712	1,610.1712	0.5208		1,623.1903
Total	**1.1936**	**12.6037**	**7.4957**	**0.0166**	**4.5550**	**0.5883**	**5.1433**	**2.4870**	**0.5413**	**3.0282**		**1,610.1712**	**1,610.1712**	**0.5208**		**1,623.1903**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	6.8400e-003	0.4699	0.1093	2.0500e-003	0.0595	3.7300e-003	0.0632	0.0163	3.5700e-003	0.0199		223.7918	223.7918	7.3500e-003	0.0355	234.5436
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0277	0.0192	0.2290	6.6000e-004	0.0822	4.1000e-004	0.0826	0.0218	3.8000e-004	0.0222		67.7183	67.7183	2.0900e-003	1.9900e-003	68.3637
Total	**0.0346**	**0.4891**	**0.3383**	**2.7100e-003**	**0.1416**	**4.1400e-003**	**0.1458**	**0.0381**	**3.9500e-003**	**0.0420**		**291.5101**	**291.5101**	**9.4400e-003**	**0.0375**	**302.9073**

Monte Cresta Road Extension - Bay Area AQMD Air District, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.4 Grading - 2023

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					1.7764	0.0000	1.7764	0.9699	0.0000	0.9699			0.0000			0.0000
Off-Road	0.4069	8.3160	9.9929	0.0166		0.0615	0.0615		0.0615	0.0615	0.0000	1,610.1712	1,610.1712	0.5208		1,623.1903
Total	**0.4069**	**8.3160**	**9.9929**	**0.0166**	**1.7764**	**0.0615**	**1.8379**	**0.9699**	**0.0615**	**1.0314**	**0.0000**	**1,610.1712**	**1,610.1712**	**0.5208**		**1,623.1903**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	6.8400e-003	0.4699	0.1093	2.0500e-003	0.0595	3.7300e-003	0.0632	0.0163	3.5700e-003	0.0199		223.7918	223.7918	7.3500e-003	0.0355	234.5436
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0277	0.0192	0.2290	6.6000e-004	0.0822	4.1000e-004	0.0826	0.0218	3.8000e-004	0.0222		67.7183	67.7183	2.0900e-003	1.9900e-003	68.3637
Total	**0.0346**	**0.4891**	**0.3383**	**2.7100e-003**	**0.1416**	**4.1400e-003**	**0.1458**	**0.0381**	**3.9500e-003**	**0.0420**		**291.5101**	**291.5101**	**9.4400e-003**	**0.0375**	**302.9073**

Monte Cresta Road Extension - Bay Area AQMD Air District, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.5 Building Construction - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.6322	6.4186	7.0970	0.0114		0.3203	0.3203		0.2946	0.2946		1,104.6089	1,104.6089	0.3573		1,113.5402
Total	**0.6322**	**6.4186**	**7.0970**	**0.0114**		**0.3203**	**0.3203**		**0.2946**	**0.2946**		**1,104.6089**	**1,104.6089**	**0.3573**		**1,113.5402**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	2.0000e-003	0.0843	0.0273	3.7000e-004	0.0123	4.7000e-004	0.0127	3.5300e-003	4.5000e-004	3.9800e-003		39.6775	39.6775	8.1000e-004	5.8800e-003	41.4486
Worker	0.0166	0.0115	0.1374	4.0000e-004	0.0493	2.4000e-004	0.0495	0.0131	2.3000e-004	0.0133		40.6310	40.6310	1.2500e-003	1.1900e-003	41.0182
Total	**0.0186**	**0.0958**	**0.1647**	**7.7000e-004**	**0.0615**	**7.1000e-004**	**0.0623**	**0.0166**	**6.8000e-004**	**0.0173**		**80.3085**	**80.3085**	**2.0600e-003**	**7.0700e-003**	**82.4668**

Monte Cresta Road Extension - Bay Area AQMD Air District, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.5 Building Construction - 2023

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.2793	6.1296	7.9624	0.0114		0.0578	0.0578		0.0578	0.0578	0.0000	1,104.6089	1,104.6089	0.3573		1,113.5402
Total	**0.2793**	**6.1296**	**7.9624**	**0.0114**		**0.0578**	**0.0578**		**0.0578**	**0.0578**	**0.0000**	**1,104.6089**	**1,104.6089**	**0.3573**		**1,113.5402**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	2.0000e-003	0.0843	0.0273	3.7000e-004	0.0123	4.7000e-004	0.0127	3.5300e-003	4.5000e-004	3.9800e-003		39.6775	39.6775	8.1000e-004	5.8800e-003	41.4486
Worker	0.0166	0.0115	0.1374	4.0000e-004	0.0493	2.4000e-004	0.0495	0.0131	2.3000e-004	0.0133		40.6310	40.6310	1.2500e-003	1.1900e-003	41.0182
Total	**0.0186**	**0.0958**	**0.1647**	**7.7000e-004**	**0.0615**	**7.1000e-004**	**0.0623**	**0.0166**	**6.8000e-004**	**0.0173**		**80.3085**	**80.3085**	**2.0600e-003**	**7.0700e-003**	**82.4668**

Monte Cresta Road Extension - Bay Area AQMD Air District, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.6 Paving - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.6112	5.5046	7.0209	0.0113		0.2643	0.2643		0.2466	0.2466		1,036.0878	1,036.0878	0.3018		1,043.6331
Paving	0.0183					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.6295**	**5.5046**	**7.0209**	**0.0113**		**0.2643**	**0.2643**		**0.2466**	**0.2466**		**1,036.0878**	**1,036.0878**	**0.3018**		**1,043.6331**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0222	0.0153	0.1832	5.3000e-004	0.0657	3.3000e-004	0.0660	0.0174	3.0000e-004	0.0177		54.1746	54.1746	1.6700e-003	1.5900e-003	54.6909
Total	**0.0222**	**0.0153**	**0.1832**	**5.3000e-004**	**0.0657**	**3.3000e-004**	**0.0660**	**0.0174**	**3.0000e-004**	**0.0177**		**54.1746**	**54.1746**	**1.6700e-003**	**1.5900e-003**	**54.6909**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.6 Paving - 2023

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.2239	4.7579	6.9028	0.0113		0.0436	0.0436		0.0436	0.0436	0.0000	1,036.0878	1,036.0878	0.3018		1,043.6331
Paving	0.0183					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.2422**	**4.7579**	**6.9028**	**0.0113**		**0.0436**	**0.0436**		**0.0436**	**0.0436**	**0.0000**	**1,036.0878**	**1,036.0878**	**0.3018**		**1,043.6331**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0222	0.0153	0.1832	5.3000e-004	0.0657	3.3000e-004	0.0660	0.0174	3.0000e-004	0.0177		54.1746	54.1746	1.6700e-003	1.5900e-003	54.6909
Total	**0.0222**	**0.0153**	**0.1832**	**5.3000e-004**	**0.0657**	**3.3000e-004**	**0.0660**	**0.0174**	**3.0000e-004**	**0.0177**		**54.1746**	**54.1746**	**1.6700e-003**	**1.5900e-003**	**54.6909**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.7 Architectural Coating - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	40.1164					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.1917	1.3030	1.8111	2.9700e-003		0.0708	0.0708		0.0708	0.0708		281.4481	281.4481	0.0168		281.8690
Total	**40.3081**	**1.3030**	**1.8111**	**2.9700e-003**		**0.0708**	**0.0708**		**0.0708**	**0.0708**		**281.4481**	**281.4481**	**0.0168**		**281.8690**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.7700e-003	1.9200e-003	0.0229	7.0000e-005	8.2100e-003	4.0000e-005	8.2600e-003	2.1800e-003	4.0000e-005	2.2200e-003		6.7718	6.7718	2.1000e-004	2.0000e-004	6.8364
Total	**2.7700e-003**	**1.9200e-003**	**0.0229**	**7.0000e-005**	**8.2100e-003**	**4.0000e-005**	**8.2600e-003**	**2.1800e-003**	**4.0000e-005**	**2.2200e-003**		**6.7718**	**6.7718**	**2.1000e-004**	**2.0000e-004**	**6.8364**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.7 Architectural Coating - 2023

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	40.1164					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.0594	1.3570	1.8324	2.9700e-003		0.0143	0.0143		0.0143	0.0143	0.0000	281.4481	281.4481	0.0168		281.8690
Total	**40.1758**	**1.3570**	**1.8324**	**2.9700e-003**		**0.0143**	**0.0143**		**0.0143**	**0.0143**	**0.0000**	**281.4481**	**281.4481**	**0.0168**		**281.8690**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.7700e-003	1.9200e-003	0.0229	7.0000e-005	8.2100e-003	4.0000e-005	8.2600e-003	2.1800e-003	4.0000e-005	2.2200e-003		6.7718	6.7718	2.1000e-004	2.0000e-004	6.8364
Total	**2.7700e-003**	**1.9200e-003**	**0.0229**	**7.0000e-005**	**8.2100e-003**	**4.0000e-005**	**8.2600e-003**	**2.1800e-003**	**4.0000e-005**	**2.2200e-003**		**6.7718**	**6.7718**	**2.1000e-004**	**2.0000e-004**	**6.8364**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0876	0.1037	0.8645	1.6600e-003	0.1855	1.2400e-003	0.1867	0.0494	1.1600e-003	0.0506		171.3891	171.3891	0.0121	8.6900e-003	174.2806
Unmitigated	0.0876	0.1037	0.8645	1.6600e-003	0.1855	1.2400e-003	0.1867	0.0494	1.1600e-003	0.0506		171.3891	171.3891	0.0121	8.6900e-003	174.2806

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Other Asphalt Surfaces	0.00	0.00	0.00		
Single Family Housing	37.76	38.16	34.20	86,168	86,168
Total	37.76	38.16	34.20	86,168	86,168

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Other Asphalt Surfaces	14.70	6.60	6.60	0.00	0.00	0.00	0	0	0
Single Family Housing	10.80	4.80	5.70	31.00	15.00	54.00	86	11	3

4.4 Fleet Mix

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Other Asphalt Surfaces	0.553342	0.058522	0.188738	0.121080	0.023016	0.005623	0.010412	0.007562	0.000987	0.000568	0.026444	0.000834	0.002871
Single Family Housing	0.553342	0.058522	0.188738	0.121080	0.023016	0.005623	0.010412	0.007562	0.000987	0.000568	0.026444	0.000834	0.002871

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	4.5600e-003	0.0390	0.0166	2.5000e-004		3.1500e-003	3.1500e-003		3.1500e-003	3.1500e-003		49.7549	49.7549	9.5000e-004	9.1000e-004	50.0506
NaturalGas Unmitigated	4.5600e-003	0.0390	0.0166	2.5000e-004		3.1500e-003	3.1500e-003		3.1500e-003	3.1500e-003		49.7549	49.7549	9.5000e-004	9.1000e-004	50.0506

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Single Family Housing	422.917	4.5600e-003	0.0390	0.0166	2.5000e-004		3.1500e-003	3.1500e-003		3.1500e-003	3.1500e-003		49.7549	49.7549	9.5000e-004	9.1000e-004	50.0506
Total		**4.5600e-003**	**0.0390**	**0.0166**	**2.5000e-004**		**3.1500e-003**	**3.1500e-003**		**3.1500e-003**	**3.1500e-003**		**49.7549**	**49.7549**	**9.5000e-004**	**9.1000e-004**	**50.0506**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Single Family Housing	0.422917	4.5600e-003	0.0390	0.0166	2.5000e-004		3.1500e-003	3.1500e-003		3.1500e-003	3.1500e-003		49.7549	49.7549	9.5000e-004	9.1000e-004	50.0506
Total		**4.5600e-003**	**0.0390**	**0.0166**	**2.5000e-004**		**3.1500e-003**	**3.1500e-003**		**3.1500e-003**	**3.1500e-003**		**49.7549**	**49.7549**	**9.5000e-004**	**9.1000e-004**	**50.0506**

6.0 Area Detail

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

6.1 Mitigation Measures Area

Use Low VOC Paint - Residential Interior

Use Low VOC Paint - Residential Exterior

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	4.5125	0.0836	5.6910	0.0101		0.7599	0.7599		0.7599	0.7599	81.5134	25.3001	106.8135	0.1014	5.7500e-003	111.0615
Unmitigated	4.5125	0.0836	5.6910	0.0101		0.7599	0.7599		0.7599	0.7599	81.5134	25.3001	106.8135	0.1014	5.7500e-003	111.0615

Monte Cresta Road Extension - Bay Area AQMD Air District, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0550					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.3023					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	4.1453	0.0798	5.3612	0.0101		0.7581	0.7581		0.7581	0.7581	81.5134	24.7059	106.2192	0.1008	5.7500e-003	110.4530
Landscaping	9.9200e-003	3.8000e-003	0.3299	2.0000e-005		1.8300e-003	1.8300e-003		1.8300e-003	1.8300e-003		0.5943	0.5943	5.7000e-004		0.6085
Total	**4.5125**	**0.0836**	**5.6910**	**0.0101**		**0.7599**	**0.7599**		**0.7599**	**0.7599**	**81.5134**	**25.3001**	**106.8135**	**0.1014**	**5.7500e-003**	**111.0615**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0550					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.3023					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	4.1453	0.0798	5.3612	0.0101		0.7581	0.7581		0.7581	0.7581	81.5134	24.7059	106.2192	0.1008	5.7500e-003	110.4530
Landscaping	9.9200e-003	3.8000e-003	0.3299	2.0000e-005		1.8300e-003	1.8300e-003		1.8300e-003	1.8300e-003		0.5943	0.5943	5.7000e-004		0.6085
Total	**4.5125**	**0.0836**	**5.6910**	**0.0101**		**0.7599**	**0.7599**		**0.7599**	**0.7599**	**81.5134**	**25.3001**	**106.8135**	**0.1014**	**5.7500e-003**	**111.0615**

7.0 Water Detail

7.1 Mitigation Measures Water

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Appendix A

Air Quality Technical Report

Construction and Operational Emissions Inventory Supporting Information

Health Risk Assessment Methodology, Assumptions, and Detailed Results

Attachment B

Health Risk Assessment Methodology, Assumptions, and Detailed Results

A health risk assessment (HRA) is accomplished in four steps: 1) hazards identification, 2) exposure assessment, 3) toxicity assessment, and 4) risk characterization. These steps cover the estimation of air emissions, the estimation of the air concentrations resulting from a dispersion analysis, the incorporation of the toxicity of the pollutants emitted, and the characterization of the risk based on exposure parameters such as breathing rate, age adjustment factors, and exposure duration; each depending on receptor type (i.e., residence, school, daycare centers, hospitals, senior care facilities, recreational areas, adult, infant, child).

This HRA was conducted in accordance with technical guidelines developed by federal, state, and regional agencies, including U.S. Environmental Protection Agency (USEPA), California Environmental Protection Agency (CalEPA), California Office of Environmental Health Hazard Assessment (OEHHA) *Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments*[1] and the Bay Area Air Quality Management District (BAAQMD) *Health Risk Screening Analysis Guidelines*.[2] This HRA addresses the emissions from construction activities including onsite equipment and haul trucks. Specific focus is on diesel particulate matter (DPM) and particulate matter equal to or less than 2.5 micrometers (fine particulate or $PM_{2.5}$) emissions. Gasoline-fueled vehicles emit air toxics in much smaller quantities and toxicity levels compared to DPM. Thus, gasoline-fueled emission sources were not included in the HRA. Secondly, air toxics emissions from project operations is not expected to be substantial and thus, the HRA focused on construction equipment emissions of DPM.

According to CalEPA, a HRA should not be interpreted as the expected rates of cancer or other potential human health effects, but rather as estimates of potential risk or likelihood of adverse effects based on current knowledge, under a number of highly conservative assumptions and the best assessment tools currently available.

TERMS AND DEFINITIONS

As the practice of conducting an HRA is particularly complex and involves concepts that are not altogether familiar to most people, several terms and definitions are provided that are considered essential to the understanding of the approach, methodology and results:

Acute effect – a health effect (non-cancer) produced within a short period of time (few minutes to several days) following an exposure to toxic air contaminants (TAC).

Cancer risk – the probability of an individual contracting cancer from a lifetime (i.e., 70 year) exposure to TAC such as DPM in the ambient air.

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[1] Office of Environmental Health Hazard Assessment, *Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments*, March 6, 2015, http://oehha.ca.gov/air/hot_spots/hotspots2015.html.

[2] Bay Area Air Quality Management District, *Health Risk Screening Analysis Guidelines*, January 2010, http://www.baaqmd.gov/~/media/Files/Engineering/Air%20Toxics%20Programs/hrsa_guidelines.ashx

Chronic effect – a health effect (non-cancer) produced from a continuous exposure occurring over an extended period (weeks, months, years).

Hazard Index (HI) – the unitless ratio of an exposure level over the acceptable reference dose. The HI can be applied to multiple compounds in an additive manner.

Hazard Quotient (HQ) – the unitless ratio of an exposure level over the acceptable reference dose. The HQ is applied to individual compounds.

Toxic Air Contaminants – any air pollutant that can cause short-term (acute) and/or long-term (chronic or carcinogenic, i.e., cancer causing) adverse human health effects (i.e., injury or illness). The current California list of TAC lists approximately 200 compounds, including particulate emissions from diesel-fueled engines.

Human Health Effects - comprise disorders such as eye watering, respiratory or heart ailments, and other (i.e., non-cancer) related diseases.

Health Risk Assessment – an analysis designed to predict the generation and dispersion of TAC in the outdoor environment, evaluate the potential for exposure of human populations, and to assess and quantify both the individual and population-wide health risks associated with those levels of exposure.

Incremental – under CEQA, the net difference (or change) in conditions or impacts when comparing the baseline to future year project conditions.

Maximum exposed individual (MEI) – an individual assumed to be located at the point where the highest concentrations of TAC, and therefore, health risks are predicted to occur.

Non-cancer risks – health risks such as eye watering, respiratory or heart ailments, and other non-cancer related diseases.

Receptors – the locations where potential health impacts or risks are predicted (i.e., schools, residences, and recreational sites).

LIMITATIONS AND UNCERTAINTIES

There are several important limitations and uncertainties commonly associated with an HRA due to the wide variability of human exposures to TAC, the extended timeframes over which the exposures are evaluated, and the inability to verify the results. Limitations and uncertainties associated with the HRA and identified by the CalEPA include: (a.) lack of reliable monitoring data; (b.) extrapolation of toxicity data in animals to humans; (c.) estimation errors in calculating TAC emissions; (d.) concentration prediction errors with dispersion models; and (e.) the variability in lifestyles, fitness and other confounding factors of the human population. This HRA was performed using the best available data and methodologies, notwithstanding the following uncertainties:

- There are uncertainties associated with the estimation of emissions from project activities. Where project-specific data, such as emission factors, are not available, default assumptions in emission models were used.

- The limitations of the air dispersion model provide a source of uncertainty in the estimation of exposure concentrations. According to USEPA, errors due to the limitation of the algorithms implemented in the air dispersion model in the highest estimated concentrations of +/- 10 percent to 40 percent are typical.[3]

- The source parameters used to model emission sources add uncertainty. For all emission sources, the source parameters used source-specific, recommended as defaults, or expected to produce more conservative results. Discrepancies might exist in actual emissions characteristics of an emission source and its representation in the dispersion model.

- The exposure duration estimates do not consider that people do not usually reside at the same location for 30 years and that other exposures (i.e., school children) are also of much shorter durations than was assumed in this HRA. This exposure duration is a highly conservative assumption, since most people do not remain at home all day and on average residents change residences every 11 to 12 years. In addition, this assumption adopts that residents are experiencing outdoor concentrations for the entire exposure period.

- For the risk and hazards calculations as well as the cumulative health impact, numerous assumptions must be made in order to estimate human exposure to pollutants. These assumptions include parameters such as breathing rates, exposure time and frequency, exposure duration, and human activity patterns. While a mean value derived from scientifically defensible studies is the best estimate of central tendency, most of the exposure variables used in this HRA are high-end estimates. The combination of several high-end estimates used as exposure parameters may substantially overestimate pollutant intake. The excess lifetime cancer risks calculated in this HRA are therefore likely to be higher than may be required to be protective of public health.

- The Cal/EPA cancer potency factor for DPM was used to estimate cancer risks associated with exposure to DPM emissions from construction activities. However, the cancer potency factor derived by Cal/EPA for DPM is highly uncertain in both the estimation of response and dose. In the past, due to inadequate animal test data and epidemiology data on diesel exhaust, the International Agency for Research on Cancer (IARC), a branch of the World Health Organization, had classified DPM as Probably Carcinogenic to Humans (Group 2); the USEPA had also concluded that the existing data did not provide an adequate basis for quantitative risk assessment.[4] However, based on two recent scientific studies,[5] IARC recently re-classified DPM

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[3] US Environmental Protection Agency, *Guideline on Air Quality Models (Revised), 40 Code of Federal Regulations, Part 51, Appendix W,* November 2005, https://www3.epa.gov/scram001/guidance/guide/appw_05.pdf

[4] US Environmental Protection Agency, *Health Assessment Document for Diesel Engine Exhaust*, May 2002, https://cfpub.epa.gov/si/si_public_record_report.cfm?dirEntryId=29060

[5] Attfield MD, Schleiff PL, Lubin JH, Blair A, Stewart PA, Vermeulen R, Coble JB, Silverman DT, *The Diesel Exhaust in Miners Study: A Nested Case-Control Study of Lung Cancer and Diesel Exhaust*, June 2012, https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3369553/

as Carcinogenic to Humans to Group 1,[6] which means that the agency has determined that there is "sufficient evidence of carcinogenicity" of a substance in humans and represents the strongest weight-of-evidence rating in IARC's carcinogen classification scheme. This determination by the IARC may provide additional impetus for the USEPA to identify a quantitative dose-response relationship between exposure to DPM and cancer.

In summary, the estimated health impacts are based primarily on a series of conservative assumptions related to predicted environmental concentrations, exposure, and chemical toxicity. The use of conservative assumptions tends to produce upper-bound estimates of risk. BAAQMD acknowledges this uncertainty by stating: "the methods used [to estimate risk] are conservative, meaning that the real risks from the source may be lower than the calculations, but it is unlikely that they will be higher." The USEPA notes that the conservative assumptions used in a HRA are intended to assure that the estimated risks do not underestimate the actual risks posed by a site and that the estimated risks do not necessarily represent actual risks experienced by populations at or near a site.[7]

HAZARDS IDENTIFICATION

California Air Resources Board (CARB) has developed a list of TAC, where a TAC is "an air pollutant which may cause or contribute to an increase in mortality or in serious illness, or which may pose a present or potential hazard to human health (California Health and Safety Code Section 39655). All USEPA hazardous air pollutants are TAC. CARB administers the Air Toxics "Hot Spots" program under Assembly Bill 2588 "Hot Spots" Information and Assessment Act, which requires periodic local review of facilities which emit TAC. Local air agencies periodically must prioritize stationary sources of TAC and prepare health risk assessments for high-priority sources.

Diesel exhaust is a complex mixture of numerous individual gaseous and particulate compounds emitted from diesel-fueled combustion engines. Diesel particulate matter is formed primarily through the incomplete combustion of diesel fuel. DPM is removed from the atmosphere through physical processes including atmospheric fall-out and washout by rain. Humans can be exposed to airborne DPM by deposition on water, soil, and vegetation; although the main pathway of exposure is inhalation. Cal/EPA has concluded that potential cancer risk from inhalation exposure to whole diesel exhaust outweigh the multi-pathway cancer risk from the speciated components.

In August 1998, the CARB identified DPM as an air toxic. CARB developed the *Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel- Fueled Engines and Vehicles* and *Risk Management Guidance for the Permitting of New Stationary Diesel-Fueled Engines* and approved these documents on September 28, 2000.[8] [9] The documents represent proposals to reduce DPM emissions, with the goal of

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[6] International Agency for Research on Cancer, *Diesel Engine Exhaust Carcinogenic*, June 2012, https://www.iarc.fr/en/media-centre/pr/2012/pdfs/pr213_E.pdf

[7] US Environmental Protection Agency, *Risk Assessment Guidance for Superfund Human Health Risk Assessment*, December 1989, https://www.epa.gov/sites/production/files/2015-09/documents/rags_a.pdf

[8] California Air Resources Board, *Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engines and Vehicles*, October 2000, http://www.arb.ca.gov/diesel/documents/rrpfinal.pdf

[9] California Air Resources Board, *Risk Management Guidance for the Permitting of New Stationary Diesel-Fueled Engines*, October 2000, https://www.arb.ca.gov/diesel/documents/rmgFinal.pdf

reducing emissions and the associated health risk by 75 percent in 2010 and by 85 percent in 2020. The program aimed to require the use of state-of-the-art catalyzed DPM filters and ultra-low-sulfur diesel fuel.

In 2001, CARB assessed the state-wide health risks from exposure to diesel exhaust and to other toxic air contaminants. It is difficult to distinguish the health risks of diesel emissions from those of other air toxics, since diesel exhaust contains approximately 40 different TAC. The CARB study detected diesel exhaust by using ambient air carbon soot measurements as a surrogate for diesel emissions. The study reported that the state-wide cancer risk from exposure to diesel exhaust was about 540 per million population as compared to a total risk for exposure to all ambient air toxics of 760 per million. This estimate, which accounts for about 70 percent of the total risk from TAC, included both urban and rural areas in the state. The estimate can also be considered an average worst-case for the state, since it assumes constant exposure to outdoor concentrations of diesel exhaust and does not account for expected lower concentrations indoors, where most of time is spent. DPM is estimated to increase statewide cancer risk by 520 cancers per million residents exposed over a lifetime.[10]

Exposure to DPM results in a greater incidence of chronic non-cancer health effects, such as cough, labored breathing, chest tightness, wheezing, and bronchitis. Individuals particularly vulnerable to DPM are children, whose lung tissue is still developing, the elderly and people with illnesses who may have other serious health problems that can be aggravated by exposure to DPM. In general, children are more vulnerable than adults to air pollutants because they have higher inhalation rates, narrower airways, and less mature immune systems. In addition, children with allergies may have an enhanced allergic response when exposed to diesel exhaust).

EXPOSURE ASSESSMENT

Dispersion is the process by which atmospheric pollutants disseminate due to wind and vertical stability. The results of a dispersion analysis are used to assess pollutant concentrations at or near an emission source. The results of an analysis allow predicted concentrations of pollutants to be compared directly to air quality standards and other criteria such as health risks based on modeled concentrations.

A rising pollutant plume reacts with the environment in several ways before it levels off. First, the plume's own turbulence interacts with atmospheric turbulence to entrain ambient air. This mixing process reduces and eventually eliminates the density and momentum differences that cause the plume to rise. Second, the wind transports the plume during its rise and entrainment process. Higher winds mix the plume more rapidly, resulting in a lower final rise. Third, the plume interacts with the vertical temperature stratification of the atmosphere, rising as a result of buoyancy in the unstable-to-neutrally stratified mixed layer. However, after the plume encounters the mixing lid and the stably stratified air above, its vertical motion is dampened.

Molecules of gas or small particles injected into the atmosphere will separate from each other as they are acted on by turbulent eddies. The Gaussian mathematical model such as AERMOD simulates the

[10] California Air Resources Board, *Summary: Diesel Particulate Matter Health Impacts*, April 12, 2016, https://www.arb.ca.gov/research/diesel/diesel-health_summ.htm

dispersion of the gas or particles within the atmosphere. The formulation of the Gaussian model is based on the following assumptions:

- The predictions are not time-dependent (all conditions remain unchanged with time)
- The wind speed and direction are uniform, both horizontally and vertically, throughout the region of concern
- The rate of diffusion is not a function of position
- Diffusion in the direction of the transporting wind is negligible when compared to the transport flow

Dispersion Modeling Approach

Air dispersion modeling was performed to estimate the downwind dispersion of DPM exhaust emissions resulting from construction activities. The following sections present the fundamental components of an air dispersion modeling analysis including air dispersion model selection and options, receptor locations, meteorological data, and source exhaust parameters.

Model Selection and Options

AERMOD (Version 21112)[11] was used for the dispersion analysis. AERMOD is the USEPA preferred atmospheric dispersion modeling system for general industrial sources. The model can simulate point, area, volume, and line sources. AERMOD is the appropriate model for this analysis based on the coverage of simple, intermediate, and complex terrain. It also predicts both short-term and long-term (annual) average concentrations. The model was executed using the regulatory default options (stack-tip downwash, buoyancy-induced dispersion, and final plume rise), default wind speed profile categories, default potential temperature gradients, and assuming no pollutant decay.

The selection of the appropriate dispersion coefficients depends on the land use within three kilometers (km) of the project site. The types of land use were based on the classification method defined by Auer (1978); using pertinent United States Geological Survey (USGS) 1:24,000 scale (7.5 minute) topographic maps of the area. If the Auer land use types of heavy industrial, light-to-moderate industrial, commercial, and compact residential account for 50 percent or more of the total area, the USEPA *Guideline on Air Quality Models*[12] recommends using urban dispersion coefficients; otherwise, the appropriate rural coefficients can be used. Based on observation of the area surrounding the project site, rural (urban is only designated within dense city centers such as downtown San Francisco) dispersion coefficients were applied within AERMOD.

Receptor Locations

Some receptors are considered more sensitive to air pollutants than others, because of preexisting health problems, proximity to the emissions source, or duration of exposure to air pollutants. Land uses

[11] US Environmental Protection Agency, AERMOD Modeling System, https://www.epa.gov/scram/air-quality-dispersion-modeling-preferred-and-recommended-models

[12] US Environmental Protection Agency, *Guideline on Air Quality Models (Revised), 40 Code of Federal Regulations, Part 51, Appendix W,* November 2005, https://www3.epa.gov/scram001/guidance/guide/appw_05.pdf

such as primary and secondary schools, hospitals, and convalescent homes are considered to be relatively sensitive to poor air quality because the very young, the old, and the infirm are more susceptible to respiratory infections and other air quality-related health problems than the general public. Residential areas are also considered sensitive to poor air quality because people in residential areas are often at home for extended periods. Recreational land uses are moderately sensitive to air pollution because vigorous exercise associated with recreation places having a high demand on respiratory system function.

Sensitive receptors were placed at receptors to estimate health impacts due to proposed project construction on existing residences. Numerous residential homes surround the project site include along Alambra Drive and Sequoia Way. Cipriani Elementary School is located approximately 0.5 miles to the south of the project site. **Figure B-1** displays the location of the sensitive receptors used in this HRA. Receptors were placed at a height of 1.8 meters (typical breathing height). Terrain elevations for receptor locations were used based on available USGS information for the area.

Meteorological Data

Hourly meteorological data from San Francisco International Airport (surface data), located approximately four miles to the west-southwest of the proposed project, and Oakland International Airport (upper air) were used in the dispersion modeling analysis. Meteorological data from 2009 through 2013 were used.[13] **Figure B-2** displays the annual wind rose. Wind directions are predominately from the south-southwest with a moderate frequency of calm wind speed conditions (approximately 13 percent), as shown in **Figure B-3**. The average annual wind speed is 10.7 miles per hour (4.8 meters per second).

Source Release Characteristics

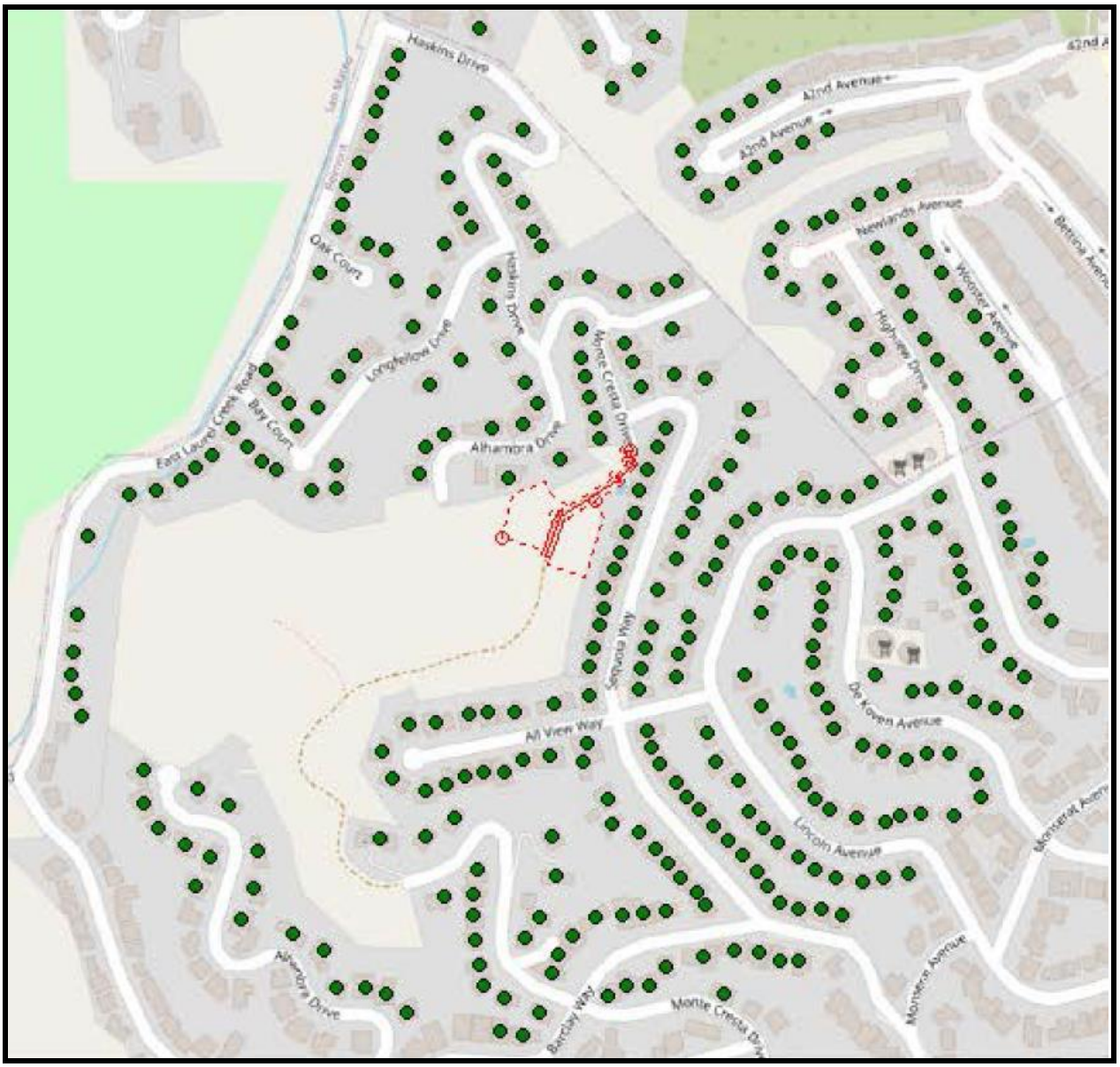
Construction equipment activities were treated as an area source. The release height of the off-road equipment exhaust was 5.0 meters (16.4 feet) and an initial vertical dimension of 1.4 meters 4.6 feet), which reflects the height of the equipment plus an additional height of the exhaust plume above the exhaust point to account for plume rise due to buoyancy and momentum. Fugitive dust-generating activities were treated as an area source. The release height of the fugitive dust was 0.0 meters (0.0 feet) and an initial vertical dimension of 1.0 meter (3.3 feet). Haul trucks were treated as a line source (i.e., volume sources placed at regular intervals) located along an access road. The haul trucks were assigned a release height of 5.0 meters (16.4 feet) and an initial vertical dimension of 1.4 meters (4.6 feet), which accounts for dispersion from the movement of vehicles.[14] [15]

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[13] California Air Resources Board, Hotspots Analysis and Reporting Program Meteorological Files, October 5, 2015, https://www.arb.ca.gov/toxics/harp/metfiles2.htm

[14] While haul truck emissions contribute substantially to overall project emissions, they are spread over many miles. Hence, the portion of trucking emissions that would impact one receptor is much smaller than the emissions that the clustered off-road activity at the project site would impact a receptor near the site. For example, the DPM emissions from truck travel within 1,000 feet of the project are less than 1 percent of the total off-road DPM emissions.

FIGURE B-1
HEALTH RISK ASSESSMENT RECEPTORS



[15] South Coast Air Quality Management District, Final Localized Significance Threshold Methodology. July 2008, http://www.aqmd.gov/docs/default-source/ceqa/handbook/localized-significance-thresholds/final-lst-methodology-document.pdf?sfvrsn=2

FIGURE B-2
WINDROSE FOR SAN FRANCISCO INTERNATIONAL AIRPORT

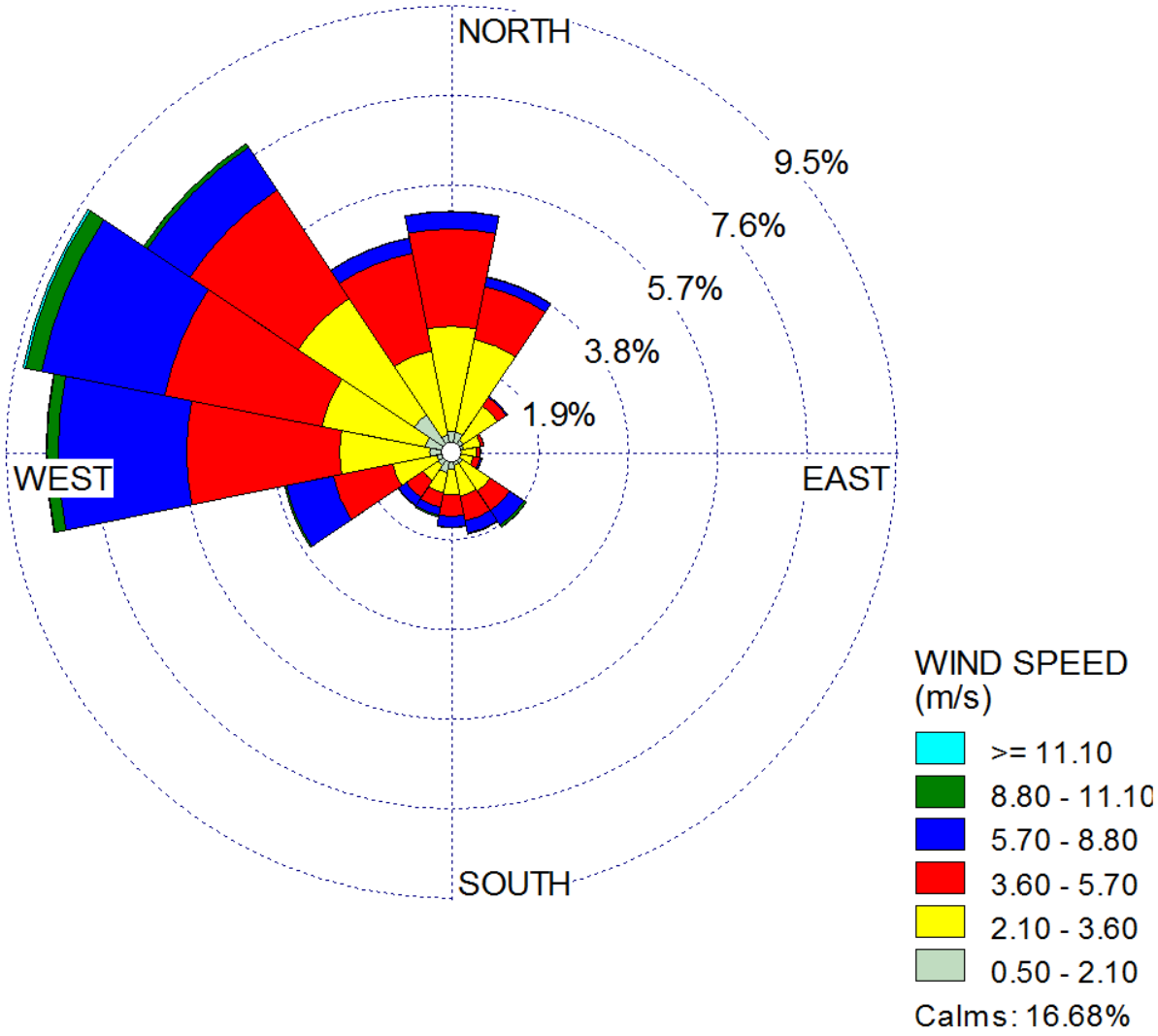
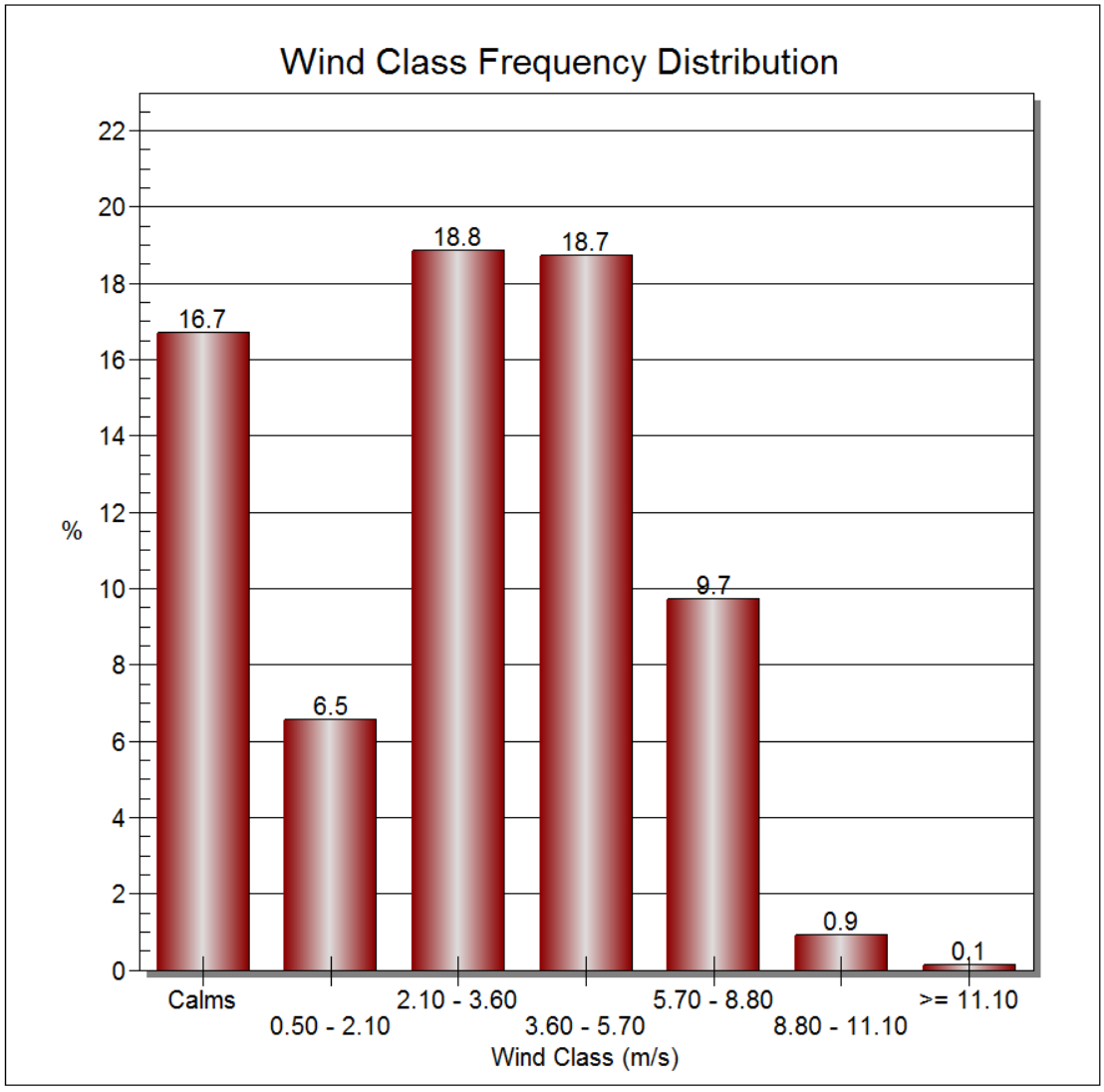


FIGURE B-3
WIND SPEED DISTRIBUTION FOR SAN FRANCISCO INTERNATIONAL AIRPORT



Typical construction activities would occur between 8:00 a.m. to 5:00 p.m. Monday through Friday. If Saturday work is required, construction activities would occur between 10:00 a.m. to 5:00 p.m.

EXPOSURE PARAMETERS

This HRA was conducted following methodologies in OEHHA's *Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments*.[16] This was accomplished by applying the estimated concentrations at the receptors analyzed to the established cancer risk estimates and acceptable reference concentrations for non-cancer health effects.

OEHHA's revisions to its *Guidance Manual* were primarily designed to ensure that the greater sensitivity of children to cancer and other health risks is reflected in HRAs. For example, OEHHA now recommends that risks be analyzed separately for multiple age groups, focusing especially on young children and teenagers, rather than the past practice of analyzing risks to the general population, without distinction by age. OEHHA also now recommends that statistical "age sensitivity factors" be incorporated into an HRA, and that children's relatively high breathing rates be accounted for. On the other hand, the *Guidance Manual* revisions also include some changes that would reduce calculated health risks. For example, under the former guidance, OEHHA recommended that residential cancer risks be assessed by assuming 70 years of exposure at a residential receptor; under the *Guidance Manual*, this assumption is lessened to 30 years.

OEHHA has developed exposure factors (e.g., daily breathing rates) for six age groups including the last trimester to birth, birth to 2 years, 2 to 9 years, 2 to 16 years, 16 to 30 years, and 16 to 70 years. These age bins allow for more refined exposure information to be used when estimating exposure and the potential for developing cancer over a lifetime. This means that exposure variates are needed for the third trimester, ages zero to less than two, ages two to less than nine, ages two to less than 16, ages 16 to less than 30, and ages 16 to 70. Residential receptors utilize the 95th percentile breathing rate values. The breathing rates are age-specific and are 1,090 liters per kilogram-day for ages less than 2 years, 745 liters per kilogram-day for ages 2 to 16 years, 335 liters per kilogram-day for ages 16 to 30 years, and 290 liters per kilogram-day for ages 30 to 70 years. A school child breathing rate is 520 liters per kilogram-day and an off-site worker breathing rate is 230 liters per kilogram-day.

OEHHA developed age sensitivity factors (ASF) to consider the increased sensitivity to carcinogens during early-in-life exposures. OEHHA recommends that cancer risks be weighted by a factor of 10 for exposures that occur from the third trimester of pregnancy to 2 years of age, and by a factor of 3 for exposures from 2 years through 15 years of age.

Based on OEHHA recommendations, the cancer risk to residential receptors assumes exposure occurs 24 hours per day for 350 days per year while accounting for a percentage of time at home. OEHHA evaluated information from activity pattern databases to estimate the fraction of time at home (FAH) during the day. This information was used to adjust exposure duration and cancer risk based on the assumption that a person is not present at home continuously for 24 hours and therefore exposure to emissions is not occurring when a person is away from their home. In general, the FAH factors are age-

[16] Office of Environmental Health Hazard Assessment, *Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments*, March 6, 2015, http://oehha.ca.gov/air/hot_spots/hotspots2015.html

specific and are 0.85 for ages less than 2 years, 0.72 for ages 2 to 16 years, and 0.73 for ages 30 to 70 years.

OEHHA has decreased the exposure duration currently being used for estimating cancer risk at the maximum exposed individual resident from 70 years to 30 years. This is based on studies showing that 30 years is a reasonable estimate of the 90^{th} to 95^{th} percentile of residency duration in the population. Additionally, OEHHA recommends using the 9 and 70-year exposure duration to represent the potential impacts over the range of residency periods.

Given the exposure durations of less than 24 hours, sensitive recreational receptors were evaluated for acute impacts only. Based on OEHHA recommendations, for children at school sites, exposure is assumed to occur 10 hours per day for 180 days (or 36 weeks) per year. Cancer risk estimates for children at school sites are calculated based on 9-year exposure duration. School sites also include teachers and other adult staff which are treated as off-site workers.

RISK CHARACTERIZATION

Cancer risk is defined as the lifetime probability of developing cancer from exposure to carcinogenic substances. Cancer risks are expressed as the chance in one million of getting cancer (i.e., number of cancer cases among one million people exposed). The cancer risks are assumed to occur exclusively through the inhalation pathway. The cancer risk can be estimated by using the cancer potency factor (milligrams per kilogram of body weight per day [mg/kg-day]), the 30-year annual average concentration (microgram per cubic meter [$\mu g/m^3$]), and the lifetime exposure adjustment.

Following guidelines established by OEHHA, the incremental cancer risks attributable to the proposed project were calculated by applying exposure parameters to modeled DPM concentrations in order to determine the inhalation dose (mg/kg-day) or the amount of pollutants inhaled per body weight mass per day. The cancer risks occur exclusively through the inhalation pathway; therefore, the cancer risks can be estimated from the following equation:

$$\text{Dose-inh} = \frac{C_{air} * \{DBR\} * A * ASF * FAH * EF * ED * 10^{-6}}{AT}$$

where:

Dose-inh	= Dose of the toxic substance through inhalation in mg/kg-day
10^{-6}	= Micrograms to milligrams conversion, Liters to cubic meters conversion
C_{air}	= Concentration in air in microgram (µg)/cubic meter (m^3)
{DBR}	= Daily breathing rate in liter (L)/kg body weight – day
A	= Inhalation absorption factor, 1.0
ASF	= Age Sensitivity Factor
EF	= Exposure frequency (days/year)
ED	= Exposure duration (years)
FAH	= Fraction of Time at Home

AT = Averaging time period over which exposure is averaged in days (25,550 days for a 70-year cancer risk)

To determine incremental cancer risk, the estimated inhalation dose attributed to the proposed project was multiplied by the cancer potency slope factor (cancer risk per mg/kg-day). The cancer potency slope factor is the upper bound on the increased cancer risk from a lifetime exposure to a pollutant. These slope factors are based on epidemiological studies and are different values for different pollutants. This allows the estimated inhalation dose to be equated to a cancer risk.

Non-cancer adverse health impacts, acute (short-term) and chronic (long-term), are measured against a hazard index (HI), which is defined as the ratio of the predicted incremental exposure concentration from the proposed project to a published reference exposure level (REL) that could cause adverse health effects as established by OEHHA. The ratio (referred to as the Hazard Quotient [HQ]) of each non-carcinogenic substance that affects a certain organ system is added to produce an overall HI for that organ system. The overall HI is calculated as the total for each organ system. If the overall HI for the highest-impacted organ system is greater than one, then the impact is significant.

The HI is an expression used for the potential for non-cancer health effects. The relationship for the non-cancer health effects is given by the annual concentration (in $\mu g/m^3$) and the REL (in $\mu g/m^3$). The acute hazard index was determined using the "simple" concurrent maximum approach, which tends to be conservative (i.e., overpredicts).

The relationship for the non-cancer health effects is given by the following equation:

$$HI = C/REL$$

Where:

HI = Hazard index; an expression of the potential for non-cancer health effects.

C = Annual average concentration ($\mu g/m^3$) during the 70-year exposure period.

REL = Concentration at which no adverse health effects are anticipated.

The chronic REL for DPM was established by the California OEHHA as 5 $\mu g/m^3$.[17] There is no acute REL for DPM.

[17] Office of Environmental Health Hazards Assessment - Acute, 8-hour, and Chronic Reference Exposure Levels, June 2014, http://www.oehha.ca.gov/air/allrels.html

Health Risk Assessment Assumptions

5	Chronic Reference Exposure Level (ug/m3) for DPM	
1.1	Cancer Potency Slope Factor (cancer risk per mg/kg-day) for DPM	
350	days per year	
25,550	days per lifetime	
1,090	95th Percentile Daily Breathing Rates (L/kg-day)	0<2 Years
861	95th Percentile Daily Breathing Rates (L/kg-day)	2<9 Years
745	95th Percentile Daily Breathing Rates (L/kg-day)	2<16 Years
335	95th Percentile Daily Breathing Rates (L/kg-day)	16<30 Years
290	95th Percentile Daily Breathing Rates (L/kg-day)	30<70 Years
0.85	fraction of ↑0<2 Years	
0.72	fraction of ↑2<16 Years	
0.73	fraction of ↑16<70 Years	

Project:	Monte Cresta Road Extension
Date:	March 22, 2022
Condition:	Unmitigated
Receptor:	Existing Residence

Exposure Year	Calender Year	Annual DPM Concentration (ug/m3)	Annual PM2.5 Concentration (ug/m3)	Daily Breathing Rates (L/kg-day)	Exposure Factor	fraction of time at home	Cancer Risk
1	2023	0.12	0.32	1,090	10.0	0.85	17.4
2	2024			1,090	10.0	0.85	
3	2025			745	4.75	0.72	
4	2026			745	3.00	0.72	
5	2027			745	3.00	0.72	
6	2028			745	3.00	0.72	
7	2029			745	3.00	0.72	
8	2030			745	3.00	0.72	
9	2031			745	3.00	0.72	
10	2032			745	3.00	0.72	
11	2033			745	3.00	0.72	
12	2034			745	3.00	0.72	
13	2035			745	3.00	0.72	
14	2036			745	3.00	0.72	
15	2037			745	3.00	0.72	
16	2038			745	3.00	0.72	
17	2039			335	1.70	0.73	
18	2040			335	1.00	0.73	
19	2041			335	1.00	0.73	
20	2042			335	1.00	0.73	
21	2043			335	1.00	0.73	
22	2044			335	1.00	0.73	
23	2045			335	1.00	0.73	
24	2046			335	1.00	0.73	
25	2047			335	1.00	0.73	
26	2048			335	1.00	0.73	
27	2049			335	1.00	0.73	
28	2050			335	1.00	0.73	
29	2051			335	1.00	0.73	
30	2052			335	1.00	0.73	

0.32	Maximum Annual PM2.5 Concentration (ug/m3)
0.3	Significance Threshold (ug/m3)
Yes	Significant?
0.02	Chronic Hazard Impact
1	Significance Threshold
No	Significant?
17.4	Cancer Risk (Child)
10	Significance Threshold
Yes	Significant?
0.78	Cancer Risk (Adult)
10	Significance Threshold
No	Significant?

Health Risk Assessment Assumptions

5	Chronic Reference Exposure Level (ug/m3) for DPM	
1.1	Cancer Potency Slope Factor (cancer risk per mg/kg-day) for DPM	
350	days per year	
25,550	days per lifetime	
1,090	95th Percentile Daily Breathing Rates (L/kg-day)	0<2 Years
861	95th Percentile Daily Breathing Rates (L/kg-day)	2<9 Years
745	95th Percentile Daily Breathing Rates (L/kg-day)	2<16 Years
335	95th Percentile Daily Breathing Rates (L/kg-day)	16<30 Years
290	95th Percentile Daily Breathing Rates (L/kg-day)	30<70 Years
0.85	fraction of	0<2 Years
0.72	fraction of	2<16 Years
0.73	fraction of	16<70 Years

Project:	Monte Cresta Road Extension
Date:	March 22, 2022
Condition:	Mitigated
Receptor:	Existing Residence

Exposure Year	Calender Year	Annual DPM Concentration (ug/m3)	Annual PM2.5 Concentration (ug/m3)	Daily Breathing Rates (L/kg-day)	Exposure Factor	fraction of time at home	Cancer Risk
1	2023	0.02	0.08	1,090	10.0	0.85	2.90
2	2024			1,090	10.0	0.85	
3	2025			745	4.75	0.72	
4	2026			745	3.00	0.72	
5	2027			745	3.00	0.72	
6	2028			745	3.00	0.72	
7	2029			745	3.00	0.72	
8	2030			745	3.00	0.72	
9	2031			745	3.00	0.72	
10	2032			745	3.00	0.72	
11	2033			745	3.00	0.72	
12	2034			745	3.00	0.72	
13	2035			745	3.00	0.72	
14	2036			745	3.00	0.72	
15	2037			745	3.00	0.72	
16	2038			745	3.00	0.72	
17	2039			335	1.70	0.73	
18	2040			335	1.00	0.73	
19	2041			335	1.00	0.73	
20	2042			335	1.00	0.73	
21	2043			335	1.00	0.73	
22	2044			335	1.00	0.73	
23	2045			335	1.00	0.73	
24	2046			335	1.00	0.73	
25	2047			335	1.00	0.73	
26	2048			335	1.00	0.73	
27	2049			335	1.00	0.73	
28	2050			335	1.00	0.73	
29	2051			335	1.00	0.73	
30	2052			335	1.00	0.73	

0.08	Maximum Annual PM2.5 Concentration (ug/m3)
0.3	Significance Threshold (ug/m3)
No	Significant?
0.00	Chronic Hazard Impact
1	Significance Threshold
No	Significant?
2.90	Cancer Risk (Child)
10	Significance Threshold
No	Significant?
0.13	Cancer Risk (Adult)
10	Significance Threshold
No	Significant?

Appendix B

Biological Resource Assessment

BIOLOGICAL RESOURCE ASSESSMENT FOR THE MONTE CRESTA DRIVE EXTENSION CITY OF BELMONT SAN MATEO COUNTY, CALIFORNIA



July 25, 2018

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I certify that the information presented herein is accurate

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The information provided in this document is intended solely for the use and benefit of Mr. Meng Huang

No other person or entity shall be entitled to rely on the services, opinions, recommendations, plans or specifications provided herein, without the express written consent of Wood Biological Consulting

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SUMMARY

This report presents the results of an assessment of existing or potentially occurring biological constraints to the construction of an extension of Monte Cresta Drive, located in the City of Belmont, San Mateo County. This Biological Resource Assessment (BRA) is intended to assist the lead agency (City of Belmont) in evaluating the potential biological impacts resulting from the proposed project. pursuant to the statutes and guidelines of the California Environmental Quality Act (CEQA). The proposed project calls for the construction of approximately 97 m (320 ft) of new road construction on an easement that is approximately 0.18 ha (0.46 ac).

Plant communities and wildlife habitats occurring within the BSA are characterized as ornamental, coast live oak woodland, coyote brush scrub, non-native annual grassland, and foothill needlegrass grassland. All of these except coyote brush scrub (located just west and downslope) occur within the project footprint. One special-status natural community, foothill needlegrass grassland, occurs in three small stands within the BSA, and would be impacted by project implementation. Impact avoidance, minimization or mitigation measures are outlined in Section 5.1.

A total of 88 special-status plant species have been recorded from the nine 7.5-minute USGS quadrangles including and surrounding the BSA (CNPS, 2018; CNDDB, 2018; USFWS, 2018). A total of 20 special-status plant species have been recorded from within a 4.8 km (3 mi) radius of the BSA; four of these (Franciscan onion, San Francisco collinsia, western leatherwood, and arcuate bush mallow) have been recorded from within 1.6 km (1 mi) of the BSA. A total of 81 of the special-status plant species are considered to have no potential for occurrence at the project site due to a lack of suitable habitat, lack of suitable soils, or geographic location of the BSA relative to known occurrences. No impact avoidance, minimization or mitigation measures are warranted for these 81 species, and no further surveys or analysis related to special-status plant species are necessary. Appropriately-timed surveys are warranted for the remaining seven species, which are described below.

A total of 85 special-status animal species have been recorded in the nine 7.5-minute USGS quadrangles including and surrounding the BSA (CNDDB, 2018; USFWS, 2018). A total of 18 special-status animal species have been recorded from within a 4.8 km (3 mi) radius of the BSA; of these, only five have been recorded from within a 1.6 km (1 mi) radius of the BSA. Based on the existing habitats on site and its geographic location, the occurrence of 79 of the target species can be ruled out entirely based on absence of suitable habitat, the site's location outside of the species known range, or absence of regional species occurrences. No federally or State-listed animal species are considered to have any potential to occur on site or to be adversely affected by project implementation. Based on the presence of suitable or marginally suitable habitat, a total of six target special-status animals are considered to have a potential to occur on site. These include Allen's hummingbird, CA thrasher, Nuttall's woodpecker, oak titmouse, spotted towhee, San Francisco dusky-footed woodrat.

1.0 INTRODUCTION

This report presents the results of an assessment of existing or potentially occurring biological constraints to the construction of an extension of Monte Cresta Drive on a parcel of land located in the City of Belmont, San Mateo County. This Biological Resource Assessment (BRA) is intended to assist the lead agency (City of Belmont) in evaluating the potential biological impacts resulting from the proposed project pursuant to the statutes and guidelines of the California Environmental Quality Act (CEQA). The report provides background and site-specific information pertaining to special-status plant and wildlife species and other regulated biological resources (e.g., wetlands, streams, natural communities, and protected trees) which may present constraints to the proposed activity. The report also evaluates three parcels that may be developed in the future as a result of the road extension, although this is not considered part of the proposed project.

1.1 Project Background and Description

The subject property is located at the southern terminus of Monte Cresta Drive, south of the intersection with Sequoia Way (Figures 1 and 2). The road easement is 15 m (50 ft) wide and extends approximately 97 m (320 ft) south from the end of the paved portion of the road. The road easement follows an existing narrow unpaved dirt road. The conceptual plans for the road extension are shown in Figure 3.

No analyses of biological resources covering this part of Monte Cresta Drive are known to have been conducted previously.

2.0 METHODS AND LIMITATIONS

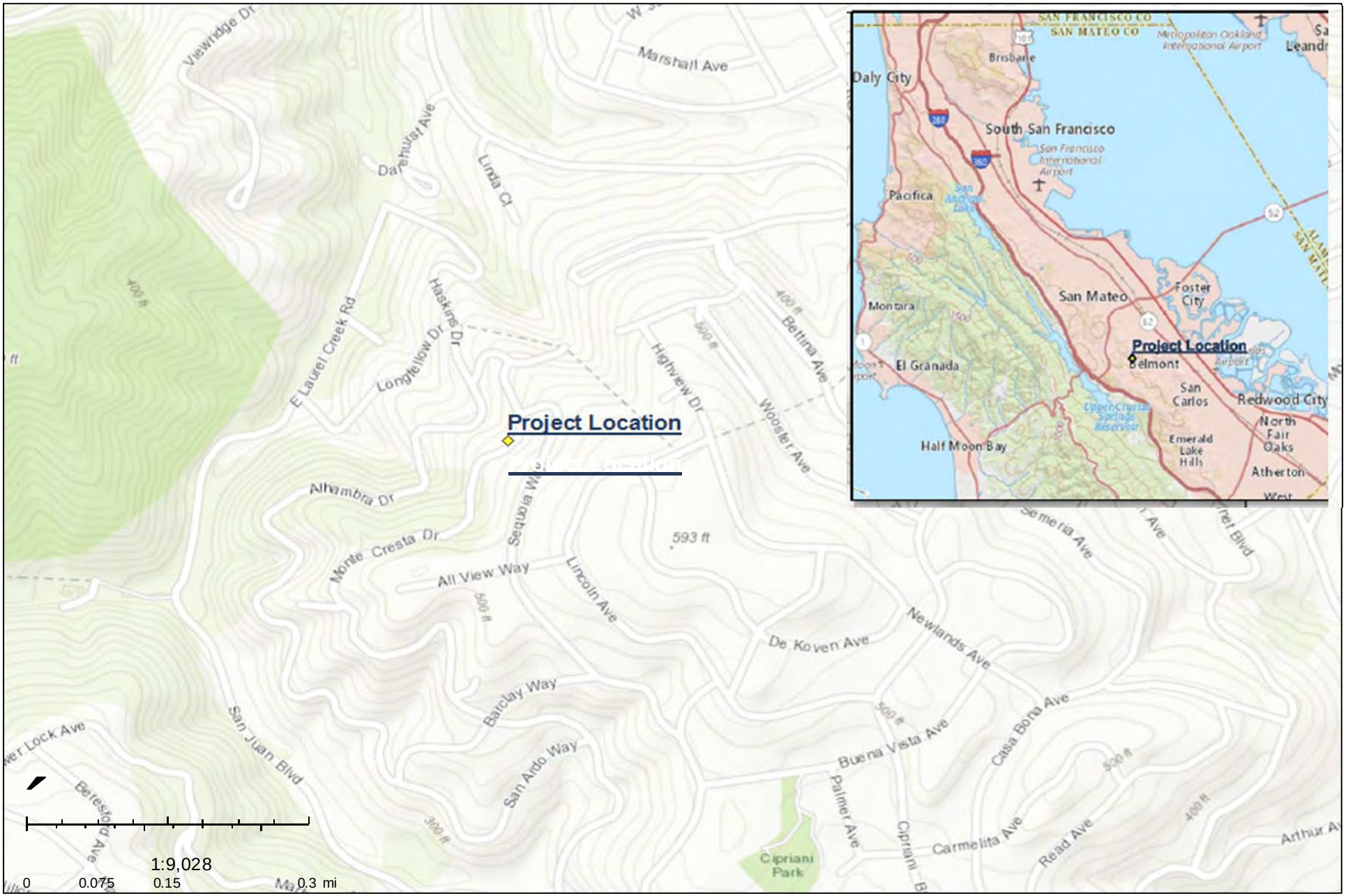
2.1 Definitions

The following terms are used to evaluate habitat suitability and on-site biological resources.

Biological Study Area The biological study area (BSA) encompasses the road easement, three additional parcels, and adjacent lands within a radius of approximately 92 m (300 ft; see Figure 4).

Project Footprint The project footprint consists of the boundary of the proposed road easement (see Figure 3).

Figure 1. Project Location



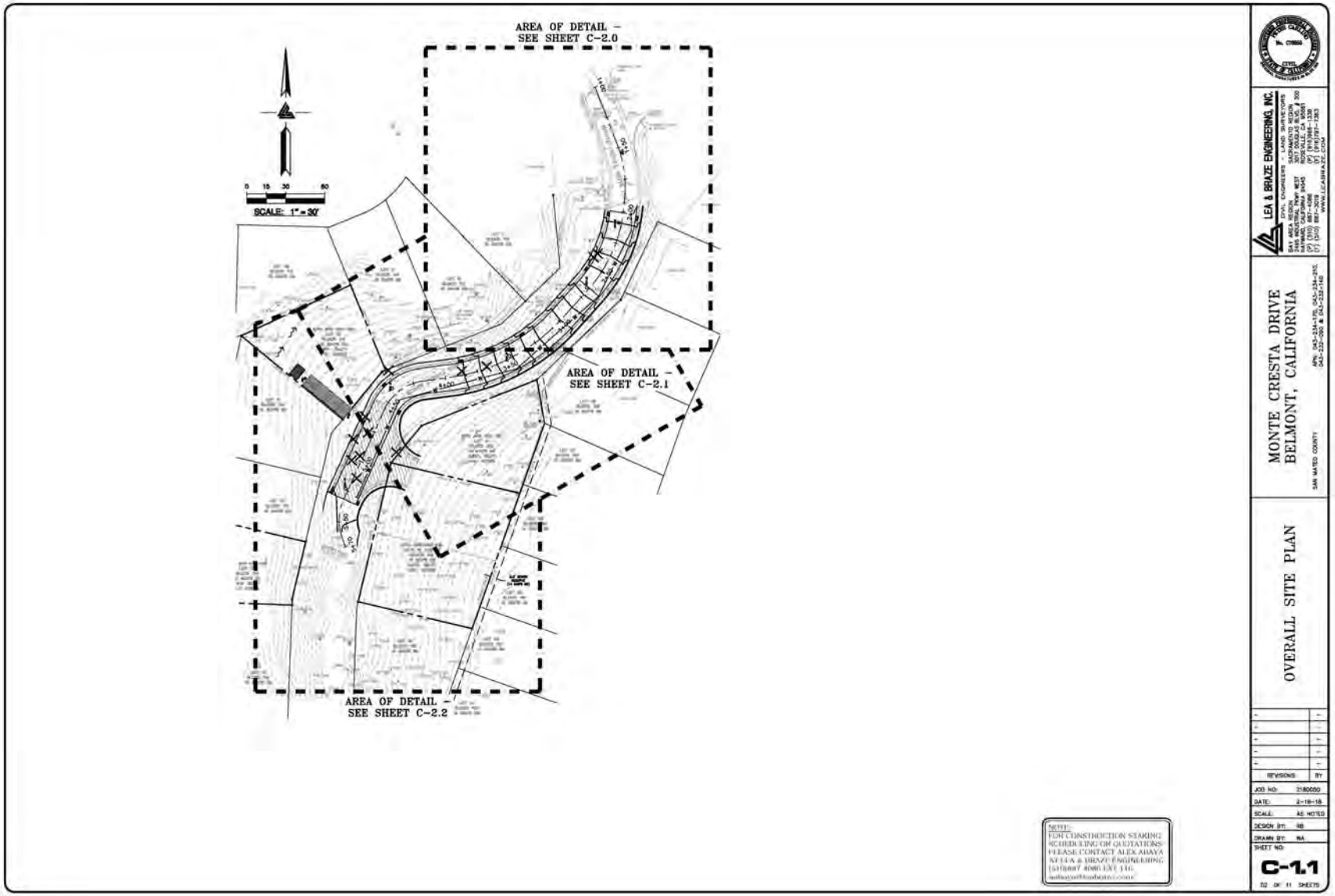
Source: NAIP 2018

Figure 2. Aerial View of the Project Vicinity



Source: Google Earth, 2018

Figure 3. Site Plan



Source: Lea and Braze Engineering, Inc., 2018

2.2 Data Sources

Lists of potentially occurring special-status plant and animal species[1] were compiled based on a review of databases maintained by the California Natural Diversity Database (CNDDB, 2018), the U.S. Fish and Wildlife Service (USFWS, 2018), and the California Native Plant Society (CNPS, 2018). Botanical nomenclature conforms to the Jepson Online Interchange (Jepson Herbarium, no date). Common names of plant species are derived from Calflora (2018). Plant habitat affinities and local distribution information are consistent with Baldwin et al. (2012), Corelli (2011), Corelli and Chandik (1995), Thomas (1961). Nomenclature for special-status plant species conforms to the California Department of Fish and Wildlife (CDFW 2018a, b).

Nomenclature for common wildlife species conforms to the (CDFW, 2016), with taxonomic nomenclature updates conforming to the American Ornithologist's Union and supplements (AOU, 2016) for birds, Jennings (2004) for amphibians and reptiles, and the American Society of Mammologists (ASM, 2016) for mammals. Nomenclature for freshwater and terrestrial invertebrates conforms to the CDFW (2018c). Local information on breeding bird species is based on Metropulos (2006). Nomenclature for special-status animal species conforms to the CDFW (2018c, d).

The classification of vegetation types described herein conforms to Sawyer et al. (2009) and, where applicable, Holland (1986) and Cowardin et al. (1979). Special-status plant community designations conform to the CDFW (CNDDB, 2018 and CDFG, 2010). Current and historic creek conditions were obtained from the *Creek and Watershed Map of San Mateo and Vicinity* (Oakland Museum, 2007). Information regarding soils was obtained from the web-based database Web Soil Survey[2], operated by the Natural Resources Conservation Service (NRCS).

2.3 Special-Status Biological Resources

A literature review was conducted to investigate the potential presence of special-status biological resources within the BSA. Occurrence summaries were obtained from the following sources:

1. Database queries for the San Mateo, Woodside, Half Moon Bay, San Leandro, Redwood Point, Palo Alto, Hunters Point, San Francisco South, and Montara Mountain 7.5-minute USGS quadrangles from the available databases (CNDDB, 2018; CNPS, 2018; USFWS, 2018).
2. An assessment of habitat types and surrounding land uses completed by reviewing recent aerial photographs.

[1] For purposes of this discussion, the term "species" implies all recognized taxa at the level of species, subspecies or variety.

[2] Available at http://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm

3. A reconnaissance-level survey by a qualified biologist.

The presence or potential for occurrence of special-status biological resources within the BSA is based on direct observation or an evaluation of the suitability of existing habitats occurring within the BSA. Suitability is based on familiarity with the specific habitat requirements (i.e., elevation, geology, soil chemistry and type, vegetation communities, microhabitats), geographic distribution, local occurrence records, and the degree of habitat disturbance or alteration. The criteria for assessing the potential for occurrence of special-status species are summarized below.

None	Applied to plant and animal species for which suitable habitat is lacking, which are not known to occur locally, or which are thought to be locally extirpated.
Absent	Applied to plant and animal species for which suitable habitat is present but which would have been detectable at the time surveys were conducted.
Not Expected	Applied to plant and animal species for which suitable habitat or key habitat elements may be present but which are considered to be of poor quality or are spatially isolated from either known occurrences or areas of suitable habitat. When the existing habitats within the BSA do not coincide with a species' life history or ecological requirements, its occurrence is not expected.
Possible	Applied to plant and animal species for which suitable habitat or key habitat elements are present within the BSA. The occurrence of these species is either considered likely, or, at the least, its presence cannot be ruled out.
Present	Applied to plant and animal species that were either observed directly or, in the case of animal species, whose presence can be presumed based on detection of diagnostic sign (i.e. tracks, scat, burrows, carcasses, castings, prey remains, etc.).

The conclusions presented in this document are based on a reconnaissance-level survey performed by biologist Chris Rogerson June 29, 2018. All plant and wildlife observations were recorded, and habitats characterized and mapped.

2.4 Limitations That May Influence Results

Based on the timing of surveys performed as part of this assessment, the presence or absence of some of the target special-status plant or animal species cannot be established. Not all plant species, for example, occurring within the BSA may have been detectable due to flowering phenology and life forms (e.g., bulbs, biennials, and annuals). In addition, some

annual plant species present in the seed bank may not germinate in some years due to drought, temperature, or fire regime. Negative findings during site assessments or focused surveys do not necessarily indicate absence unless field surveys conform to agency approved protocols.

A multi-season floristic survey was not performed as part of this assessment and not all target special-status plant species would have been identifiable at the time the single survey was performed. However, the survey was performed by a qualified botanist and an assessment of the potential for occurrence of all target plant species was completed.

3.0 SETTING

The BSA is situated near the top of a northwest-facing slope overlooking San Juan Canyon. Lands to the north and east of the study area support single family residences. Undeveloped lands are situated to the south of the project footprint, with additional homes located beyond.

The study area is contiguous with undeveloped slopes of San Juan Canyon and the San Juan Hills. San Juan Canyon is contiguous with the City of San Mateo's Sugar Loaf Mountain Open Space Preserve and Laurelwood Park. Combined, the park, preserve and canyon occupy well over 122 ha (300 ac) of mostly native, mixed oak woodland, riparian, chaparral, and grassland habitats. San Juan Canyon drains into Laurel Creek, which drains into San Francisco Bay. The project site has a northwesterly aspect, with elevations ranging from 119-142 m (390-465 ft) above mean sea level (msl).

The BSA is mapped as supporting soils classified as Los Gatos loam, 30-75 percent slopes, and Orthents, cut and fill – Urban land complex, 5-75 percent slopes (USDA, 2018). Neither of these soil units is considered a hydric soil type (USDA, 2017).

The limits of the BSA are illustrated in Figure 4. Photographs of the BSA and project footprint are presented in Appendix A.

Figure 4. Plant Communities within the Biological Study Area



Source: Google Earth 2018

Foothill Needlegrass Grassland

Non-Native Annual Grassland

Oak Woodland

Ornamental

3.1 Plant Communities and Wildlife Habitats

Plant communities and wildlife habitats occurring within the BSA are characterized as ornamental, coast live oak woodland, coyote brush scrub, non-native annual grassland, and foothill needlegrass grassland. All of these except coyote brush scrub (located just west and downslope) occur within the project footprint. Each is described below. The location and extent of each of these habitats are illustrated in Figure 4. Table 1 summarizes the area extent of each community within the project footprint.

Table 1. Area of Plant Communities

Plant Community	Area – hectares (acres)
Coast live oak woodland	0.24 (0.59)
Foothill Needlegrass Grassland	0.02 (0.04)
Non-Native Annual Grassland	0.12 (0.30)
Ornamental	0.01 (0.03)
Total	**0.39 (0.97)**

Coast Live Oak Woodland

Coast live oak woodland is typically found on north-facing slopes and shaded ravines in the southern and inland portions of the State and on more exposed, mesic sites in the north. This community is dominated by coast live oak, a drought-resistant evergreen tree growing to 25 m (82 ft) tall. It produces both deep taproots and extensive surface roots. The species frequently occurs in pure, dense stands with a closed canopy. Coast live oak woodland is restricted primarily to the coast side of the State and is distributed from Sonoma County to Baja California. It occurs throughout the outer South Coast ranges and coastal slopes of the Transverse and Peninsular ranges, from sea level to about 1200 m (4000 ft) in elevation. Coast live oak woodlands can be found on alluvial terraces, canyon bottoms, stream banks, slopes, and flats, growing on deep, sandy or loamy soils with high organic matter content (Sawyer, et al., 2009).

Membership in this alliance requires that coast live oak trees comprise over 50 percent relative cover in the tree canopy, or, if CA bay is present, less than 33 percent relative cover in the tree canopy. The California Fish and Game Code (CFGC) defines oak woodland as "an oak stand with a greater than ten percent canopy cover or that may have historically supported greater than ten percent canopy cover".[3] Stands with a mixed tree layer may include as co-dominant species arroyo willow, big-leaf maple, black oak, black walnut, blue oak, CA bay, CA buckeye, CA sycamore, Coulter pine, Engelmann oak, madrone, and valley oak (Sawyer, et al., 2009). Coast live oak woodland has been assigned a rarity ranking of G5/S4, which is considered secure statewide and is does not have a high priority for inventory in the CNDDB (CDFG, 2010).

[3] CFGC § 1361(h)

Within the BSA, coast live oak woodland consists of a dense stand in the eastern portion, which decreases in density toward the west. This stand is dominated by mature coast live oak trees ranging from 10-65 cm (4-25 inches) dbh. The understory is sparse where weed control activities along the road have been implemented, to dense grass, thistles and shrubs (i.e., poison oak, and coyote brush) on steeper slopes.

Within the BSA, coast live oak woodland conforms to the *Quercus agrifolia* Woodland Alliance as described by Sawyer, et al. (2009; CA vegetation code 71.060.02 and Holland code 71160). This plant association is classified as an upland habitat following Cowardin, et al. (1979). Unless protected under local policies or ordinances or found to support special-status plant or animal species, impacts to coast live oak woodland in upland or non-riparian settings would not typically be regarded as significant under the statues and guidelines of CEQA (see discussion in Section 4.1).

In general, oak woodlands are considered essential for the conservation of many bird and mammal species (USDA, 1999; Block et al., 1990). Over 300 vertebrate species are known to use oak trees. Important components of oak habitats to wildlife include acorns, snags, trunk cavities, and downed wood/litter. As a seasonal food, acorns play an important role in the survival of many animal species (Tietje, 1990). Mature oak trees frequently bear snag limbs and trunk cavities, which are provide opportunities for nesting, roosting, foraging, caching and wintering by a wide variety of birds and bats. Acorns constitute a significant portion of the diet of numerous birds and mammals. Numerous species of raptors (birds-of-prey) are associated with coast live oak woodland.

Coast live oak woodland provides foraging, nesting, cover, and movement habitat for a variety of other animal species. California newt and CA slender salamander can be found underneath surface litter, such as downed wood, leaf litter and bark. Pacific treefrog and western toad also might occur in oak woodland if suitable spawning pools are nearby. Reptiles often found in oak woodland include alligator lizard, common kingsnake, gopher snake, terrestrial garter snake, western fence lizard, and western skink.

Avian insect eaters, such as bushtit, chestnut-backed chickadee, dark-eyed junco, and oak titmouse feed off of the foliage of oaks. Bark gleaner species, such as brown creeper, Nuttall's woodpecker, and white-breasted nuthatch. Other species such as acorn woodpecker, CA scrub-jay, and Steller's jay feed on insects as well as acorns. California quail and CA towhee are ground foliage gleaners. Great horned owl, red-shouldered hawk, red-tailed hawk may forage on small mammals in adjacent grasslands from the protection of the canopy of oak woodlands while Cooper's hawk and sharp-shinned hawk may hunt small birds among the tree canopy.

Mammals associated with coast live oak woodland include the native western gray squirrel and the ubiquitous non-native eastern fox squirrel, which forage and nest in the canopy. The

long-tailed weasel hunts for shrews and CA vole on the ground. Bobcat, dusky-footed woodrat, gray fox, mountain lion, mule deer, raccoon, and Virginia opossum are also likely to utilize the understory of this community (e.g., poison oak, blackberry bushes) for shelter, hunting and for browse. Mature oaks and snags are important habitat features because they provide nesting and roosting areas for a variety of special-status species of bats that occur in this region, including long-eared myotis, long-legged myotis, pallid bat, and Yuma myotis (Whitaker, 1997).

Animal species or their sign detected in this habitat during the present wildlife reconnaissance survey include American crow, Anna's hummingbird, black-capped chickadee, CA towhee, mule deer, oak titmouse, red tailed hawk, San Francisco dusky footed woodrat, song sparrow, and western scrub-jay.

Foothill Needlegrass Grassland

The native perennial bunchgrass, foothill needlegrass, forms three relatively discrete stands within the BSA on the margins of the road easement and on one of the adjacent parcels (Lot 10, downslope from the road easement; see Figure 4). These stands have and estimated cover of foothill needlegrass of between 15-25% over a total area of 158 m^2 (1,696 sf; 0.04 acre).

Foothill needlegrass grassland grades into non-native grassland and coyote brush scrub, where foothill needlegrass occurs as an occasional member of those communities. Other late-flowering native plant species also occur in this grassland community, including pearly everlasting and small tarweed. Foothill needlegrass grassland typically occurs in areas with fine-textured soil with high clay content and moisture retention that allows for the perennial grass to persist through the dry summer.

Foothill needlegrass grassland is described by Sawyer, et al. (2009); it would be classified as upland following Cowardin, et al. (1979). As a provisional alliance, it has a global and State rarity ranking of G3?/S3?, which indicates that the community is threatened throughout its range, with 21-100 documented viable occurrences and/or 2,590-12,950 ha, but that here is some uncertainty and a need for additional data. Additionally, it is listed by CDFW as a sensitive plant community (CDFW 2018b). As such, impacts to this plant community may be considered significant pursuant to the statutes and guidelines of CEQA (see discussion in Section 4.1).

Foothill needlegrass grassland is structurally similar to non-native annual grassland described above, and can be expected to support a similar complement of wildlife species.

Non-native Annual Grassland

Non-native grasslands are generally found in open areas in valleys and foothills throughout coastal and interior California (Holland, 1986). They typically occur on soils consisting of

fine-textured loams or clays that are somewhat poorly drained. This vegetation type is dominated by non-native annual grasses and weedy annual and perennial forbs, primarily of Mediterranean origin, that have replaced native perennial grasslands, scrub and woodland habitats as a result of human disturbance. Scattered native wildflowers and grasses, representing remnants of the original vegetation may also be common in spring.

Within the BSA, non-native annual grassland occurs primarily on the road easement, on the upper slopes above the road easement, with smaller patches below the road. It is dominated by such characteristic non-native species as false-brome, perennial ryegrass, rattail fescue, ripgut brome, and wild oats; co-dominant non-native annual forbs include Italian thistle, milk thistle, and veldt grass, among others.

In the BSA, areas of non-native annual grassland most closely conform to Annual Brome Grasslands (*Bromus* [*diandrus, hordeaceus*]-*Brachypodium distachyon* Semi-Natural Herbaceous Stands), as described in Sawyer, et al. (2009). It has been described as Non-native Grassland by Holland (1986; Holland code 42200) and the CDFW (CA vegetation code 42.026.00). Non-native annual grasslands would be classified as an upland following Cowardin, et al. (1979). As a common, widespread and non-natural plant association, on-native annual grassland has no global or State rarity ranking (Sawyer, et al., 2009; CDFG, 2010). Unless found to harbor special-status species, impacts to non-native annual grassland would not typically meet the significance criteria pursuant to the statutes and guidelines of CEQA (see discussion in Section 4.1).

Grasslands may support a variety of reptiles and amphibians including alligator lizard, common kingsnake, gopher snake, northern Pacific rattlesnake, ring-necked snake, western fence lizard, and western skink, among others. This habitat also attracts avian seed-eating and insect-eating species of birds and mammals. California quail, mourning dove, and western meadowlark are a few seed-eaters that nest and forage in grasslands. Insect-eaters such as barn swallow, CA scrub-jay, and western bluebird commonly forage in grasslands. In the project region, burrowing owl may nest and forage in grasslands where the vegetation is kept low by grazing or regular mowing.

Grasslands are important foraging grounds for aerial and ground foraging insect-eating bat species in the genus *Myotis*. A large number of other mammal species such as black-tailed jackrabbit, Botta's pocket gopher, brush rabbit, CA ground squirrel, CA vole, and deer mouse also reside or forage within grasslands. Small rodents attract raptors (birds of prey) such as barn owls and great horned owls that hunt at night, as well as day-hunting raptors such as golden eagle and red-tailed hawk. Mule deer use grassland for grazing and, if the grass is tall enough, for bedding down at night. American badger, coyote, gray fox, and red fox will dig dens in grasslands for the rearing of young and daytime refuge, and, along with bobcats, will hunt in grasslands.

Animal species or their sign detected in this habitat during the present survey include mule deer, western fence lizard and song sparrow.

Ornamental

Ornamental plant communities are those dominated by plant species established and cultivated by humans. Some are entirely artificial and maintained, such as landscaped gardens, parks and other public areas. Others include areas where cultivated plants have been left untended or have escaped cultivation and become naturalized in the environment. On such sites, the native vegetation has typically been removed by clearing in preparation for cultivation, landscaping, or development. Cleared areas that are planted with or colonized by non-indigenous plant species can create distinct communities dominated by annual grasses and forbs, shrubs, or trees. Some of these communities are only perpetuated with direct human intervention such as irrigation or grazing, while have naturalized and are able to persist without artificial means. In some situations, introduced non-indigenous species invade native habitats, altering the composition of the native understory or canopy, or both.

Ornamental habitats within the BSA consist of maintained ornamental landscaping associated with residential properties adjacent to the project footprintWithin the boundaries of the project footprint, a hedge of planted oleander shrubs is present along the eastern property line near the end of the paved portion of Monte Cresta Drive.

Ornamental landscaping as a plant community is not classified by Sawyer et al. (2009); it would be classified as an upland following Cowardin et al. (1979). Unless found to support special-status plant or animal species, or as otherwise regulated under local tree or zoning ordinances, impacts to ornamental vegetation would not be regarded as significant pursuant to the statutes and guidelines of CEQA (see discussion in Section 4.1).

Many native and non-native animal species are well adapted to anthropogenic habitats, while others have benefited greatly from urbanization and anthropogenic effects. These species are attracted by certain resources readily available in anthropogenic settings such as forage, water and shelter while being tolerant of human disturbances such as noise, lighting, and the movement of people and machinery. Many mammals are attracted to human development providing a source of food (e.g., rubbish, garden plants, pet food, and pets themselves).

Mature ornamental shrubs, such as large oleanders, may support a variety of birds by providing roosting, nesting, and foraging opportunities. Common birds that can nest and roost in such trees include passerines (i.e, perching birds) such as black phoebe, bushtit, CA scrub-jay CA towhee, chestnut-backed chickadee, house finch, house sparrow, mourning dove, northern mockingbird, oak titmouse, and red-shouldered hawk, among many others. Common mammals likely to occur in this habitat within the BSA include eastern fox squirrel, mule deer, raccoon, striped skunk, and Virginia opossum, among others.

3.2 Animal Movement Corridors

Under CEQA, impacts to animal movement corridors are considered significant if a project would interfere substantially with the movement of native resident or migratory fish or animal species or with established native resident or migratory animal corridors, or impede the use of native animal nursery sites. Animal movement corridors are defined as linear habitats that naturally connect and provide passage between two or more large habitats or habitat fragments; they are important for the persistence of animal species overtime. For populations to be viable, animal species must have access to adequate resources. Corridors are used to find suitable forage, nesting and resting sites, mates and for the establishment of new home ranges by dispersing juveniles. In addition, corridors for dispersal within breeding populations will decrease the likelihood that extirpations will occur in subpopulations. Even where patches of pristine habitat are fragmented, as commonly occurs with riparian vegetation, the movement of animals between populations is facilitated through habitat linkages, migration corridors and movement corridors.

Animal movements includes migration (i.e., usually one direction per season), inter-population movement (i.e., long-term genetic exchange) and small travel pathways (i.e., daily movement within an animal's home range). Daily movement patterns define an animal's home range where activities such as foraging, resting and conspecific (individuals of the same species) interactions occur. Generally, longer movements, usually by dispersing individuals connect breeding populations, permit gene flow between subpopulations. Corridors generally provide adequate habitat for animals to disperse until reaching an area large enough to establish home ranges. Corridors are different depending on the type of organism; a corridor for a butterfly or bird may be a series of "stepping stones" of suitable habitat, while a terrestrial vertebrate may require a continuous band of suitable habitat for successful movement. Habitat loss, fragmentation, and degradation resulting from a change in land use or habitat conversion can alter the use and viability of corridors.

The BSA encompasses residential neighborhoods at the interface of undeveloped lands of San Juan Canyon and the adjacent Sugar Loaf Open Space Preserve and Laurelwood Park. These lands are connected to the much large open space surrounding Crystal Springs Reservoir and the State Fish and Game Refuge. Despite the presence of Interstate 280, San Juan Canyon is basically contiguous with the extensive open space of the San Mateo Peninsula. For this reason, it is expected that San Juan Canyon supports a high level of wildlife abundance and diversity. However, the subject parcels are at the periphery of developed lands and, as such, is not in the pathway of wildlife movements between connected open space lands. Development of the parcel would have no significant adverse effects on the movements of terrestrial wildlife.

4.0 SPECIAL-STATUS BIOLOGICAL RESOURCES

Certain natural plant communities, wildlife habitats and landscape features are considered to have special-status due to their restricted occurrence in the State, their tendency to support special-status plant or animal species, or because impacts are restricted or otherwise regulated under federal, State, or local laws or ordinances. These are discussed below.

4.1 Sensitive Natural Communities and Landscape Features

Sensitive Natural Communities

Sensitive natural communities are those that are considered rare in the region, support special-status plant or animal species, or receive regulatory protection under the Clean Water Act (CWA), Lake and Streambed Alteration Program (LSAP), and/or the Porter-Cologne Water Quality Control Act (PCWQCA). A number of communities have been designated as rare and these communities are given the highest inventory priority (CNDDB, 2018; CDFG, 2010). Vegetation alliances given a rarity ranking of G1/S1, G2/S2 or G3/S3 are considered to be of high inventory priority by the CNDDB; impacts would be considered significant pursuant to CEQA. Alliances ranked as G4/S4 or G5/S5 are generally considered common enough to not be of concern; impacts would not normally be considered as significant pursuant to CEQA (rarity rankings are explained in Appendix D).

Wetland and riparian habitats are considered by federal and State regulatory agencies to represent a sensitive and declining resource. Wetland and riparian habitats can serve significant biological functions by providing nesting, breeding, foraging, and spawning habitat for a wide variety of resident and migratory animal species. No wetland or riparian habitats are present on the subject parcel or in the BSA.

Sensitive natural communities recorded from the project region include Serpentine Bunchgrass Grassland and Valley Needlegrass Grassland (CNDDB, 2018). These special-status natural communities are not present within the BSA and would not be impacted as a result of project implementation. No impact avoidance, minimization or mitigation measures are warranted for Serpentine Bunchgrass Grassland and Valley Needlegrass Grassland. However, Foothill Needlegrass Grassland, described in Section 3.1, also is a sensitive natural community for which there are no records in the vicinity of the project, but does occur on the site ins several small discrete patches. The total area of Foothill Needlegrass Grassland within the BSA is 158 m^2 (1,696 sf; 0.04 acre), which is relatively small relative to some opinions[4] that patches of one acre or more warrant conservation. At the same time, the dearth of documented occurrences in the San Juan Hills, and the Peninsula in general, may as easily be an artifact of under-reporting of an uncommon plant community. Previous environmental documents for the area have noted the presence of foothill needlegrass as locally abundant (Wood Biological Consulting, 2012). Impacts on

[4] Informal conversations with CDFW staff, various dates.

sensitive natural communities may be regarded as significant pursuant to CEQA and should be addressed in environmental review documents.

Special-Status Landscape Features

In addition to wetlands and riparian habitats, discussed above, non-vegetated channels, drainages, swales, ponds and lakes, and other bodies of water also receive regulatory protection under federal, State or local laws or policies.

The U.S. Army Corps of Engineers (USACE) and U.S. Environmental Protection Agency (USEPA) assert jurisdiction over "non-navigable tributaries of traditional navigable waters (TNW) that are relatively permanent where the tributaries typically flow year-round or have continuous flow at least seasonally (e.g., typically three months)" and "wetlands that abut such tributaries" (USEPA/USACE, 2008). Such areas are referred to collectively as "Waters of the U.S."[5] The extent of USACE jurisdiction corresponds to the Ordinary High Water Mark (OHWM).[6] As such, the placement of fill below the OHWM would be regulated pursuant to the CWA[7] and would fall under the jurisdiction of the USACE and the San Francisco Regional Water Quality Control Board (RWQCB).

The CDFW also asserts jurisdiction over water courses and water bodies. Pursuant to the LSAP[8], entities must notify the CDFW prior to commencing any of the following activities:

- Substantially divert or obstruct the natural flow of any river, stream or lake[9];
- Substantially change or use any material from the bed, channel or bank of any river, stream, or lake; or

[5] As defined in 40 CFR 230.3(s), Waters of the U.S. include:
- All waters that are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters that are subject to the ebb and flow of tide;
- All interstate waters, including interstate wetlands;
- All other waters, such as interstate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, vernal pools, wet meadows, playa lakes, or natural ponds, the use, degradation, or destruction of which could affect interstate or foreign commerce;
- Tributaries of the above;
- Territorial seas; and
- Wetlands adjacent to waters defined above.

Although isolated wetlands no longer fall under USACE jurisdiction, impacts to isolated wetlands continue to be regulated under State law (see below).

[6] The OHWM is the line on the shores established by the fluctuations of water and indicated by physical characteristics such as: a clear natural line impressed on the bank; shelving; changes in the character of the soil; destruction of terrestrial vegetation; the presence of litter and debris; or other appropriate means that consider the characteristics of the surrounding areas (USACE, 2006).

[7] CWA § 404 and CWA § 401

[8] CFGC §§ 1600, *et seq*.

[9] These include those that are episodic (they are dry for periods of time) as well as those that are perennial (they flow year round). This includes ephemeral streams, desert washes, and watercourses with a subsurface flow. It may also apply to work undertaken within the flood plain of a body of water.

- Deposit debris, waste or other materials that could pass into any river, stream or lake.

The extent of CDFW jurisdiction extends to the top of bank or beyond if an overhanging riparian canopy is present.

No special-status landscape features are present within the BSA and none would be impacted as a result of project implementation. No impact avoidance, minimization or mitigation measures are warranted.

4.2 Special-Status Plant Species

Special-status plant species include all plant species that meet one or more of the following criteria:[10]

- Listed or proposed for listing as Threatened or Endangered under the federal Endangered Species Act (FESA) or candidates for possible future listing as Threatened or Endangered under the FESA.[11]
- Listed[12] or candidates for listing by the State of California as Threatened or Endangered under the California Endangered Species Act (CESA).[13] A species, subspecies, or variety of plant is **endangered** when the prospects of its survival and reproduction in the wild are in immediate jeopardy from one or more causes, including loss of habitat, change in habitat, over-exploitation, predation, competition, disease, or other factors.[14] A plant is **threatened** when it is likely to become endangered in the foreseeable future in the absence of special protection and management measures.[15]
- Listed as Rare under the California Native Plant Protection Act (CNPPA).[16] A plant is **Rare** when, although not presently threatened with extinction, the species, subspecies, or variety is found in such small numbers throughout its range that it may be endangered if its environment worsens.[17]
- Meet the definition of Rare or Endangered under CEQA.[18] Species that may meet the definition of Rare or Endangered include the following:
    - Species considered by the CNPS to be "rare, threatened or endangered in California" (Lists 1A, 1B and 2);

[10] This definition is provided in CDFG (2009).
[11] 50 CFR §17.12
[12] Refer to current online published lists available at: http://www.dfg.ca.gov/biogeodata.
[13] CFGC § 2050 *et seq*.
[14] CFGC § 2062
[15] CFGC § 2067
[16] CFGC § 1900, *et seq*.
[17] CFGC § 1901
[18] CEQA § 15380[b] and [d]

- Species that may warrant consideration on the basis of local significance or recent biological information;
- Some species included on the California Natural Diversity Database's (CNDDB) *Special Plants, Bryophytes, and Lichens List*.

- **Locally significant species,** that is, a species that is not rare from a statewide perspective but is rare or uncommon in a local context such as within a county or region[19] or is so designated in local or regional plans, policies, or ordinances (CEQA Guidelines[20]). Examples include a species at the outer limits of its known range or a species occurring on an uncommon soil type.

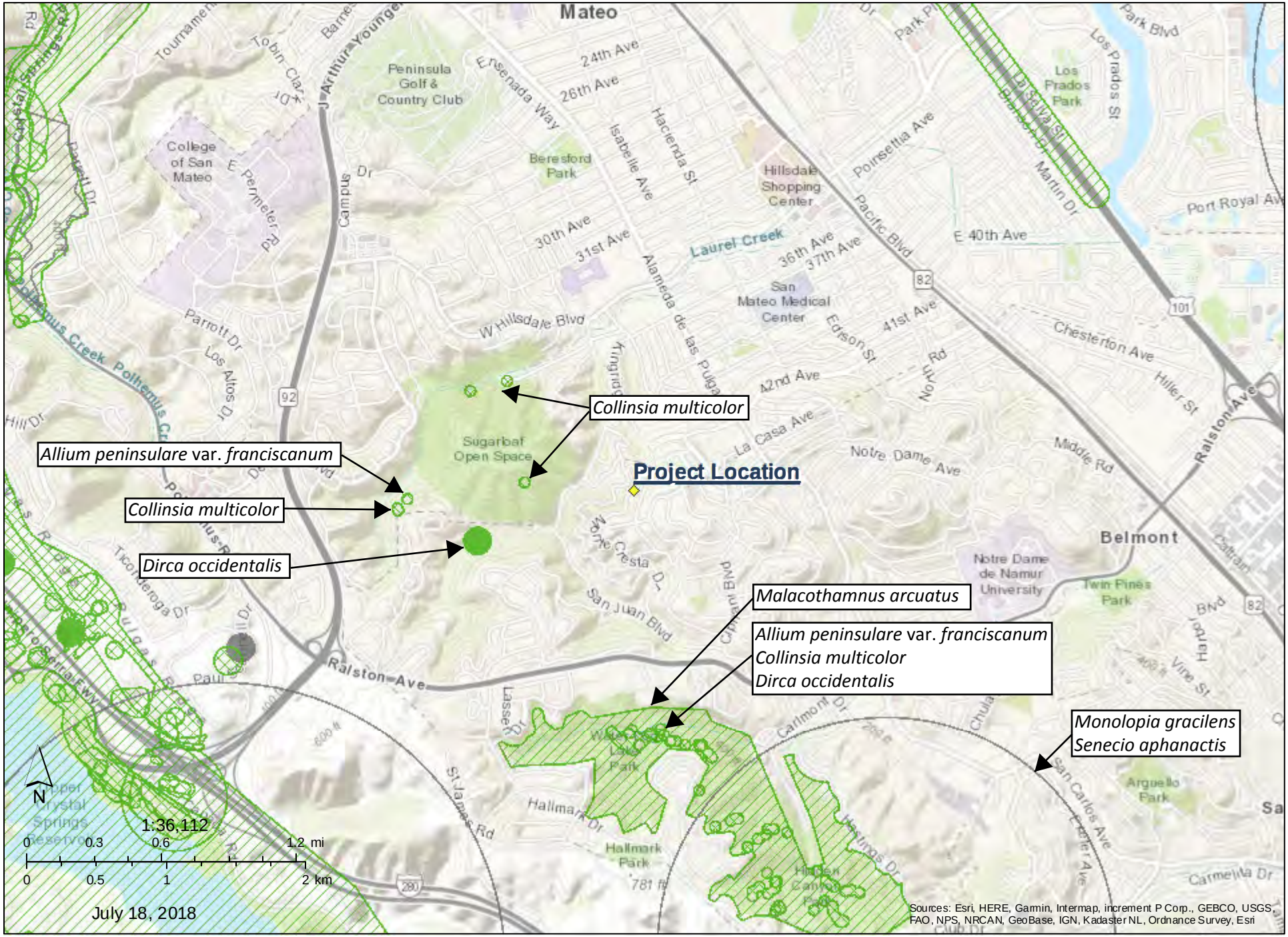
In addition, plant species have been assigned global and State rarity rankings (rarity rankings are explained in Appendix D). Species ranked as S1, S2, or S3 are considered to be critically imperiled, imperiled or vulnerable to extinction within the boundaries of the State (CDFW, 2018a). As such, these species may be considered to meet the criteria for listing as endangered, threatened or rare under CESA.[21] Species ranked as S4 or S5 are generally considered common enough to be secure and not at risk of extinction. Impacts on special-status plants species, as thusly defined, would be regarded as significant pursuant to CEQA[22] and should be addressed in environmental review documents.[23]

A total of 88 special-status plant species have been recorded from the nine 7.5-minute USGS quadrangles including and surrounding the BSA (CNPS, 2018; CNDDB, 2018; USFWS, 2018). A total of 20 special-status plant species have been recorded from within a 4.8 km (3 mi) radius of the BSA; four of these (Franciscan onion, San Francisco collinsia, western leatherwood, and arcuate bush mallow) have been recorded from within 1.6 km (1 mi) of the BSA (Figure 5).

A total of 81 of the special-status plant species are considered to have no potential for occurrence at the project site due to a lack of suitable habitat, lack of suitable soils, or geographic location of the BSA relative to known occurrences. While suitable habitat is present within the BSA for three of the species (arcuate bush mallow, coast iris and western leatherwood), they are a perennial herb, shrub, and small tree that would have been identifiable at the time of the survey. No impact avoidance, minimization or mitigation measures are warranted for these 81 species, and no further surveys or analysis related to special-status plant species are necessary. Appropriately-timed surveys are warranted for the remaining seven species, which are described below.

[19] CEQA § 15125 (c)
[20] CEQA Appendix G
[21] CEQA § 15380(d)
[22] CEQA § 15065
[23] CEQA § 15125

Figure 5. Rare Plant Locations in the Project Vicinity (1-mile radius)



A list of all special-status species evaluated as part of this analysis is in Appendix B. An explanation of all rarity status codes is provided in Appendix D.

The following special-status plant species have the potential to occur within the BSA:

Franciscan Onion

Regulatory Status: FESA: none; CESA: none; CRPR: 1B.2; CNDDB: G5T2/S2

Description: Franciscan onion (*Allium peninsulare* var. *franciscanum*) is a bulb-forming perennial geophyte[24] belonging to the onion family (Alliaceae). The bulbs are ovoid to spheric with a herring-bone pattern on the bulb coat. Plants produce 2-3 curved and channeled leaves. The red-purple flowers develop on short pedicels 8-20 mm long, atop peduncles 12-45 cm long. Flowering occurs May through June. Franciscan onion occurs in cismontane woodland and valley/foothill grassland, on clay, volcanic or serpentinitic soils. It is extant in Mendocino, Sonoma, San Mateo and Santa Clara counties.

Critical Habitat: Franciscan onion is not listed under FESA; as such, Critical Habitat has not been designated for the species.

Habitat Suitability and Potential Occurrence: Suitable habitat for Franciscan onion is present within the BSA. Woodland and grassland areas could support this species. At the time of the present survey, its presence or absence could not be determined.

Potential Project-Related Effects: Due to the presence on site of suitable habitat for the species, its occurrence cannot be ruled out. To determine presence or absence of this species, a properly timed botanical survey is warranted. If it is determined that future development would impact the species, such impacts may be deemed as a significant adverse effect pursuant to the statutes and guidelines of CEQA and should be addressed in environmental documents. Impact avoidance, minimization or mitigation measures may be warranted (see Section 5.2, below).

San Francisco collinsia

Regulatory Status: FESA: none; CESA: none; CRPR: 1B.2; Global/State rarity ranking: G2/S2.2

Description: San Francisco collinsia (*Collinsia multicolor*), also known as Franciscan blue-eyed Mary, is a member of the plaintain family (Plantaginaceae). It is an annual herb producing loosely branched stems 10-51 cm (4-20 in) tall. Leaves are narrowly triangular, about one inch long and form in pairs that clasp both sides of the stem. Flowers are lavender to violet-blue with a whitish upper lip, forming in a series of whorls, one stacked on top of the other,

[24] a plant with an underground storage organ

forming a very showy inflorescence as much as ten inches high. Flowering occurs March through May.

San Francisco collinsia is endemic to California, restricted to Monterey, Marin, Santa Clara, Santa Cruz, San Francisco, and San Mateo counties. It is associated with closed-cone coniferous forests and coastal scrub, occasionally on serpentine-derived soils, at 30-250 m (98-820 ft) in elevation (CNDDB, 2018).

Critical Habitat: San Francisco collinsia is not listed under FESA; as such, Critical Habitat has not been designated for the species.

Habitat Suitability and Potential Occurrence: Suitable habitat for San Francisco collinsia is present within the BSA, specifically in oak woodland habitat, although it typically occurs in shadier sites with relatively high native understory species composition. Because this annual species would not have been detectable during the present survey, its occurrence cannot be ruled out. San Francisco collinsia is recorded from several locations within 1.6 km (1 mi) of the project site (CNDDB, 2018).

Potential Project-Related Effects: Due to the presence on site of suitable habitat for the species its occurrence cannot be ruled out. To determine presence or absence of this species, a properly timed botanical survey is warranted. If it is determined that future development would impact the species, such impacts may be deemed as a significant adverse effect pursuant to the statutes and guidelines of CEQA and should be addressed in environmental documents. Impact avoidance, minimization or mitigation measures may be warranted (see Section 5.2, below).

Bent-Flowered Fiddleneck

Regulatory Status: FESA: none; CESA: none; CRPR: 1B.2; Global/State rarity ranking: G2?/S2?

Description: Bent-flowered fiddleneck (*Amsinckia lunaris*) is an annual species of the borage family (Boraginaceae), it has an orange flower with two red marks and is differentiated from other species in the genus by its five lobed calyx and bilateral corolla with a bent tube. Bent-flowered fiddleneck flowers from May to June.

Bent-flowered fiddleneck occurs on coastal bluff scrubs, and in cismontane woodlands and valley and foothill grasslands at 3-500 m (10-1640 ft) in elevation. It is known from 64 records from in Alameda, Contra Costa, Colusa, Lake, Marin, Napa, San Benito, Santa Clara, Santa Cruz, San Mateo, Sonoma and Yolo counties (CNDDB, 2018).

Critical Habitat: Bent-flowered fiddleneck is not listed under FESA; as such, Critical Habitat has not been designated for the species.

Habitat Suitability and Potential Occurrence: Suitable habitat for bent-flowered fiddleneck is present within the BSA. The non-native annual grassland, foothill needlegrass grassland, and more open understory of some of the oak woodland could support this species. Portions of the site that are dominated by dense weeds or heavy canopy of oaks provide less suitable habitat.

Bent-flowered fiddleneck is recorded from within 3.2 km (2 mi) of the project site (CNDDB, 2018). In San Mateo County, it is known from several collections in grasslands along Crystal Springs Road and Polhemus Road, on Pulgas Ridge, and near the shoreline of Crystal Springs Reservoir.

Potential Project-Related Effects: Due to the presence on site of suitable habitat for the species its occurrence cannot be ruled out. To determine presence or absence of this species, a properly timed botanical survey is warranted. If it is determined that future development would impact the species, such impacts may be deemed as a significant adverse effect pursuant to the statutes and guidelines of CEQA and should be addressed in environmental documents. Impact avoidance, minimization or mitigation measures may be warranted (see Section 5.2, below).

Brewer's calandrinia

Regulatory Status: FESA: none; CESA: none; CRPR: 4.2; Global/State rarity ranking: G4/S4

Description: Brewer's calandrinia (*Calandrinia breweri*) is an annual species of the miner's lettuce family (Montiaceae). It has a pink to purple flowers, and is differentiated from the other species in the genus by its longer fruit in relation to the calyx and by tubercled vs. net-like pattern on the seeds. Brewer's calandrinia flowers from March to June.

Brewer's calandrinia occurs in coastal scrub and chaparral, cismontane woodlands and valley and foothill grasslands at 10-1220 m (33-4000 ft) in elevation. It has been collected widely from northern to southern California (CNDDB, 2018), and in the San Francisco Peninsula watershed west of Crystal Springs reservoir (Calfora, 2018).

Critical Habitat: Brewer's calandrinia is not listed under FESA; as such, Critical Habitat has not been designated for the species.

Habitat Suitability and Potential Occurrence: Suitable habitat for Brewer's calandrinia is present within the BSA, specifically in grassland and scrub habitats. Because this annual species may not have been detectable during the present survey, its occurrence cannot be ruled out. Brewer's calandrinia occurrences are not tracked in the CNDDB. It is known from gravelly soil on brushy slopes.

Potential Project-Related Effects: Due to the presence on site of suitable habitat for the species its occurrence cannot be ruled out. To determine presence or absence of this species, a

properly timed botanical survey is warranted. If it is determined that future development would impact the species, such impacts may be deemed as a significant adverse effect pursuant to the statutes and guidelines of CEQA and should be addressed in environmental documents. Impact avoidance, minimization or mitigation measures may be warranted (see Section 5.2, below).

California Bottle-Brush Grass

Regulatory Status: FESA: none: CESA: none: CRPR: 4.3; Global/State rarity ranking: G4/S4.

Description: California bottle-brush grass (*Elymus californicus)* is an herbaceous species belonging to the grass family (Poaceae). This perennial grass produces flat leaf blades up to 2 cm (1 in) wide. Flower spikes 1-2 m (3.3-6.6 ft) high develop May through August. California bottle-brush grass is distinguished from other members of the genus by a lack of glumes below the florets, with straight lemma awns up to 2 cm (1 in) long.

California bottle-brush grass has been recorded from Marin, Santa Cruz, San Mateo and Sonoma counties. It occurs in broadleafed upland forest, cismontane woodland, North Coast coniferous forest, and riparian woodland, between 15-470 m (50-1540 ft) in elevation.

Critical Habitat: California bottle-brush grass is not listed under FESA; as such, Critical Habitat has not been designated for the species.

Habitat Suitability and Occurrence Data: Suitable habitat for California bottle-brush grass is present within the BSA. Oak woodland could support this species. The present survey coincided with the flowering time for this species. Although a systematic survey following CDFW guidelines was not performed (and therefore absence could not be determined), no California bottlebrush plants were observed.

California bottle-brush grass occurrences are not tracked in the CNDDB. It is known from moist wooded slopes and flats, occasionally in coniferous forests or their bordering woodlands, and rarely on brushy slopes. It has been observed as recently as 1994 along Crystal Springs Road, approximately 4 km (2.5 mi) northwest of the BSA.

Potential Project-Related Effects: Due to the presence on site of suitable habitat for the species its occurrence cannot be ruled out. To determine presence or absence of this species, a properly timed botanical survey is warranted. If it is determined that future development would impact the species, such impacts may be deemed as a significant adverse effect pursuant to the statutes and guidelines of CEQA and should be addressed in environmental documents. Impact avoidance, minimization or mitigation measures may be warranted (see Section 5.2, below).

*Monolopia gracilen*s

Regulatory Status: FESA: none: CESA: none: CRPR: 1.B2; Global/State rarity ranking: G3/S3.

Description: Woodland monolopia (*Monolopia gracilens)* is an herbaceous species belonging to the sunflower family (Asteraceae). This annual flowering plant produces showy yellow flowers up to 2 cm (1 in) wide on spreading, branched inflorescences from March through July. Woodland monolopia has gray-green leaves and stems covered with soft white hairs.

Woodland monolopia has been recorded from Alameda, Contra Costa, San Francisco, Santa Cruz, San Mateo, Monterey and San Luis Obispo counties. It occurs in mixed evergreen forest, redwood forest, chaparral and serpentine grassland, between 100-1200 m (325-3900 ft) in elevation.

Critical Habitat: Woodland monolopia is not listed under FESA; as such, Critical Habitat has not been designated for the species.

Habitat Suitability and Occurrence Data: Suitable habitat for woodland monolopia is present within the BSA. Oak woodland and grasslands could support this species. Because this annual species may not have been detectable during the present survey, its occurrence cannot be ruled out.

Recent observations of woodland monolopia have been made at Edgewood County Park and in the San Francisco Peninsula watershed, more than 6 km (3.7 mi) from the BSA.

Potential Project-Related Effects: Due to the presence on site of suitable habitat for the species its occurrence cannot be ruled out. To determine presence or absence of this species, a properly timed botanical survey is warranted. If it is determined that future development would impact the species, such impacts may be deemed as a significant adverse effect pursuant to the statutes and guidelines of CEQA and should be addressed in environmental documents. Impact avoidance, minimization or mitigation measures may be warranted (see Section 5.2, below).

Chaparral ragwort

Regulatory Status: FESA: none: CESA: none: CRPR: 2.B2; Global/State rarity ranking: G3/S2.

Description: Chaparral ragwort (*Senecio aphanactis)* is an herbaceous species belonging to the sunflower family (Asteraceae). This annual flowering plant produces small yellow flowers, sometimes without showy petals on branched inflorescences from January through April. The plants are often very small, not more than 5 cm (2 in) high.

Chaparral ragwort has been recorded from many central and southern Califonia counties, and in the Sierra Nevada foothills. It occurs in foothill woodland, northern coastal scrub,

coastal sage scrub, typically dry rocky or alkali areas, between 50-550 m (165-1800ft) in elevation.

Critical Habitat: Chaparral ragwort is not listed under FESA; as such, Critical Habitat has not been designated for the species.

Habitat Suitability and Occurrence Data: Suitable habitat for chaparral ragwort is present within the BSA. Rocky or bare soils within the grassland areas could support this species. Because this annual species would not have been detectable during the present survey, its occurrence cannot be ruled out.

Observations of chaparral ragwort have been made in the hills west of San Carlos approximately 4 km (2.5 mi) southeast of the BSA (CNDDB 2018).

Potential Project-Related Effects: Due to the presence on site of suitable habitat for the species its occurrence cannot be ruled out. To determine presence or absence of this species, a properly timed botanical survey is warranted. If it is determined that future development would impact the species, such impacts may be deemed as a significant adverse effect pursuant to the statutes and guidelines of CEQA and should be addressed in environmental documents. Impact avoidance, minimization or mitigation measures may be warranted (see Section 5.2, below).

4.3 Special-Status Animal Species

Special-status animal species include listed as Endangered, Threatened, Rare, or as Candidates for listing under the FESA (USFWS, 2017) or CESA (CDFW, 2017d). Other species regarded as having special-status include special animals, as listed by the CDFW (2017c). Additional bird species receive protection under the Bald and Golden Eagle Protection Act (BGEPA)[25], the Migratory Bird Treaty Act (MBTA)[26] and the Migratory Bird Treaty Reform Act (MBTRA)[27]. The USFWS maintains a list of bird species of conservation concern (BCC) which includes species of migratory nongame birds that could become candidates for listing under FESA (USFWS, 2008). The CFGC provides specific language protecting birds and raptors[28], "fully protected birds"[29], "fully protected mammals"[30], "fully protected reptiles and amphibians"[31] and "fully protected fish".[32] The California Code of Regulations (CCR) prohibits the take[33] of fully protected fish[34], certain fur-bearing

[25] 16 USC 668
[26] 16 USC 703-711
[27] 70 FR 12710
[28] §§ 3503 and 3503.5
[29] CFGC § 3511
[30] CFGC § 4700
[31] CFGC § 5050
[32] CFGC § 5515
[33] Pursuant to CFGC § 86, "take" means hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill.

mammals,[35] and restricts the taking of amphibians[36] and reptiles[37]. Additional definitions are given in CEQA.[38] Impacts on special-status animal species, as thusly defined, may qualify as significant pursuant to the statutes and guidelines of CEQA.

A total of 85 special-status animal species have been recorded in the nine 7.5-minute USGS quadrangles including and surrounding the BSA (CNDDB, 2018; USFWS, 2018). A total of 18 special-status animal species have been recorded from within a 4.8 km (3 mi) radius of the BSA; of these, only five have been recorded from within a 1.6 km (1 mi) radius of the BSA (Figure 6).

Based on the existing habitats on site and its geographic location, the occurrence of 79 of the target species can be ruled out entirely based on absence of suitable habitat, the site's location outside of the species known range, or absence of regional species occurrences. No federally or State-listed animal species are considered to have any potential to occur on site or to be adversely affected by project implementation.

Based on the presence of suitable or marginally suitable habitat, a total of six target special-status animals are considered to have a potential to occur on site. These include Allen's hummingbird, CA thrasher, Nuttall's woodpecker, oak titmouse, spotted towhee, San Francisco dusky-footed woodrat.

These species, along with other high-profile species known from the region, are described below. A list of all special-status animal species evaluated as part of this analysis can be found in Appendix C. An explanation of rarity status codes is provided in Appendix D.

Special-Status or Locally Rare Animal Species

Allen's Hummingbird

Regulatory Status: FESA: none; CESA: none; CDFW: Special Animal (nesting); USFWS: Bird of Conservation Concern; Global/State rarity ranking: G5/S4.

Description: Allen's hummingbird (*Selasphorus sasin*) is a spring and summer resident found along the coastline from Curry County in southern Oregon to Santa Barbara and the Channel Islands in southern California (Mitchell, 2000). Migration begins early and may depart their wintering grounds in Central Mexico as early as December or January (Mitchell,

[34] 14 CCR § 5.93
[35] 14 CCR § 460
[36] 14 CCR § 5.05
[37] 14 CCR § 5.60
[38] § 15380(d)

1-mile radius

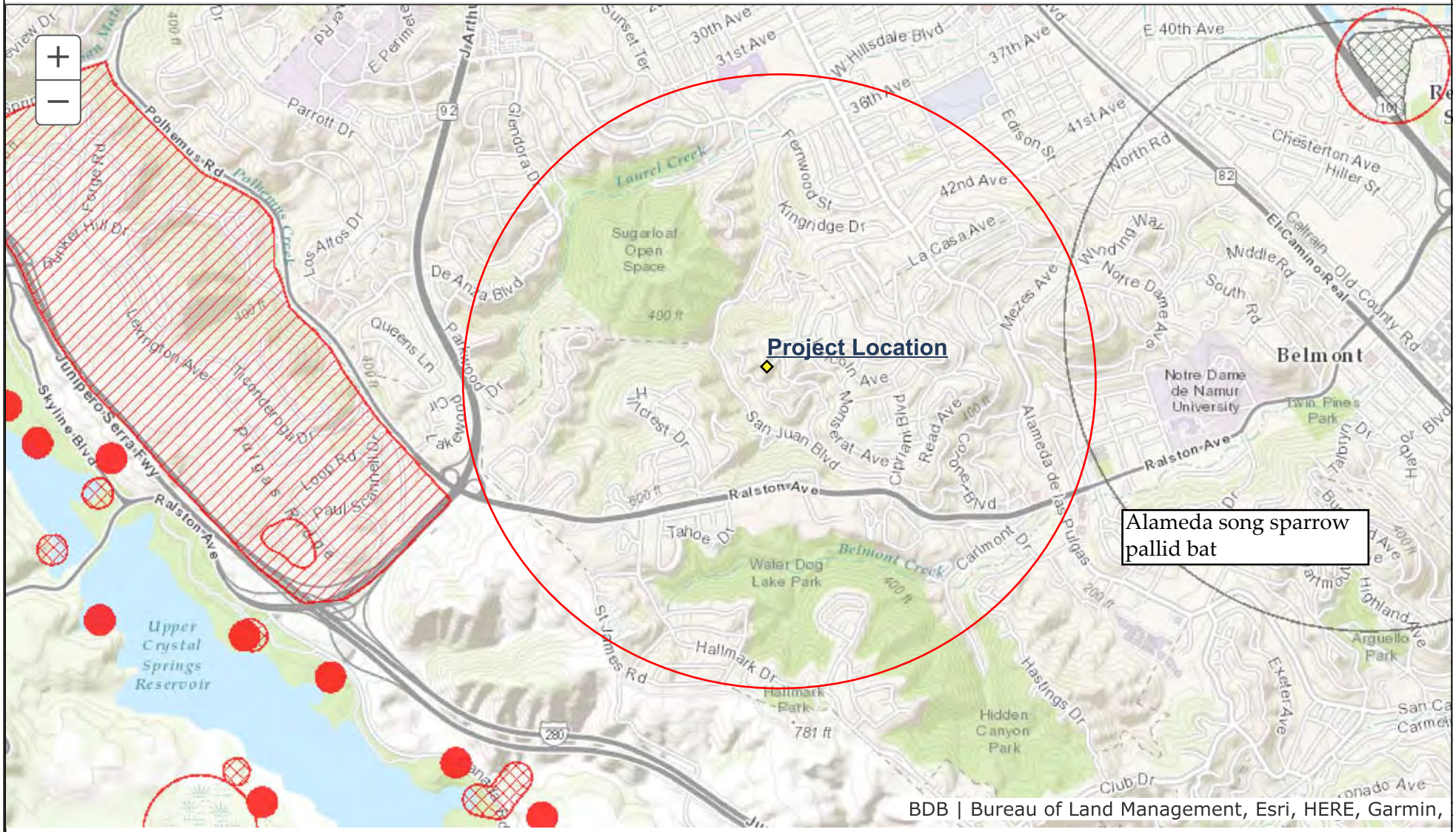


Figure 6. Rare Animal Occurrences in the Project Vicinity

2000). Breeding habitat varies in the Bay Area from moist coastal scrub, mixed evergreen forests, riparian corridors, and eucalyptus groves to oak woodlands, chaparral and scrub, where it builds small nests on the branches of trees and shrubs (Mitchell, 2000; Baicich and Harrison, 2005). This species is highly territorial and will aggressively defend its nesting and foraging grounds. Breeding typically begins in February and is commonly double-brooded due to the extended breeding season (Baicich and Harrison, 2005). Allen's hummingbird is a confirmed breeder in San Mateo County (Metropulos, 2006).

Critical Habitat: Allen's hummingbird is not listed under FESA; as such, Critical Habitat has not been designated for the species.

Habitat Suitability and Occurrence Data: Within the BSA, coast live oak woodland provides suitable nesting and foraging habitat for Allen's hummingbird.

Although Allen's hummingbird nesting is not tracked by CNDDB, it is a Bird of Conservation Concern listed by the USFWS (2018) as occurring in the project region. Based on the suitability of habitat and known nesting range, it is possible Allen's hummingbirds utilize the BSA for nesting.

Potential Project-Related Effects: Although nesting by Allen's hummingbird has not been recorded within the BSA, suitable nesting sites are present. If active nesting is underway at the time of construction, direct or indirect impacts to breeding behavior or success could result. Such effects would be deemed a significant adverse impact pursuant to the statutes and guidelines of CEQA; impacts should be addressed in environmental review documents. Impact avoidance measures are warranted, as outlined in Section 5.3, below.

California Thrasher

Regulatory Status: FESA: none; CESA: none; CDFW: none; USFWS: Bird of Conservation Concern; Global/State rarity ranking: none.

Description: The California thrasher (*Toxostoma redivivum*) is listed as a Species of Special Concern by CDFW (2018c) and it is protected under the MBTA and CFGC[39]. This relatively common resident of foothills and lowlands occupies moderate to dense chaparral habitat and, less commonly, extensive riparian thickets, especially with blackberry patches. It nests close to the ground and feeds on invertebrates, acorns, and forb seeds. California thrasher occurs across the length of California. Along the coastal fog belt north of San Francisco, it is restricted to drier sites.

Critical Habitat: The California thrasher is not listed under FESA; as such, Critical Habitat has not been designated for the species.

[39] CFGC § 3503

Habitat Suitability and Occurrence Data: No California thrashers were observed during the site reconnaissance. However, suitable nesting habitat is present within the proposed development area and vicinity. For this reason, the potential exists for the species to inhabit the project site.

Although California thrasher nesting is not tracked by CNDDB, it is a Bird of Conservation Concern listed by the USFWS (2017) as occurring in the project region. Based on the suitability of habitat and known nesting range, it is possible that the species occurs in the BSA and on the subject parcel.

Potential Project-Related Effects: If present at the time of site clearing, project implementation could result in a take of the species, which would be in violation of the MBTA and would be deemed a significant adverse impact pursuant to the statutes and guidelines of CEQA; impacts should be addressed in environmental review documents. Impact avoidance measures are warranted, as outlined in Section 5.3, below. With the incorporation of these measures into the project design, impacts would be reduced to a less-than-significant level.

Nuttall's woodpecker

Regulatory Status: FESA: none; CESA: none; CDFW: Special Animal (nesting); USFWS: Bird of Conservation Concern; Global/State rarity ranking: none.

Description: The Nuttall's woodpecker *(Picoides nuttallii*) inhabits riparian woodlands and oak woodlands in canyons and shaded areas, characterized especially by (Lowther, 2000). It is a cavity nester, building nests in trunks and snags of coast live oak, valley oak, willows, CA sycamore, and even fence posts (Lowther, 2000). Breeding begins in March and is single-brooded (Baicich and Harrison, 2005). Nuttall's woodpecker is a confirmed breeder in San Mateo County (Metropulos, 2006).

Critical Habitat: Nuttall's woodpecker is not listed under FESA; as such, Critical Habitat has not been designated for the species.

Habitat Suitability and Potential Occurrence: Suitable habitat for Nuttall's woodpecker is present in the BSA, consisting of coast live oak trees. This species prefers canyons and shaded areas; suitable habitat features are present within the San Ramon Creek riparian corridor. No Nuttall's woodpeckers were observed during the site reconnaissance.

Although Nuttall's woodpecker nesting is not tracked by CNDDB, it is a Bird of Conservation Concern listed by the USFWS (2008) as occurring in the project region. Based on the suitability of habitat and known nesting range, it is possible that the species breeds within the BSA.

Potential Project-Related Effects: If active nesting is underway at the time of construction, direct or indirect impacts to breeding behavior or success could result. Such effects would

be deemed a significant adverse impact pursuant to the statutes and guidelines of CEQA; impacts should be addressed in environmental review documents. Impact avoidance measures are warranted, as outlined in Section 5.3, below.

Oak Titmouse

Regulatory Status: FESA: none; CESA: none; CDFW: Special Animal (nesting); USFWS: Bird of Conservation Concern; Global/State rarity ranking: G4/S4.

Description: The oak titmouse (*Baeolophus inornatus*) is considered an oak obligate species, inhabiting oak woodlands, oak savannahs, piñon and juniper woodlands and occasionally suburban areas with oaks (Cicero, 2000; Baicich and Harrison, 2005). It is a year-round resident throughout much of California. Nests are situated in natural or excavated cavities in trunks, primary and secondary branches, and stumps (Cicero, 2000). Breeding begins in March and is single-brooded (Baicich and Harrison, 2005). The oak titmouse is a confirmed breeder in San Mateo County (Metropulos, 2007).

Critical Habitat: The oak titmouse is not listed under FESA; as such, Critical Habitat has not been designated for the species.

Habitat Suitability and Occurrence Data: Suitable habitat is present in the BSA, consisting of the coast live oak trees. Potential nest cavities were observed in oak trees during the site reconnaissance and an oak titmouse was observed foraging within the BSA.

Although oak titmouse nesting is not tracked by CNDDB, it is a Bird of Conservation Concern listed by the USFWS (2017) as occurring in the project region. Based on the suitability of habitat and known nesting range, it is possible that oak titmouse utilizes the BSA for nesting.

Potential Project-Related Effects: Although nesting by oak titmouse was not confirmed within the BSA, suitable nesting sites are present. If active nesting is underway at the time of construction, direct or indirect impacts to breeding behavior or success could result. Such effects would be deemed a significant adverse impact pursuant to the statutes and guidelines of CEQA; impacts should be addressed in environmental review documents. Impact avoidance measures are warranted, as outlined in Section 5.3, below.

San Francisco Dusky-Footed Woodrat

Regulatory Status: FESA: none: CESA: none; CDFW: Species of Special Concern; Global/State rarity ranking: G5T2T3/S2S3.

Description: The San Francisco dusky-footed woodrat (*Neotoma fuscipes annectens*; hereafter SFDW) is one of eleven recognized woodrat subspecies occurring in California (Matocq, 2002). It inhabits oak and riparian woodlands with a well-developed understory and is

distributed through the Santa Cruz Mountains and Diablo Range from the Pajaro River north to the San Francisco Bay (Hall, 1981). It is most common in riparian, oak woodland and scrub habitats, but is able to persist in semi-rural areas in proximity to houses, if patches of native habitat are present. A study of a similar subspecies *N. f. luciana* on Camp Roberts found that densities increased significantly if dense under-story was present; densities reached 46.7 animals per ha (18.9 per ac) in plots of dense vegetation (Tietje, 1995).

The SFDW is a medium-sized native rodent with large ears and a long, scantily haired tail. They build mounded stick nests that may range in size from 1-2.5 m (3-8 ft) across at the base and up to 1.8m (6 ft) tall. Less typically, they may den in tree cavities, rock crevices and ground holes that are well-hidden and easily overlooked. Woodrats they tend to live in colonies of three to 15 nests or more. Nests may contain multiple chambers used for sleeping and food storage. Each nest is usually occupied by single adults or females with their litters for a few months until the young disperse to nearby nests. Adult female woodrats live in the same nest until they die, when the nest is taken over by one of the female offspring. In this manner nests may be occupied and maintained by the same family for decades. They exhibit high site fidelity and build stick nests that may last for 20 years or more. They are also highly arboreal and sometimes construct aerial nests, utilizing evergreen or live oaks and other trees and shrubs with thick leaves (Kelly, 1990; Williams et al., 1992). Woodrat nests are also used by a wide variety of native amphibians, small mammals, reptiles and insects (Carraway and Verts, 1991).

Woodrats are generalist herbivores, consuming a variety of nuts, fruits, fungi, foliage and some forbs (Jameson and Peeters, 1988). They are mostly nocturnal in habit and active throughout the year. The SFDW breeds from February through September and may produce up to five litters per year, with litters containing one to four young (Zeiner, et al. 1988).

Critical Habitat: The SFDW is not listed under FESA; as such, Critical Habitat has not been designated for the species.

Habitat Suitability and Potential Occurrence: Two stick nests were observed in oak trees approximately 35 m (115 ft) south of the project footprint. Abundant suitable habitat exists for this subspecies in the vicinity.

The project site is located within the geographic range of SFDW. There are no records of SFDW from within 1.6 km (1 mi) of the project site, but there are two records from within 4.8 km (3 mi) (CNDDB, 2017). Despite the lack of nearby records, this wide-ranging, relatively common subspecies is underreported in the CNDDB.

Potential Project-Related Effects: Although no woodrat nests were detected in the project footprint during the reconnaissance-level survey, there is a potential for this species to move into and inhabit the subject parcel. Should SFDW move into the work area, construction-

related activities could result in direct mortalities of individuals and loss of nest structures. Such impacts would be considered a significant adverse effect pursuant to CEQA. Impact avoidance measures are warranted, as outlined in Section 5.3, below.

Spotted Towhee

Regulatory Status: FESA: none; CESA: none; CDFW: none; USFWS: Bird of Conservation Concern; Global/State rarity ranking: none.

Description: The spotted towhee (*Pipilo maculatus*) is a large sparrow with a thick, pointed bill, short neck, chunky body, and long, rounded tail. They are found from the Great Plains to the Pacific Coast and from Canada to Mexico. In California, the species occurs from the Sierra Nevada to the coast.

Males have jet-black upperparts and throat; their wings and back are spotted bright white. The flanks are warm rufous and the belly is white. Females have the same pattern but are warm brown where males are black. In flight, look for white corners to the black tail. Spotted towhees hop over the ground beneath dense tangles of shrubs, scratching in leaf litter for food, mainly insects, but also includes acorns, berries, and seeds. They also climb into lower branches to search for insects and fruits, or to deliver their quick, buzzy song. The inhabit dry thickets, brushy tangles, forest edges, old fields, shrubby backyards, chaparral, coulees, and canyon bottoms, places with dense shrub cover and plenty of leaf litter. Spotted towhees place their nests on the ground or as high as 12 feet high deep inside thickets.

Critical Habitat: The spotted towhee is not listed under FESA; as such, Critical Habitat has not been designated for the species.

Habitat Suitability and Occurrence Data: No spotted towhees were observed during the site reconnaissance. However, suitable nesting habitat is present within the proposed development area and vicinity. For this reason, the potential exists for the species to inhabit the project site.

Although spotted towhee nesting is not tracked by CNDDB, it is a Bird of Conservation Concern listed by the USFWS (2017) as occurring in the project region. Based on the suitability of habitat and known nesting range, it is possible that the species occurs in the BSA and on the subject parcel.

Potential Project-Related Effects: If present at the time of site clearing, project implementation could result in a take of the species, which would be in violation of the MBTA and would be deemed a significant adverse impact pursuant to the statutes and guidelines of CEQA; impacts should be addressed in environmental review documents. Impact avoidance measures are warranted, as outlined in Section 5.3, below. With the incorporation of these measures into the project design, impacts would be reduced to a less-than-significant level.

5.0 DISCUSSION

As described in Section 3.0, the project site is located in a residential area at the interface with undeveloped lands of San Juan Canyon. Although the subject parcel is undeveloped, it has been altered by historic grazing and grading. Habitats that would be impacted by the proposed home construction include ruderal, non-native annual grassland and coast live oak woodland. While no special-status plant or animal species are known to occur on site, there is a potential for impacts special-status species. The implications of the proposed project as they relate to these resources are discussed below.

5.1 Special-Status Natural Communities and Landscape Features

As described in Section 4.1 above, project implementation would result in adverse effects on Foothill Needlegrass Grassland, and sensitive natural community. A discussion of the implications and appropriate impact avoidance, minimization, or mitigation measures is presented below.

5.1.1 Implications of the Proposed Project: Foothill Needlegrass Grassland

To avoid, minimize and compensate for unavoidable impacts on 1,696 sf foothill needlegrass grassland, the following measures should be implemented to restore 1,696 sf of foothill needlegrass grassland:

1. Minimize impact. The road extension project should be designed in a manner that minimizes impacts on stands of foothill needlegrass grassland to the maximum practicable extent, using the mapping in Figure 4 as a basis for design.
2. Quantify unavoidable impacts. A grading and access plan should be prepared and reviewed by a qualified biologist[40]. Areas within the limits of grading that overlap foothill needlegrass grassland as shown on Figure 4 shall be considered impacted.
3. Grassland Restoration Plan. A native grassland restoration plan should be prepared by a qualified biologist and reviewed and approved by the Lead Agency. The plan should include the following components:
    a. Identification of the grassland planting area, which shall be the shoulders of the new constructed Monte Cresta Drive extension in the vicinity of the existing foothill needlegrass grassland.
    b. Specifications for the salvage of topsoil. Following road construction, disturbed compacted soils to be restored with foothill needlegrass should be roughened by light shallow disking or equivalent means.

[40] The qualified biologist should have at least five years of demonstrated experience in native bunchgrass grassland restoration and monitoring.

c. Specification of Best Management Practice (BMPs) to prevent erosion and sedimentation during and following construction.

d. Specifications for reseeding or replanting with foothill needlegrass and additional native grass and forb species suitable for erosion control. Seeded areas should then be covered with blown seed-free straw or an equivalent type of mulch to increase infiltration, minimize compaction and runoff, and to minimize seed predation.

e. Specifications for routine maintenance measures (e.g., prescribed grazing, mowing, eradication of invasive non-native species) to protect restoration sites and promote the establishment of foothill needlegrass during a one year establishment period.

f. Specifications for periodic monitoring to identify remedial measures as warranted for the successful re-establishment of foothill needlegrass grassland. Monitoring should be conducted for a period of three years following construction.

g. Photo points established to cover all grassland restoration areas. Photographs should be taken prior to the commencement of work, upon the completion of work, and twice annually during the monitoring period.

h. Criteria by which successful restoration can be gauged. The collection of quantitative vegetation data and success standards are not proposed. Rather, the qualified biologist should provide a subjective evaluation of the cover and density of foothill needlegrass in the restored areas compared to preconstruction conditions.

i. Annual memoranda should be prepared by the qualified biologist and submitted to the Lead Agency by the end of each calendar year. The memoranda should include site photographs and a brief assessment of the reestablishment of foothill needlegrass.

j. If, at the end of three years, the qualified biologist can make a reasonable assumption that the restored areas are successfully recolonized by foothill needlegrass, the effort should be deemed successful and no further monitoring is warranted. If foothill needlegrass is not found to recolonize the disturbed areas, the qualified biologist should submit written recommendations for remedial actions such as reseeding and an extension of the monitoring period. This proposal should be submitted to the Lead Agency for review and concurrence.

With the incorporation of these measures, any potential impacts on foothill needlegrass grassland would be reduced to a less-than-significant level.

5.2 Special-Status Plant Species

As described in Section 4.2 above, project implementation could result in significant adverse effects on special-status plant species. A discussion of the implications and appropriate impact avoidance, minimization, or mitigation measures is presented below.

5.2.1 Implications of the Proposed Project: Special-Status Plants

Grading to accommodate road and house construction could impact populations of special-status plant species, if present. Therefore, the following impact avoidance and minimization measures should be incorporated into the project plans:

1. A floristic survey should be completed in accordance with the guidelines outlined by the CDFW (CDFG, 2009), USFWS (2000a), and CNPS (2001). These guidelines call for the performance of surveys during each season in which all potentially occurring special-status species would be identifiable. For the subject property, surveys should be performed in the spring (April-May). All plant species must be identified to the lowest taxonomic level to determine their rarity status.
2. Any special-status species identified on site should be mapped and enumerated, and field forms should be submitted to the CNDDB.
3. The location of all special-status plant populations should be mapped relative to the proposed limits of grading. Impacts to special-status plant species should be minimize to the degree practicable.
4. Unavoidable impacts to special-status species should be quantified in terms of the number of individuals or area occupied by each population.
5. Depending on the species involved, mitigation may be warranted to offset unavoidable impacts. Mitigation may involve seed and/or plant collection and relocation elsewhere on site, preservation and enhancement of off-site populations, funding for seed and plant collection for research purposes, payment of in-lieu fees to an approved mitigation bank or conservation-oriented organization, or other measures.
6. No direct or indirect impacts to plant species listed under CESA is allowable without consultation with the CDFW and issuance of an Incidental Take Permit (ITP), pursuant to CESA.[41]

With the incorporation of the measures outlined above, impacts to special-status plant species would be reduced to a less-than-significant level pursuant to the guidelines of CEQA.

5.3 Special-Status Animal Species

As described in Section 4.3 above, a total of six special-status animal species are considered to have a potential to occur on the subject parcel. These include Allen's hummingbird, California thrasher, Nuttall's woodpecker, oak titmouse, San Francisco dusky-footed woodrat, and spotted towhee, as well as numerous species of migratory birds.

[41] CESA § 2081

Project implementation could therefore result in direct, indirect and/or cumulative impacts to special-status animal species. Such impacts would be considered a significant pursuant to the statutes and guidelines of CEQA. A discussion of the implications and appropriate impact avoidance, minimization, or mitigation measures is presented below.

5.3.1 Implications of the Proposed Project: Special-Status and Migratory Birds

Within the project area, grasslands, shrubs, and trees provide nesting habitat for **Allen's hummingbird, California thrasher, oak titmouse, and spotted towhee, as well as many other migratory bird species**. Site clearing activities (e.g., grubbing, grading, trenching, and tree removal or pruning) could result in direct or indirect impacts to nesting birds by causing the destruction or abandonment of occupied nests. To ensure compliance with the MBTA/MBTRA and the CFGC the measures outlined below should be performed.

1. Raptor Nests. Prior to the removal or significant pruning of any trees, they should be inspected by a qualified biologist for the presence of raptor nests. This is required regardless of season. If a suspected raptor nest is discovered, the CDFW should be notified. Pursuant to the CFGC[42], raptor nests, whether or not they are occupied, may not be removed until approval is granted by the CDFW.
2. Site Clearing – Non-Breeding Season. If clearing, grubbing or tree removal/pruning are to be conducted outside of the breeding season (i.e., September 1 through January 31), no preconstruction surveys for nesting migratory birds are necessary.
3. Site Clearing – Breeding Season. If clearing and grubbing and tree removal or pruning are to be conducted during the breeding season (i.e., February 1 through August 31), a preconstruction nesting bird survey should be conducted. The survey should be performed by a qualified biologist no more than two weeks prior to the initiation of work. If no nesting or breeding activity is observed, work may proceed without restrictions. To the extent allowed by access, all active nests identified within 76 m (250 ft) for raptors and 15 m (50 ft) for passerines should be mapped.
4. Active Nesting. For any active nests found near the construction limits (76 m [250 ft] for raptors and 15 m [50 ft] for passerines) a qualified biologist should make a determination as to whether or not construction activities are likely to disrupt reproductive behavior. If it is determined that construction is unlikely to disrupt breeding behavior, construction may proceed. If it is determined that construction may disrupt breeding, a no-construction buffer zone should be designated on the grading plans. Avoidance of impacts on nesting migratory birds is the only acceptable mitigation; take of nesting birds is a violation of State and federal law. The ultimate size of the no-construction buffer zone may be adjusted by a qualified biologist based on the species involved, topography, lines of site between the work area and the nest, physical barriers, and the ambient level of human activity. Site evaluations and buffer

[42] § 3503.5

adjustments should be made in consultation with the CDFW and/or the USFWS Division of Migratory Bird Management, as appropriate.

If it is determined that construction activities are likely to disrupt raptor breeding, construction activities within the no-construction buffer zone may not proceed until the qualified biologist determines that the nest is long longer occupied.

5. Nest Monitoring. If maintenance of a no-construction buffer zone is not feasible, the Project Biologist should monitor the nest(s) to document breeding and rearing behavior of the adult birds. If it is determined that construction activities are likely to cause nest abandonment, work should cease immediately and the CDFW and/or the USFWS Division of Migratory Bird Management should be contacted for guidance.

With the incorporation of these measures, impacts to special-status and other migratory bird species would be reduced to a less-than-significant level pursuant to the statutes and guidelines of CEQA.

5.3.2 Implications for Future Development: Impacts on San Francisco Dusky-Footed Woodrat

Although no active nests of the SFDW were detected curing the present survey and no individual animals were observed, there is a high likelihood for SFDW to be encountered during construction due to the presence of abundant occupied habitat nearby. To avoid direct mortalities and adverse effects on SFDW, the following measures should be implemented.

1. Site Clearing. Prior to site clearing, grubbing or tree removal, the project biologist should survey for SFDW nests within and adjacent to the limits of grading. All nests (active or inactive) should be mapped and flagged in the field. If no stick nests are detected, no further surveys, monitoring or mitigation are warranted.
2. Nest Removal – Non-Breeding Season. If a woodrat nest is detected in the work zone and it cannot be avoided, site clearing should be performed during the non-breeding season (i.e., September 1 through November 30). During the non-breeding season, the nest should be disassembled by hand and the nest materials (e.g., sticks) removed and disposed of off-site. Any adult animals present should be permitted to disperse into adjacent habitat. This work may only be performed by a qualified biologist in coordination with the CDFW.
3. Nest Removal – Breeding Season. If site clearing must proceed during the breeding season (i.e., December 1 through August 31), it will be necessary to determine whether or not the nest is occupied. This may be done by direct observation over the course of at least two evenings no more than 48 hours prior to nest disassembly. Direct observation may consist of installation of camera traps at the nest or by a biologist on the ground. If no animals are observed, the nest may be disassembled by hand. If, during the process of disassembling the nest, live animals are encountered, nest materials should be

replaced on top of the nest and the effort abandoned. Nest may not be disassembled if young woodrats are present. Construction must then be postponed until the end of the breeding season when juveniles are able to survive on their own.

With the incorporation of these measures, impacts to the SFDW would be reduced to less-than-significant level pursuant to the statutes and guidelines of CEQA.

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APPENDIX A. SITE PHOTOGRAPHS

Photographs taken June 29, 2018



1. Monte Cresta Drive, unpaved section to be extended.



2. Road extension with grassland slope above.

3. Foothill needlegrass grassland at road edge.



4. Typical oak woodland understory.



APPENDIX B. SPECIAL-STATUS PLANT SPECIES

Selected Elements by Scientific Name

California Department of Fish and Wildlife

California Natural Diversity Database

Query Criteria: San Mateo, Woodside, Half Moon Bay, San Leandro, Redwood Point, Palo Alto, Hunters Point, San Francisco South, and Montara Mountain 7.5-minute USGS quadrangles

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Acanthomintha duttonii San Mateo thorn-mint	PDLAM01040	Endangered	Endangered	G1	S1	1B.1
Agrostis blasdalei Blasdale's bent grass	PMPOA04060	None	None	G2	S2	1B.2
Allium peninsulare var. franciscanum Franciscan onion	PMLIL021R1	None	None	G5T2	S2	1B.2
Amsinckia lunaris bent-flowered fiddleneck	PDBOR01070	None	None	G3	S3	1B.2
Arctostaphylos andersonii Anderson's manzanita	PDERI04030	None	None	G2	S2	1B.2
Arctostaphylos franciscana Franciscan manzanita	PDERI040J3	Endangered	None	G1	S1	1B.1
Arctostaphylos imbricata San Bruno Mountain manzanita	PDERI040L0	None	Endangered	G1	S1	1B.1
Arctostaphylos montana ssp. ravenii Presidio manzanita	PDERI040J2	Endangered	Endangered	G3T1	S1	1B.1
Arctostaphylos montaraensis Montara manzanita	PDERI042W0	None	None	G1	S1	1B.2
Arctostaphylos pacifica Pacific manzanita	PDERI040Z0	None	Endangered	G1	S1	1B.1
Arctostaphylos regismontana Kings Mountain manzanita	PDERI041C0	None	None	G2	S2	1B.2
Astragalus pycnostachyus var. pycnostachyus coastal marsh milk-vetch	PDFAB0F7B2	None	None	G2T2	S2	1B.2
Astragalus tener var. tener alkali milk-vetch	PDFAB0F8R1	None	None	G2T2	S2	1B.2
Carex comosa bristly sedge	PMCYP032Y0	None	None	G5	S2	2B.1
Centromadia parryi ssp. congdonii Congdon's tarplant	PDAST4R0P1	None	None	G3T2	S2	1B.1
Centromadia parryi ssp. parryi pappose tarplant	PDAST4R0P2	None	None	G3T2	S2	1B.2
Chloropyron maritimum ssp. palustre Point Reyes salty bird's-beak	PDSCR0J0C3	None	None	G4?T2	S2	1B.2
Chorizanthe cuspidata var. cuspidata San Francisco Bay spineflower	PDPGN04081	None	None	G2T1	S1	1B.2

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Chorizanthe robusta var. robusta robust spineflower	PDPGN040Q2	Endangered	None	G2T1	S1	1B.1
Cirsium andrewsii Franciscan thistle	PDAST2E050	None	None	G3	S3	1B.2
Cirsium fontinale var. fontinale Crystal Springs fountain thistle	PDAST2E161	Endangered	Endangered	G2T1	S1	1B.1
Cirsium occidentale var. compactum compact cobwebby thistle	PDAST2E1Z1	None	None	G3G4T2	S2	1B.2
Cirsium praeteriens lost thistle	PDAST2E2B0	None	None	GX	SX	1A
Collinsia corymbosa round-headed Chinese-houses	PDSCR0H060	None	None	G1	S1	1B.2
Collinsia multicolor San Francisco collinsia	PDSCR0H0B0	None	None	G2	S2	1B.2
Dirca occidentalis western leatherwood	PDTHY03010	None	None	G2	S2	1B.2
Eriophyllum latilobum San Mateo woolly sunflower	PDAST3N060	Endangered	Endangered	G1	S1	1B.1
Eryngium aristulatum var. hooveri Hoover's button-celery	PDAPI0Z043	None	None	G5T1	S1	1B.1
Eryngium jepsonii Jepson's coyote-thistle	PDAPI0Z130	None	None	G2	S2	1B.2
Fritillaria biflora var. ineziana Hillsborough chocolate lily	PMLIL0V031	None	None	G3G4T1	S1	1B.1
Fritillaria liliacea fragrant fritillary	PMLIL0V0C0	None	None	G2	S2	1B.2
Gilia capitata ssp. chamissonis blue coast gilia	PDPLM040B3	None	None	G5T2	S2	1B.1
Gilia millefoliata dark-eyed gilia	PDPLM04130	None	None	G2	S2	1B.2
Grindelia hirsutula var. maritima San Francisco gumplant	PDAST470D3	None	None	G5T1Q	S1	3.2
Helianthella castanea Diablo helianthella	PDAST4M020	None	None	G2	S2	1B.2
Hemizonia congesta ssp. congesta congested-headed hayfield tarplant	PDAST4R065	None	None	G5T2	S2	1B.2
Hesperevax sparsiflora var. brevifolia short-leaved evax	PDASTE5011	None	None	G4T3	S2	1B.2
Hesperolinon congestum Marin western flax	PDLIN01060	Threatened	Threatened	G1	S1	1B.1
Heteranthera dubia water star-grass	PMPON03010	None	None	G5	S2	2B.2

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Hoita strobilina Loma Prieta hoita	PDFAB5Z030	None	None	G2	S2	1B.1
Horkelia cuneata var. sericea Kellogg's horkelia	PDROS0W043	None	None	G4T1?	S1?	1B.1
Horkelia marinensis Point Reyes horkelia	PDROS0W0B0	None	None	G2	S2	1B.2
Lasthenia californica ssp. macrantha perennial goldfields	PDAST5L0C5	None	None	G3T2	S2	1B.2
Lasthenia conjugens Contra Costa goldfields	PDAST5L040	Endangered	None	G1	S1	1B.1
Layia carnosa beach layia	PDAST5N010	Endangered	Endangered	G2	S2	1B.1
Leptosiphon croceus coast yellow leptosiphon	PDPLM09170	None	Candidate Endangered	G1	S1	1B.1
Leptosiphon rosaceus rose leptosiphon	PDPLM09180	None	None	G1	S1	1B.1
Lessingia arachnoidea Crystal Springs lessingia	PDAST5S0C0	None	None	G2	S2	1B.2
Lessingia germanorum San Francisco lessingia	PDAST5S010	Endangered	Endangered	G1	S1	1B.1
Limnanthes douglasii ssp. ornduffii Ornduff's meadowfoam	PDLIM02039	None	None	G4T1	S1	1B.1
Malacothamnus arcuatus arcuate bush-mallow	PDMAL0Q0E0	None	None	G2Q	S2	1B.2
Monardella sinuata ssp. nigrescens northern curly-leaved monardella	PDLAM18162	None	None	G3T2	S2	1B.2
Monolopia gracilens woodland woollythreads	PDAST6G010	None	None	G3	S3	1B.2
Pentachaeta bellidiflora white-rayed pentachaeta	PDAST6X030	Endangered	Endangered	G1	S1	1B.1
Plagiobothrys chorisianus var. chorisianus Choris' popcornflower	PDBOR0V061	None	None	G3T1Q	S1	1B.2
Polemonium carneum Oregon polemonium	PDPLM0E050	None	None	G3G4	S2	2B.2
Polygonum marinense Marin knotweed	PDPGN0L1C0	None	None	G2Q	S2	3.1
Potentilla hickmanii Hickman's cinquefoil	PDROS1B0U0	Endangered	Endangered	G1	S1	1B.1
Sanicula maritima adobe sanicle	PDAPI1Z0D0	None	Rare	G2	S2	1B.1
Senecio aphanactis chaparral ragwort	PDAST8H060	None	None	G3	S2	2B.2

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Silene verecunda ssp. verecunda San Francisco campion	PDCAR0U213	None	None	G5T1	S1	1B.2
Spergularia macrotheca var. longistyla long-styled sand-spurrey	PDCAR0W062	None	None	G5T2	S2	1B.2
Streptanthus albidus ssp. peramoenus most beautiful jewelflower	PDBRA2G012	None	None	G2T2	S2	1B.2
Stuckenia filiformis ssp. alpina slender-leaved pondweed	PMPOT03091	None	None	G5T5	S3	2B.2
Suaeda californica California seablite	PDCHE0P020	Endangered	None	G1	S1	1B.1
Trifolium amoenum two-fork clover	PDFAB40040	Endangered	None	G1	S1	1B.1
Trifolium hydrophilum saline clover	PDFAB400R5	None	None	G2	S2	1B.2
Triphysaria floribunda San Francisco owl's-clover	PDSCR2T010	None	None	G2?	S2?	1B.2
Triquetrella californica coastal triquetrella	NBMUS7S010	None	None	G2	S2	1B.2
Usnea longissima Methuselah's beard lichen	NLLEC5P420	None	None	G4	S4	4.2

Record Count: 70

Selected Elements by Scientific Name

California Department of Fish and Wildlife

California Natural Diversity Database

Query Criteria: San Mateo, Woodside, Half Moon Bay, San Leandro, Redwood Point, Palo Alto, Hunters Point, San Francisco South, and Montara Mountain 7.5-minute USGS quadrangles

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Northern Coastal Salt Marsh	CTT52110CA	None	None	G3	S3.2	
Northern Coastal Salt Marsh						
Northern Maritime Chaparral	CTT37C10CA	None	None	G1	S1.2	
Northern Maritime Chaparral						
Serpentine Bunchgrass	CTT42130CA	None	None	G2	S2.2	
Serpentine Bunchgrass						
Valley Needlegrass Grassland	CTT42110CA	None	None	G3	S3.1	
Valley Needlegrass Grassland						
Valley Oak Woodland	CTT71130CA	None	None	G3	S2.1	
Valley Oak Woodland						

Record Count: 5

CNPS California Native Plant Society

Inventory of Rare and Endangered Plants

Plant List

88 matches found. *Click on scientific name for details*

Search Criteria

Found in Quads 3712264, 3712263, 3712262, 3712254, 3712253, 3712252, 3712244 3712243 and 3712242;

Modify Search Criteria | Export to Excel | Modify Columns | Modify Sort | Display Photos

Scientific Name	Common Name	Family	Lifeform	Blooming Period	CA Rare Plant Rank	State Rank	Global Rank
Acanthomintha duttonii	San Mateo thorn-mint	Lamiaceae	annual herb	Apr-Jun	1B.1	S1	G1
Agrostis blasdalei	Blasdale's bent grass	Poaceae	perennial rhizomatous herb	May-Jul	1B.2	S2	G2
Allium peninsulare var. franciscanum	Franciscan onion	Alliaceae	perennial bulbiferous herb	(Apr)May-Jun	1B.2	S1	G5T1
Amsinckia lunaris	bent-flowered fiddleneck	Boraginaceae	annual herb	Mar-Jun	1B.2	S2S3	G2G3
Androsace elongata ssp. acuta	California androsace	Primulaceae	annual herb	Mar-Jun	4.2	S3S4	G5? T3T4
Arabis blepharophylla	coast rockcress	Brassicaceae	perennial herb	Feb-May	4.3	S4	G4
Arctostaphylos andersonii	Anderson's manzanita	Ericaceae	perennial evergreen shrub	Nov-May	1B.2	S2	G2
Arctostaphylos franciscana	Franciscan manzanita	Ericaceae	perennial evergreen shrub	Feb-Apr	1B.1	S1	G1
Arctostaphylos imbricata	San Bruno Mountain manzanita	Ericaceae	perennial evergreen shrub	Feb-May	1B.1	S1	G1
Arctostaphylos montana ssp. ravenii	Presidio manzanita	Ericaceae	perennial evergreen shrub	Feb-Mar	1B.1	S1	G3T1
Arctostaphylos montaraensis	Montara manzanita	Ericaceae	perennial evergreen shrub	Jan-Mar	1B.2	S1	G1
Arctostaphylos pacifica	Pacific manzanita	Ericaceae	evergreen shrub	Feb-Apr	1B.1	S1	G1
Arctostaphylos regismontana	Kings Mountain manzanita	Ericaceae	perennial evergreen shrub	Dec-Apr	1B.2	S2	G2
Astragalus nuttallii var. nuttallii	ocean bluff milk-vetch	Fabaceae	perennial herb	Jan-Nov	4.2	S4	G4T4
Astragalus pycnostachyus var. pycnostachyus	coastal marsh milk-vetch	Fabaceae	perennial herb	(Apr)Jun-Oct	1B.2	S2	G2T2
Astragalus tener var. tener	alkali milk-vetch	Fabaceae	annual herb	Mar-Jun	1B.2	S2	G2T2
Calandrinia breweri	Brewer's calandrinia	Montiaceae	annual herb	(Jan)Mar-Jun	4.2	S4	G4

Calochortus umbellatus	Oakland star-tulip	Liliaceae	perennial bulbiferous herb	Mar-May	4.2	S3?	G3?
Castilleja ambigua var. ambigua	johnny-nip	Orobanchaceae	annual herb (hemiparasitic)	Mar-Aug	4.2	S4	G4T5
Centromadia parryi ssp. congdonii	Congdon's tarplant	Asteraceae	annual herb	May-Oct(Nov)	1B.1	S2	G3T2
Centromadia parryi ssp. parryi	pappose tarplant	Asteraceae	annual herb	May-Nov	1B.2	S2	G3T2
Chloropyron maritimum ssp. palustre	Point Reyes bird's-beak	Orobanchaceae	annual herb (hemiparasitic)	Jun-Oct	1B.2	S2	G4?T2
Chorizanthe cuspidata var. cuspidata	San Francisco Bay spineflower	Polygonaceae	annual herb	Apr-Jul(Aug)	1B.2	S1	G2T1
Chorizanthe robusta var. robusta	robust spineflower	Polygonaceae	annual herb	Apr-Sep	1B.1	S1	G2T1
Cirsium andrewsii	Franciscan thistle	Asteraceae	perennial herb	Mar-Jul	1B.2	S3	G3
Cirsium fontinale var. fontinale	Crystal Springs fountain thistle	Asteraceae	perennial herb	(Apr)May-Oct	1B.1	S1	G2T1
Cirsium occidentale var. compactum	compact cobwebby thistle	Asteraceae	perennial herb	Apr-Jun	1B.2	S2	G3G4T2
Cirsium praeteriens	lost thistle	Asteraceae	perennial herb	Jun-Jul	1A	SX	GX
Collinsia corymbosa	round-headed Chinese-houses	Plantaginaceae	annual herb	Apr-Jun	1B.2	S1	G1
Collinsia multicolor	San Francisco collinsia	Plantaginaceae	annual herb	(Feb)Mar-May	1B.2	S2	G2
Cypripedium fasciculatum	clustered lady's-slipper	Orchidaceae	perennial rhizomatous herb	Mar-Aug	4.2	S4	G4
Dirca occidentalis	western leatherwood	Thymelaeaceae	perennial deciduous shrub	Jan-Mar(Apr)	1B.2	S2	G2
Elymus californicus	California bottle-brush grass	Poaceae	perennial herb	May-Aug(Nov)	4.3	S4	G4
Equisetum palustre	marsh horsetail	Equisetaceae	perennial rhizomatous herb	unk	3	S1S3	G5
Eriophyllum latilobum	San Mateo woolly sunflower	Asteraceae	perennial herb	May-Jun	1B.1	S1	G1
Eryngium aristulatum var. hooveri	Hoover's button-celery	Apiaceae	annual / perennial herb	(Jun)Jul(Aug)	1B.1	S1	G5T1
Eryngium jepsonii	Jepson's coyote thistle	Apiaceae	perennial herb	Apr-Aug	1B.2	S2?	G2?
Erysimum franciscanum	San Francisco wallflower	Brassicaceae	perennial herb	Mar-Jun	4.2	S3	G3
Fritillaria biflora var. ineziana	Hillsborough chocolate lily	Liliaceae	perennial bulbiferous herb	Mar-Apr	1B.1	S1	G3G4T1
Fritillaria lanceolata var. tristulis	Marin checker lily	Liliaceae	perennial bulbiferous herb	Feb-May	1B.1	S2	G5T2
Fritillaria liliacea	fragrant fritillary	Liliaceae	perennial bulbiferous herb	Feb-Apr	1B.2	S2	G2
Gilia capitata ssp. chamissonis	blue coast gilia	Polemoniaceae	annual herb	Apr-Jul	1B.1	S2	G5T2
Gilia millefoliata	dark-eyed gilia	Polemoniaceae	annual herb	Apr-Jul	1B.2	S2	G2
Grindelia hirsutula var. maritima	San Francisco gumplant	Asteraceae	perennial herb	Jun-Sep	3.2	S1	G5T1Q
Helianthella castanea	Diablo helianthella	Asteraceae	perennial herb	Mar-Jun	1B.2	S2	G2

Hemizonia congesta ssp. congesta	congested-headed hayfield tarplant	Asteraceae	annual herb	Apr-Nov	1B.2	S1S2	G5T1T2
Hesperevax sparsiflora var. brevifolia	short-leaved evax	Asteraceae	annual herb	Mar-Jun	1B.2	S2	G4T3
Hesperolinon congestum	Marin western flax	Linaceae	annual herb	Apr-Jul	1B.1	S1	G1
Heteranthera dubia	water star-grass	Pontederiaceae	perennial herb (aquatic)	Jul-Oct	2B.2	S2	G5
Horkelia cuneata var. sericea	Kellogg's horkelia	Rosaceae	perennial herb	Apr-Sep	1B.1	S1?	G4T1?
Horkelia marinensis	Point Reyes horkelia	Rosaceae	perennial herb	May-Sep	1B.2	S2	G2
Iris longipetala	coast iris	Iridaceae	perennial rhizomatous herb	Mar-May	4.2	S3	G3
Lasthenia californica ssp. macrantha	perennial goldfields	Asteraceae	perennial herb	Jan-Nov	1B.2	S2	G3T2
Lasthenia conjugens	Contra Costa goldfields	Asteraceae	annual herb	Mar-Jun	1B.1	S1	G1
Leptosiphon ambiguus	serpentine leptosiphon	Polemoniaceae	annual herb	Mar-Jun	4.2	S4	G4
Leptosiphon croceus	coast yellow leptosiphon	Polemoniaceae	annual herb	Apr-Jun	1B.1	S1	G1
Leptosiphon rosaceus	rose leptosiphon	Polemoniaceae	annual herb	Apr-Jul	1B.1	S1	G1
Lessingia arachnoidea	Crystal Springs lessingia	Asteraceae	annual herb	Jul-Oct	1B.2	S2	G2
Lessingia germanorum	San Francisco lessingia	Asteraceae	annual herb	(Jun)Jul-Nov	1B.1	S1	G1
Lessingia hololeuca	woolly-headed lessingia	Asteraceae	annual herb	Jun-Oct	3	S3?	G3?
Lilium maritimum	coast lily	Liliaceae	perennial bulbiferous herb	May-Aug	1B.1	S2	G2
Limnanthes douglasii ssp. ornduffii	Ornduff's meadowfoam	Limnanthaceae	annual herb	Nov-May	1B.1	S1	G4T1
Lupinus arboreus var. eximius	San Mateo tree lupine	Fabaceae	perennial evergreen shrub	Apr-Jul	3.2	S2	G2Q
Malacothamnus aboriginum	Indian Valley bush-mallow	Malvaceae	perennial deciduous shrub	Apr-Oct	1B.2	S3	G3
Malacothamnus arcuatus	arcuate bush-mallow	Malvaceae	perennial evergreen shrub	Apr-Sep	1B.2	S2	G2Q
Malacothamnus davidsonii	Davidson's bush-mallow	Malvaceae	perennial deciduous shrub	Jun-Jan	1B.2	S2	G2
Malacothamnus hallii	Hall's bush-mallow	Malvaceae	perennial evergreen shrub	(Apr)May-Sep(Oct)	1B.2	S2	G2
Micropus amphibolus	Mt. Diablo cottonweed	Asteraceae	annual herb	Mar-May	3.2	S3S4	G3G4
Monardella sinuata ssp. nigrescens	northern curly-leaved monardella	Lamiaceae	annual herb	(Apr)May-Jul(Aug-Sep)	1B.2	S2	G3T2
Monolopia gracilens	woodland woolythreads	Asteraceae	annual herb	(Feb)Mar-Jul	1B.2	S3	G3
Navarretia myersii ssp. myersii	pincushion navarretia	Polemoniaceae	annual herb	Apr-May	1B.1	S2	G2T2
Pedicularis dudleyi	Dudley's lousewort	Orobanchaceae	perennial herb	Apr-Jun	1B.2	S2	G2
Pentachaeta bellidiflora	white-rayed pentachaeta	Asteraceae	annual herb	Mar-May	1B.1	S1	G1
	Choris' popcornflower	Boraginaceae	annual herb	Mar-Jun	1B.2	S2	G3T2Q

Plagiobothrys chorisianus var. chorisianus							
Polemonium carneum	Oregon polemonium	Polemoniaceae	perennial herb	Apr-Sep	2B.2	S2	G3G4
Potentilla hickmanii	Hickman's cinquefoil	Rosaceae	perennial herb	Apr-Aug	1B.1	S1	G1
Ranunculus lobbii	Lobb's aquatic buttercup	Ranunculaceae	annual herb (aquatic)	Feb-May	4.2	S3	G4
Senecio aphanactis	chaparral ragwort	Asteraceae	annual herb	Jan-Apr(May)	2B.2	S2	G3
Silene verecunda ssp. verecunda	San Francisco campion	Caryophyllaceae	perennial herb	(Feb)Mar-Jun(Aug)	1B.2	S1	G5T1
Streptanthus albidus ssp. peramoenus	most beautiful jewelflower	Brassicaceae	annual herb	(Mar)Apr-Sep(Oct)	1B.2	S2	G2T2
Stuckenia filiformis ssp. alpina	slender-leaved pondweed	Potamogetonaceae	perennial rhizomatous herb (aquatic)	May-Jul	2B.2	S3	G5T5
Suaeda californica	California seablite	Chenopodiaceae	perennial evergreen shrub	Jul-Oct	1B.1	S1	G1
Trifolium amoenum	two-fork clover	Fabaceae	annual herb	Apr-Jun	1B.1	S1	G1
Trifolium hydrophilum	saline clover	Fabaceae	annual herb	Apr-Jun	1B.2	S2	G2
Triphysaria floribunda	San Francisco owl's-clover	Orobanchaceae	annual herb	Apr-Jun	1B.2	S2?	G2?
Triquetrella californica	coastal triquetrella	Pottiaceae	moss		1B.2	S2	G2
Tropidocarpum capparideum	caper-fruited tropidocarpum	Brassicaceae	annual herb	Mar-Apr	1B.1	S1	G1
Usnea longissima	Methuselah's beard lichen	Parmeliaceae	fruticose lichen (epiphytic)		4.2	S4	G4

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APPENDIX C. SPECIAL-STATUS ANIMAL SPECIES

Selected Elements by Scientific Name

California Department of Fish and Wildlife

California Natural Diversity Database

Query Criteria: San Mateo, Woodside, Half Moon Bay, San Leandro, Redwood Point, Palo Alto, Hunters Point, San Francisco South, and Montara Mountain 7.5-minute USGS quadrangles

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Accipiter cooperii Cooper's hawk	ABNKC12040	None	None	G5	S4	WL
Adela oplerella Opler's longhorn moth	IILEE0G040	None	None	G2	S2	
Ambystoma californiense California tiger salamander	AAAAA01180	Threatened	Threatened	G2G3	S2S3	WL
Aneides niger Santa Cruz black salamander	AAAAD01070	None	None	G3	S3	SSC
Antrozous pallidus pallid bat	AMACC10010	None	None	G5	S3	SSC
Ardea herodias great blue heron	ABNGA04010	None	None	G5	S4	
Asio flammeus short-eared owl	ABNSB13040	None	None	G5	S3	SSC
Athene cunicularia burrowing owl	ABNSB10010	None	None	G4	S3	SSC
Banksula incredula incredible harvestman	ILARA14100	None	None	G1	S1	
Bombus caliginosus obscure bumble bee	IIHYM24380	None	None	G4?	S1S2	
Bombus crotchii Crotch bumble bee	IIHYM24480	None	None	G3G4	S1S2	
Bombus occidentalis western bumble bee	IIHYM24250	None	None	G2G3	S1	
Brachyramphus marmoratus marbled murrelet	ABNNN06010	Threatened	Endangered	G3G4	S1	
Caecidotea tomalensis Tomales isopod	ICMAL01220	None	None	G2	S2S3	
Calicina minor Edgewood blind harvestman	ILARA13020	None	None	G1	S1	
Callophrys mossii bayensis San Bruno elfin butterfly	IILEPE2202	Endangered	None	G4T1	S1	
Charadrius alexandrinus nivosus western snowy plover	ABNNB03031	Threatened	None	G3T3	S2S3	SSC
Cicindela hirticollis gravida sandy beach tiger beetle	IICOL02101	None	None	G5T2	S2	

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Circus cyaneus northern harrier	ABNKC11010	None	None	G5	S3	SSC
Corynorhinus townsendii Townsend's big-eared bat	AMACC08010	None	None	G3G4	S2	SSC
Coturnicops noveboracensis yellow rail	ABNME01010	None	None	G4	S1S2	SSC
Danaus plexippus pop. 1 monarch - California overwintering population	IILEPP2012	None	None	G4T2T3	S2S3	
Dicamptodon ensatus California giant salamander	AAAAH01020	None	None	G3	S2S3	SSC
Dipodomys venustus venustus Santa Cruz kangaroo rat	AMAFD03042	None	None	G4T1	S1	
Dufourea stagei Stage's dufourine bee	IIHYM22010	None	None	G1G2	S1	
Elanus leucurus white-tailed kite	ABNKC06010	None	None	G5	S3S4	FP
Emys marmorata western pond turtle	ARAAD02030	None	None	G3G4	S3	SSC
Erethizon dorsatum North American porcupine	AMAFJ01010	None	None	G5	S3	
Eucyclogobius newberryi tidewater goby	AFCQN04010	Endangered	None	G3	S3	SSC
Euphydryas editha bayensis Bay checkerspot butterfly	IILEPK4055	Threatened	None	G5T1	S1	
Falco columbarius merlin	ABNKD06030	None	None	G5	S3S4	WL
Falco peregrinus anatum American peregrine falcon	ABNKD06071	Delisted	Delisted	G4T4	S3S4	FP
Geothlypis trichas sinuosa saltmarsh common yellowthroat	ABPBX1201A	None	None	G5T3	S3	SSC
Haliaeetus leucocephalus bald eagle	ABNKC10010	Delisted	Endangered	G5	S3	FP
Hydrochara rickseckeri Ricksecker's water scavenger beetle	IICOL5V010	None	None	G2?	S2?	
Hydroporus leechi Leech's skyline diving beetle	IICOL55040	None	None	G1?	S1?	
Ischnura gemina San Francisco forktail damselfly	IIODO72010	None	None	G2	S2	
Lasiurus cinereus hoary bat	AMACC05030	None	None	G5	S4	
Laterallus jamaicensis coturniculus California black rail	ABNME03041	None	Threatened	G3G4T1	S1	FP

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Lichnanthe ursina bumblebee scarab beetle	IICOL67020	None	None	G2	S2	
Melospiza melodia pusillula Alameda song sparrow	ABPBXA301S	None	None	G5T2?	S2S3	SSC
Microcina edgewoodensis Edgewood Park micro-blind harvestman	ILARA47010	None	None	G1	S1	
Mylopharodon conocephalus hardhead	AFCJB25010	None	None	G3	S3	SSC
Myotis thysanodes fringed myotis	AMACC01090	None	None	G4	S3	
Neotoma fuscipes annectens San Francisco dusky-footed woodrat	AMAFF08082	None	None	G5T2T3	S2S3	SSC
Nycticorax nycticorax black-crowned night heron	ABNGA11010	None	None	G5	S4	
Nyctinomops macrotis big free-tailed bat	AMACD04020	None	None	G5	S3	SSC
Oncorhynchus mykiss irideus pop. 8 steelhead - central California coast DPS	AFCHA0209G	Threatened	None	G5T2T3Q	S2S3	
Phalacrocorax auritus double-crested cormorant	ABNFD01020	None	None	G5	S4	WL
Plebejus icarioides missionensis Mission blue butterfly	IILEPG801A	Endangered	None	G5T1	S1	
Rallus obsoletus obsoletus California Ridgway's rail	ABNME05016	Endangered	Endangered	G5T1	S1	FP
Rana draytonii California red-legged frog	AAABH01022	Threatened	None	G2G3	S2S3	SSC
Reithrodontomys raviventris salt-marsh harvest mouse	AMAFF02040	Endangered	Endangered	G1G2	S1S2	FP
Riparia riparia bank swallow	ABPAU08010	None	Threatened	G5	S2	
Rynchops niger black skimmer	ABNNM14010	None	None	G5	S2	SSC
Scapanus latimanus parvus Alameda Island mole	AMABB02031	None	None	G5THQ	SH	SSC
Sorex vagrans halicoetes salt-marsh wandering shrew	AMABA01071	None	None	G5T1	S1	SSC
Speyeria callippe callippe callippe silverspot butterfly	IILEPJ6091	Endangered	None	G5T1	S1	
Speyeria zerene myrtleae Myrtle's silverspot butterfly	IILEPJ608C	Endangered	None	G5T1	S1	
Spirinchus thaleichthys longfin smelt	AFCHB03010	Candidate	Threatened	G5	S1	SSC

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Sternula antillarum browni	ABNNM08103	Endangered	Endangered	G4T2T3Q	S2	FP
California least tern						
Taxidea taxus	AMAJF04010	None	None	G5	S3	SSC
American badger						
Thamnophis sirtalis tetrataenia	ARADB3613B	Endangered	Endangered	G5T2Q	S2	FP
San Francisco gartersnake						
Trachusa gummifera	IIHYM80010	None	None	G1	S1	
San Francisco Bay Area leaf-cutter bee						
Tryonia imitator	IMGASJ7040	None	None	G2	S2	
mimic tryonia (=California brackishwater snail)						

Record Count: 65

IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

Location

San Mateo County, California



Local office

Sacramento Fish And Wildlife Office

(916) 414-6600
(916) 414-6713

Federal Building
2800 Cottage Way, Room W-2605
Sacramento, CA 95825-1846

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Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population, even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species[1] are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service.

1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information.

The following species are potentially affected by activities in this location:

NOT FOR CONSULTATION

Mammals

NAME	STATUS
Salt Marsh Harvest Mouse *Reithrodontomys raviventris* No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/613	Endangered

Birds

NAME	STATUS
California Clapper Rail *Rallus longirostris obsoletus* No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/4240	Endangered
California Least Tern *Sterna antillarum browni* No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/8104	Endangered
Marbled Murrelet *Brachyramphus marmoratus* There is **final** critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/4467	Threatened
Western Snowy Plover *Charadrius alexandrinus nivosus* There is **final** critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/8035	Threatened

Reptiles

NAME	STATUS

Green Sea Turtle Chelonia mydas — Threatened
No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/6199

San Francisco Garter Snake Thamnophis sirtalis tetrataenia — Endangered
No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/5956

Amphibians

NAME	STATUS
California Red-legged Frog Rana draytonii There is **final** critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/2891	Threatened

Fishes

NAME	STATUS
Delta Smelt Hypomesus transpacificus There is **final** critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/321	Threatened
Steelhead Oncorhynchus (=Salmo) mykiss There is **final** critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/1007	Threatened

Insects

NAME	STATUS
Bay Checkerspot Butterfly Euphydryas editha bayensis There is **final** critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/2320	Threatened
Mission Blue Butterfly Icaricia icarioides missionensis There is **proposed** critical habitat for this species. The location of the critical habitat is not available. https://ecos.fws.gov/ecp/species/6928	Endangered
Myrtle's Silverspot Butterfly Speyeria zerene myrtleae No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/6929	Endangered
San Bruno Elfin Butterfly Callophrys mossii bayensis There is **proposed** critical habitat for this species. The location of the critical habitat is not available. https://ecos.fws.gov/ecp/species/3394	Endangered

Flowering Plants

NAME	STATUS
Fountain Thistle Cirsium fontinale var. fontinale No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/7939	Endangered
Marin Dwarf-flax Hesperolinon congestum No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/5363	Threatened

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San Mateo Thornmint Acanthomintha obovata ssp. duttonii No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/2038	Endangered
San Mateo Woolly Sunflower Eriophyllum latilobum No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/7791	Endangered
White-rayed Pentachaeta Pentachaeta bellidiflora No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/7782	Endangered

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

THERE ARE NO CRITICAL HABITATS AT THIS LOCATION.

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any activity that results in the take (to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct) of migratory birds or eagles is prohibited unless authorized by the U.S. Fish and Wildlife Service[3]. There are no provisions for allowing the take of migratory birds that are unintentionally killed or injured. Any person or organization who plans or conducts activities that may result in the take of migratory birds is responsible for complying with the appropriate regulations and implementing appropriate conservation measures, as described below.

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.
3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

Additional information can be found using the following links:

- Birds of Conservation Concern http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php
- Measures for avoiding and minimizing impacts to birds http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php
- Nationwide conservation measures for birds http://www.fws.gov/migratorybirds/pdf/management/nationwidestandardconservationmeasures.pdf

The birds listed below are USFWS Birds of Conservation Concern that might be affected by activities in this location. The list does not contain every bird you may find in this location, nor is it guaranteed that all of the birds on the list will be found on or near this location. To get a better idea of the specific locations where certain species have been reported and their level of occurrence, please refer to resources such as the E-bird data mapping tool (year-round bird sightings by birders and the general public) and Breeding Bird Survey (relative abundance maps for breeding birds). Although it is important to try to avoid and minimize impacts to all birds, special attention should be given to the birds on the list below. To get a list of all birds potentially present in your project area, visit the E-bird Explore Data Tool.

NAME	BREEDING SEASON
Allen's Hummingbird Selasphorus sasin https://ecos.fws.gov/ecp/species/9637	Breeds Feb 1 to Jul 15
Ashy Storm-petrel Oceanodroma homochroa https://ecos.fws.gov/ecp/species/7237	Breeds May 1 to Jan 15
Black Oystercatcher Haematopus bachmani https://ecos.fws.gov/ecp/species/9591	Breeds Apr 15 to Oct 31
Black Rail Laterallus jamaicensis https://ecos.fws.gov/ecp/species/7717	Breeds Mar 1 to Sep 15

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Black Skimmer Rynchops niger https://ecos.fws.gov/ecp/species/5234	Breeds May 20 to Sep 15
Black Swift Cypseloides niger https://ecos.fws.gov/ecp/species/8878	Breeds Jun 15 to Sep 10
Black Turnstone Arenaria melanocephala	Breeds elsewhere
Burrowing Owl Athene cunicularia https://ecos.fws.gov/ecp/species/9737	Breeds Mar 15 to Aug 31
California Thrasher Toxostoma redivivum	Breeds Jan 1 to Jul 31
Common Yellowthroat Geothlypis trichas sinuosa https://ecos.fws.gov/ecp/species/2084	Breeds May 20 to Jul 31
Gull-billed Tern Gelochelidon nilotica https://ecos.fws.gov/ecp/species/9501	Breeds May 1 to Jul 31
Lawrence's Goldfinch Carduelis lawrencei https://ecos.fws.gov/ecp/species/9464	Breeds Mar 20 to Sep 20
Long-billed Curlew Numenius americanus https://ecos.fws.gov/ecp/species/5511	Breeds elsewhere
Marbled Godwit Limosa fedoa https://ecos.fws.gov/ecp/species/9481	Breeds elsewhere
Nuttall's Woodpecker Picoides nuttallii https://ecos.fws.gov/ecp/species/9410	Breeds Apr 1 to Jul 20
Oak Titmouse Baeolophus inornatus https://ecos.fws.gov/ecp/species/9656	Breeds Mar 15 to Jul 15
Red Knot Calidris canutus ssp. roselaari https://ecos.fws.gov/ecp/species/8880	Breeds elsewhere
Rufous Hummingbird selasphorus rufus https://ecos.fws.gov/ecp/species/8002	Breeds elsewhere
Short-billed Dowitcher Limnodromus griseus https://ecos.fws.gov/ecp/species/9480	Breeds elsewhere
Snowy Plover Charadrius alexandrinus	Breeds Mar 5 to Sep 15
Song Sparrow Melospiza melodia pusillula https://ecos.fws.gov/ecp/species/3509	Breeds Feb 20 to Sep 5
Spotted Towhee Pipilo maculatus clementae https://ecos.fws.gov/ecp/species/4243	Breeds Apr 15 to Jul 20
Tricolored Blackbird Agelaius tricolor https://ecos.fws.gov/ecp/species/3910	Breeds Mar 15 to Aug 10
Whimbrel Numenius phaeopus https://ecos.fws.gov/ecp/species/9483	Breeds elsewhere
Yellow-billed Magpie Pica nuttalli https://ecos.fws.gov/ecp/species/9726	Breeds Apr 1 to Jul 31

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Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in your project's counties during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

Breeding Season (■)
Yellow bars denote when the bird breeds in the Bird Conservation Region(s) in which your project lies. If there are no yellow bars shown for a bird, it does not breed in your project area.

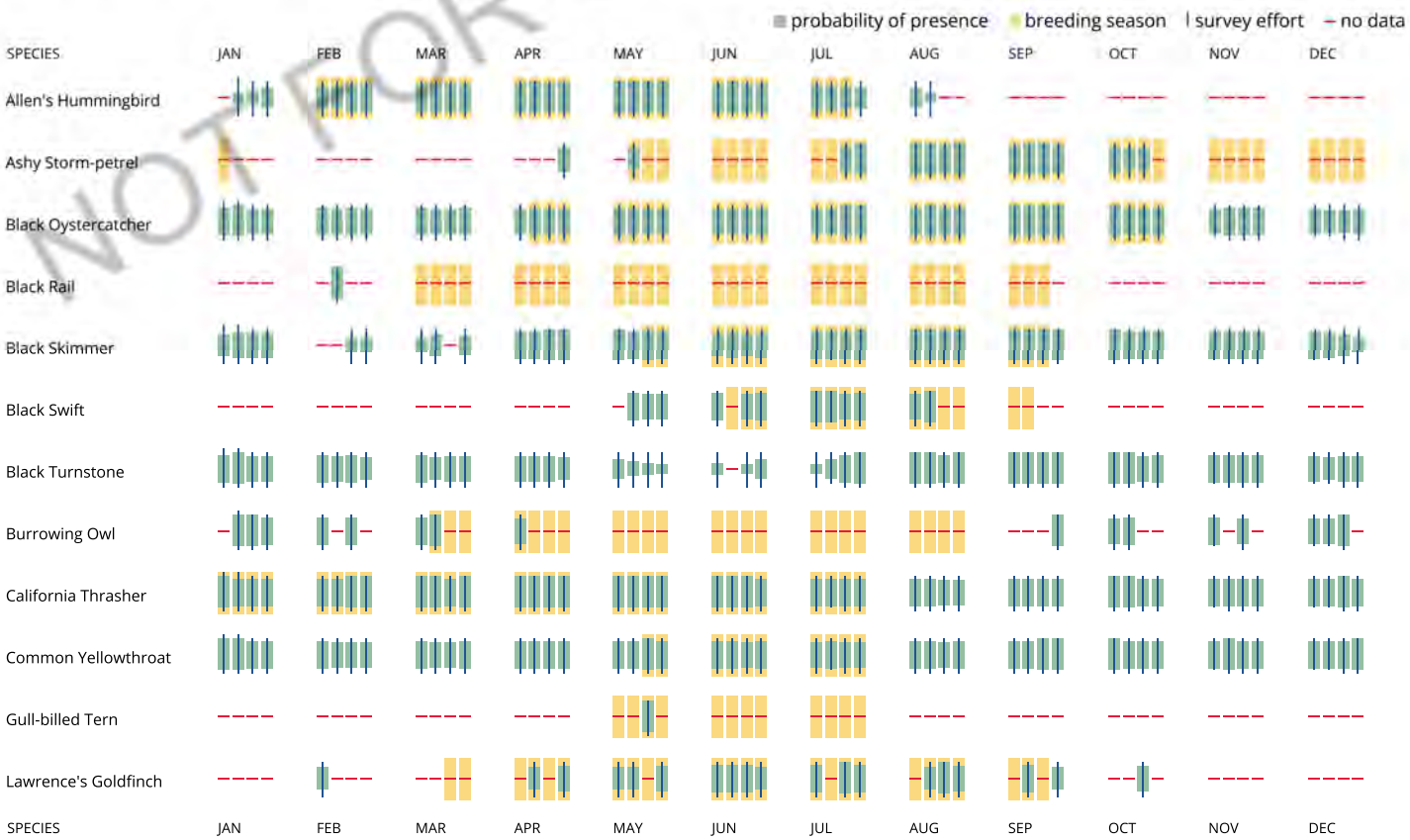
Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the counties of your project area. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

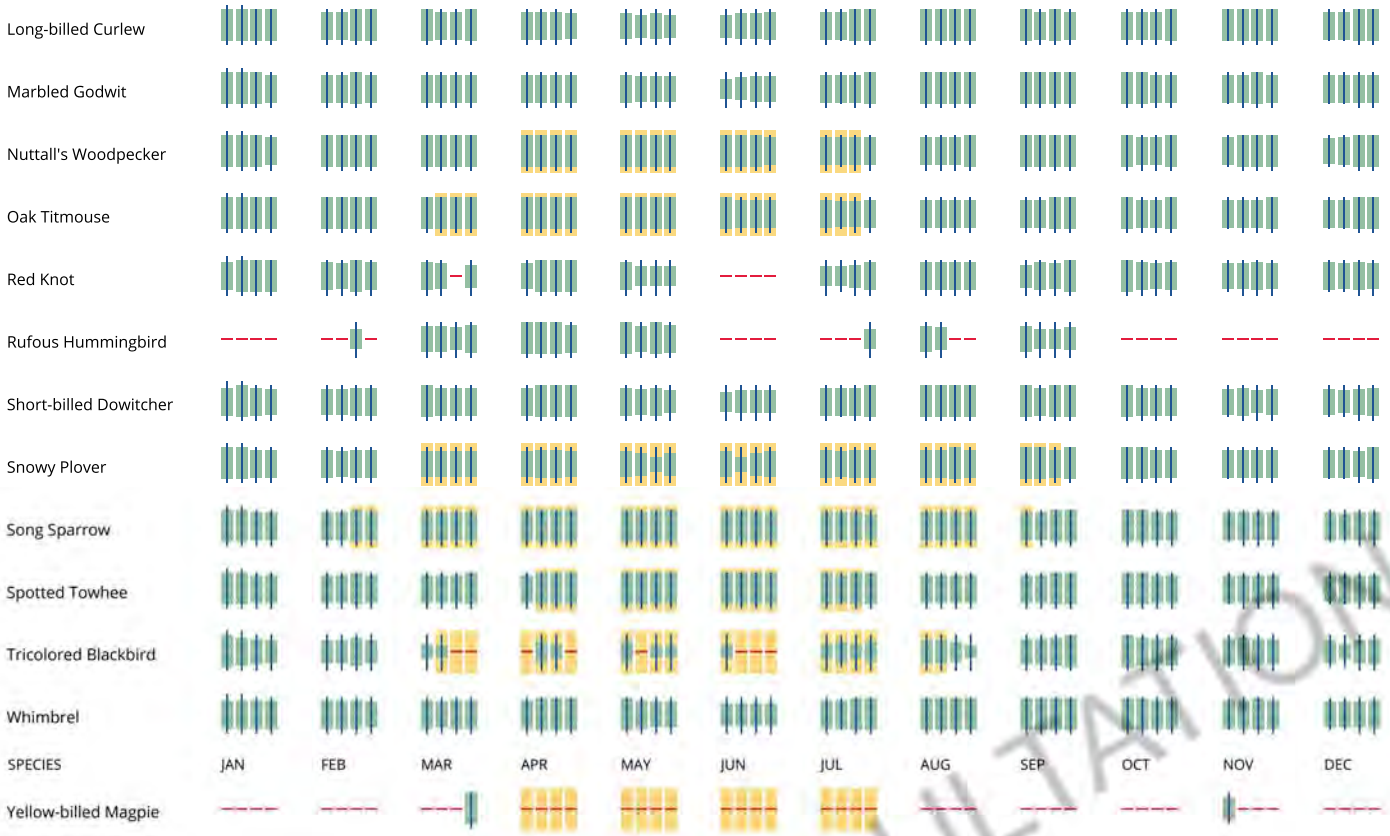
To see a bar's survey effort range, simply hover your mouse cursor over the bar.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information.

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Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Such measures are particularly important when birds are most likely to occur in the project area. To see when birds are most likely to occur in your project area, view the Probability of Presence Summary. Special attention should be made to look for nests and avoid nest destruction during the breeding season. The best information about when birds are breeding can be found in Birds of North America (BNA) Online under the "Breeding Phenology" section of each species profile. Note that accessing this information may require a subscription. Additional measures and/or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the migratory birds potentially occurring in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) that might be affected by activities in your project location. These birds are of priority concern because it has been determined that without additional conservation actions, they are likely to become candidates for listing under the Endangered Species Act (ESA).

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets. The AKN list represents all birds reported to be occurring at some level throughout the year in the counties in which your project lies. That list is then narrowed to only the Birds of Conservation Concern for your project area.

Again, the Migratory Bird Resource list only includes species of particular priority concern, and is not representative of all birds that may occur in your project area. Although it is important to try to avoid and minimize impacts to all birds, special attention should be made to avoid and minimize impacts to birds of priority concern. To get a list of all birds potentially present in your project area, please visit the E-bird Explore Data Tool.

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets.

Probability of presence data is continuously being updated as new and better information becomes available.

How do I know if a bird is breeding, wintering, migrating or present year-round in my project area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may refer to the following resources: The The Cornell Lab of Ornithology All About Birds Bird Guide, or (if you are unsuccessful in locating the bird of interest there), the Cornell Lab of Ornithology Neotropical Birds guide. If a bird entry on your migratory bird species list indicates a breeding season, it is probable the bird breeds in your project's counties at some point within the time-frame specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

Facilities

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Wildlife refuges

Any activity proposed on National Wildlife Refuge lands must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGES AT THIS LOCATION.

Fish hatcheries

THERE ARE NO FISH HATCHERIES AT THIS LOCATION.

Wetlands in the National Wetlands Inventory

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

THERE ARE NO KNOWN WETLANDS AT THIS LOCATION.

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

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APPENDIX D. RARITY STATUS CODES

EXPLANATION OF RARITY STATUS CODES

ENDANGERED SPECIES ACT (FESA) LISTING CODES

FE = federally listed as Endangered
FT = federally listed as Threatened
FPE = proposed for listing Endangered
FPT = proposed for listing Threatened
FC = federal candidate; former Category 1 candidates
FD/FPD = delisted/proposed for delisting
BCC = Bird Species of Conservation Concern
SC = species of concern; established by NMFS, effective April 15, 2004.

CALIFORNIA ENDANGERED SPECIES ACT (CESA) LISTING CODES

SE = state-listed as Endangered
ST = state-listed as Threatened
SR = state-listed as Rare
SCE = state candidate for listing as Endangered
SCT = state candidate for listing as Threatened
SD/SCD = delisted/State candidate for delisting

GLOBAL (G) AND STATE (S) RARITY_RANKINGS

G1/S1 = Critically imperiled: at high risk of extinction, extremely rare.
G2/S2 = Imperiled: at high risk of extinction, restricted range, very few populations.
G3/S3 = Vulnerable: moderate risk of extinction, restricted range, few populations.
G4/S4 = Apparently secure: uncommon, not rare, possible long-term declines.
G5/S5 = Secure: common, widespread, abundant.
H = All records are historical
Q = Very rare, but taxonomy is questionable
T = Rank assigned to a sub-specific taxon.
X = All records are extirpated (extinct in the wild)

CALIFORNIA RARE PLANT RANKINGS (CRPR)

1A: Plants presumed extinct in CA, rare or extinct elsewhere.
1B: Plants rare, threatened, or endangered in CA and elsewhere.
2A: Plants presumed extirpated in CA but common elsewhere.
2B: Plants rare, threatened or endangered in CA but common elsewhere.
3: Plants for which more information is needed – a review list.
4: Plants of limited distribution – a watch list.
.1 - Seriously endangered in CA
.2 – Fairly endangered in CA
.3 – Not very endangered in CA

OTHER CODES

ABC: WL - American Bird Conservancy Watch List of Birds of Conservation Concern.

AFS - American Fisheries Society categories of risk for marine, estuarine and diadromous fish stocks. Codes: **E**=endangered; **T**=threatened; **V**=vulnerable

AUD: WL - Audubon: Watch List 2007. Bird species facing population decline and/or threats such as loss of breeding and wintering grounds, or species with limited geographic ranges. **R** – Red List, global conservation concern; **Y** – Yellow List, national conservation concern.

BLM: S - Bureau of Land Mgt: Sensitive. Includes species under review by USFWS or NMFS, species whose numbers are declining so rapidly that federal listing may become necessary, species with small and widely dispersed populations, or species inhabiting refugia or other unique habitats.

CDF: S – CA Dept. of Forestry and Fire Protection: Sensitive. Includes species that warrant special protection during timber operations.

DFW: FP - CDFW: Fully Protected. Species protected under §§3511 (birds), 4700 (mammals), 5050 (reptiles and amphibians), and 5515 (fish) of the California Fish and Game Code.

DFW: SA - CDFW: Special Animal. Species included on the CDFW's lists of special animals.

DFW: SP - CDFW: Special Plant. Species included on the CDFW's lists of special plants.

DFW: SSC - CDFW: California Species of Special Concern.

DFW: WL - CDFW: (Watch List): taxa that don't meet SSC criteria but about which there is concern and additional information is needed to clarify status.

FS: S - USDA Forest Service: Sensitive. Species whose population viability is a concern, as evidenced by significant current or predicted downward trends in numbers or density, or in habitat capability that would reduce a species' existing distribution.

FWS: BCC - U.S. Fish and Wildlife Service: Birds of Conservation Concern. Migratory and non-migratory bird species that represent the USFWS's highest conservation priorities.

FWS: BEPA - U.S. Fish and Wildlife Service: Bald Eagle Protection Act.

FWS: MBTA U.S. Fish and Wildlife Service: International Migratory Bird Treaty Act.

FWS: MNB - U.S. Fish and Wildlife Service: Migratory Nongame Birds of Management Concern. Species of concern in the U.S. due to documented or apparent population declines, small or restricted populations, or dependence on restricted or vulnerable habitats.

MMPA – Marin Mammal Protection Act

NMFS: SC - National Marine Fisheries Service: Species of Concern.

WBWG - Western Bat Working Group. Priority for funding, planning or conservation actions. Priority Codes: **H**=high; **MH**=medium-high; **M**=medium; **LM**=low-medium

Xerces - Xerces Society Red List.
Codes: **C**=critically imperiled; **I**=imperiled; **V**=vulnerable; **D**=data deficient

Appendix C

Geologic and Geotechnical Report

GEOTECHNICAL REPORT

MONTE CRESTA DRIVE ROAD EXTENSION

BELMONT, CALIFORNIA 94002

Prepared for

Mr. Meng Huang

226 Coleman Street

San Francisco, California 94124

August 2018

Project No. 4268-1B

August 9, 2018
4268-1B

Mr. Meng Huang
226 Coleman Street
San Francisco, California 94124

RE: GEOTECHNICAL REPORT
MONTE CRESTA DRIVE
ROAD EXTENSION
BELMONT, CALIFORNIA

Dear Mr. Huang:

As requested, we have performed a geotechnical investigation and prepared this design-level geotechnical report for the proposed 335-foot-long extension of Monte Cresta Drive in Belmont, California. The findings, conclusions, and preliminary recommendations from our geologic and geotechnical feasibility study for the proposed road extension were presented in our feasibility report, dated April 30, 2018, which is included in Appendix A.

We refer you to the text of this report for our specific design-level recommendations for the proposed road extension.

Thank you for the opportunity to work with you on this project. Please call if you have questions or comments about site conditions along the proposed road extension or the findings, conclusions, or recommendations from our site investigation.

Very truly yours,

ROMIG ENGINEERS, INC.

Payum Vossoughi, E.I.T.

Richard G. Woodard, P.E., G.E.

REGISTERED PROFESSIONAL ENGINEER
RICHARD G. WOODARD
No. 905
GEOTECHNICAL
STATE OF CALIFORNIA

Copies: Addressee (4)
Lea & Braze Engineering, Inc. (via email)
Attn: Mr. Ryan Barton and Mr. Pete Carlino

RGW:PV:pf

GEOTECHNICAL REPORT
MONTE CRESTA DRIVE ROAD EXTENSION
BELMONT, CALIFORNIA 94002

PREPARED FOR:

MR. MENG HUANG

226 COLEMAN STREET

SAN FRANCISCO, CALIFORNIA 94124

PREPARED BY:

ROMIG ENGINEERS, INC.

1390 EL CAMINO REAL, SECOND FLOOR

SAN CARLOS, CALIFORNIA 94070

AUGUST 2018

ROMIG ENGINEERS

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REFERENCES

APPENDIX A - Geologic and Geotechnical Feasibility Study, Monte Cresta Drive Road Extension, dated April 30, 2018, prepared by Romig Engineers, Inc.

GEOTECHNICAL REPORT
FOR
MONTE CRESTA DRIVE ROAD EXTENSION
BELMONT, CALIFORNIA

INTRODUCTION

This report presents the results of our geotechnical investigation for the proposed 335-foot-long extension of Monte Cresta Drive in Belmont, California. The purpose of this study was to evaluate the geologic and geotechnical conditions along the alignment of the proposed road extension, which are described in feasibility report in Appendix A, and to provide design-level geotechnical recommendations for the proposed road extension.

Project Description

The proposed project consists of extending Monte Cresta Drive to the south from its present terminus adjacent to the northern end of Sequoia Way. The road extension will be located within the existing Monte Cresta Drive right-of-way and will extend approximately 335-feet to the south. The road extension will provide access to several unimproved lots along the road right-of-way including APN 043-234-170 (Lot 21) and APN 043-234-210 (combined Lots 19 and 20) located upslope (east) of the road extension, and APN 043-232-090 (Lot 10) located downslope (west) of the road extension. The road extension will not provide access to APN 043-232-140 (Lot 13), which is located south of Station 5+35, the end of the road extension. The proposed road extension will be paved with asphalt concrete and includes two new fire hydrants, retaining walls along both sides, and a hammer-head turn-around for fire trucks at the southern end.

Scope of Work

The scope of our work for this investigation was presented in our agreement with Mr. Meng Huang, dated February 2, 2018. In order to accomplish this design-level investigation and report, we performed the following work.

- Review of geologic, geotechnical, and seismic conditions in the vicinity of the proposed road extension, including information presented in our Geologic and Geotechnical Engineering Feasibility Study for the Monte Cresta Drive Through Road, dated June 30, 2008, and in our Geologic and Geotechnical Feasibility Study for the Monte Cresta Drive Road Extension, dated April 30, 2018.

- Review of the City of Belmont Planning Division's Incomplete Letter to Mr. Meng Huang, dated June 18, 2018.

- Review of Cotton, Shires and Associates' Peer Review letter, dated June 22, 2018, addressing our Geologic and Geotechnical Feasibility Study Report for the proposed road extension and the preliminary road extension plans, dated February 16, 2018, prepared by Lea & Braze Engineering, Inc. Our responses to the comments in Cotton, Shires and Associates' Peer Review letter are presented in a letter, dated August 8, 2018.

- Review of the updated improvement plans for the Monte Cresta Drive road extension, revised on August 14, 2018, prepared by Lea & Braze Engineering, Inc.

- Engineering analysis and evaluation of the field and laboratory test data from our April 30, 2018 feasibility study to develop geotechnical design and construction criteria for the proposed road extension.

- Preparation of this report presenting our findings, conclusions, and geotechnical recommendations for the proposed roadway extension.

Limitations

This report was prepared for the exclusive use of Mr. Meng Huang for specific application to developing geotechnical design criteria for the proposed Monte Cresta Drive road extension in Belmont, California. We make no warranty, expressed or implied, for the services we perform for this project. Our services are performed in accordance with the geotechnical engineering principles generally accepted at this time and location. This report was prepared to expand on the findings, conclusions, and preliminary recommendations presented in our feasibility study described herein. In the event there are changes in the nature, design, or location of the proposed road extension, or if any future improvements are planned, the conclusions and recommendations presented in this report should not be considered valid unless: 1) the changes are reviewed by us, and; 2) the conclusions and recommendations presented in this report are modified or verified in writing.

The conclusions and recommendations presented in this report are based on site conditions as they existed at the time of our study; the currently proposed road extension plans; review of readily available reports relevant to the site conditions; and laboratory test results. It should be recognized that certain limitations are inherent in the evaluation of subsurface conditions and that certain conditions may not be detected during an investigation of this type. Changes in the information or data gained from any of these sources could result in changes to our conclusions and recommendations. If such changes occur, we should be advised so that we can review our report in light of those changes.

SITE RECONNAISSANCE AND SUBSURFACE EXPLORATION

Our Geologic and Geotechnical Feasibility Study report for the Monte Cresta Drive Road Extension, dated April 30, 2018, is included in Appendix A and should be referenced for a description of the findings and conclusions from our site reconnaissance and subsurface exploration along the proposed road extension alignment.

GEOLOGIC SETTING

Our Geologic and Geotechnical Feasibility Study report for the Monte Cresta Drive Road Extension in Appendix A and should be referenced for a description of regional and site geology, observations during our geologic site reconnaissance, aerial photograph review, faulting and seismicity, earthquake design parameters, and potential geologic hazards along and adjacent to the proposed road extension.

CONCLUSIONS AND RECOMMENDATIONS

From a geotechnical viewpoint, the site is suitable for the proposed 335-foot-long extension of Monte Cresta Drive provided the recommendations presented in this report are followed during design and construction. The primary geotechnical concerns for the proposed road extension site are: 1) the presence of up to about 8 feet of undocumented fill along portions of the downslope side of the proposed road extension; 2) the presence of recent landslides upslope and downslope of portions of the proposed road extension, as shown on Figure 2 of the attached report; 3) the moderate to steep slopes along the road extension site, and; 4) the potential for severe ground shaking at the site during a major earthquake.

We recommend the existing fill between the proposed retaining walls along the proposed road alignment be excavated and recompacted to modern day construction standards on a series of level benches preferably excavated into weathered bedrock and/or competent residual soil. If the existing fill is not removed and reconstructed along the road extension alignment, as recommended in this report, there could be a potential for differential settlement along the road extension, particularly during and after heavy rainfall and/or as a result of strong seismic shaking. In the mapped landslide areas between about Stations 2+00 and 4+00, it may not be practical to extend the depth of fill removal and replacement down to weathered bedrock due to the presence of the mapped landslides shown on Figure 2 of the attached report and on the revised road improvement plans. In this area, the depth of fill removal and recompaction may be limited to 8 feet below finished grade.

The retaining wall along the upslope (east) side of proposed road extension will generally retain a cut into the native hillside and will have relatively level ground along its downslope side. The majority of this retaining wall may be supported on conventional spread footings extending into weathered bedrock. Between about Stations 2+90 and 3+80, the retaining wall along the upslope side of the road extension should be supported on reinforced concrete piers due to the presence of a mapped landslide.

To reduce the risk of soil and storm water runoff flowing over the top of the retaining wall along the upslope side of the road extension, the top of this wall should extend at least 6 to 12 inches above finished grade behind the wall.

The retaining wall along the downslope (west) side of the proposed road extension will support fill and will have sloping ground along its downslope side. This wall should be supported on relatively deep reinforced concrete piers extending into weathered bedrock below the fill, colluvium, and any remaining landslide debris. To reduce the potential for damage to the road extension from slope deformation within and above the mapped landslide area between about Stations 2+00 and 4+00, piers along this segment of the road may need to extend deeper and may need to be installed with a larger diameter and/or at closer spacing than the piers along the southern portion of the road extension.

Specific geotechnical recommendations for grading, removal and replacement of existing fill, retaining wall design and construction, and the structural pavement section for the Monte Cresta Drive road extension are presented in the following sections of this report.

Because subsurface conditions may vary from those encountered at the locations of our exploratory borings and to confirm that our recommendations are properly implemented, Romig Engineers should be retained to: 1) review the project plans for conformance with our recommendations, and; 2) observe and test during earthwork, foundation, retaining wall, and pavement construction.

SITE SUITABILTY FOR RESIDENCES ON LOTS 10, 19/20, AND 21

The proposed road extension will provide access to several unimproved lots including the Huang property on APN 043-234-170 (Lot 21) and APN 043-234-210 (combined Lots 19 and 20) located upslope (east) of the road extension, and on APN 043-232-090 (Lot 10) located downslope (west) of the road extension. Based on the site observations, geologic mapping, and subsurface exploration performed during our feasibility study for the proposed road extension, we expect that bedrock will be located at a relatively shallow depth, probably less than about 2 feet below existing grade in the building areas on Lots 10, 19/20, and 21.

Future residences on Lots 10, 19/20, and 21 can be supported on conventional shallow foundations embedded in competent bedrock. If a portion of the future residence on Lot 19/20 is located within about 15 feet of the head of the subtle landslide that has been mapped in the southwestern portion of Lot 19 (see Engineering Geologic Site Plan, Figure 2, in Appendix A), this portion of the residence may need to be supported on reinforced concrete piers to reduce the potential for differential movement of this portion of the residence due to creep deformation of the slope below. If site grading on Lots 10, 19/20, and 21 includes fill deeper than about 3 feet, portions of the residences over the deeper fill will need to be supported on deep continuous footings supported on bedrock or on reinforced concrete piers.

Our geotechnical recommendations for future residences on Lots 10, 19/20, and 21 will be presented in a geotechnical report after the proposed building locations, configuration, and grading on these lots are determined and after we perform subsurface exploration on each of the lots. If borings located within these lots encounter bedrock at a greater depth than currently expected, or if significant fill is proposed, we may recommend supporting the proposed residences on a reinforced concrete pier and grade beam foundation system rather than on conventional foundations embedded in bedrock.

The road extension will not provide access to the Huang property on APN 043-232-140 (Lot 13), which is located south of the end of the road extension at Station 5+35. In our opinion, the steep slopes and active landslides mapped south of the currently proposed road extension are expected to make access to and development of suitable building sites on individual lots south of the proposed road extension extremely difficult and probably cost prohibitive.

ROADWAY RETAINING WALLS

Retaining walls along the upslope and downslope sides of the proposed road extension should be designed to support the adjacent native materials, fill, and backfill. Retaining walls that are constructed with a backdrain system, have relatively level backfill, and are be free to rotate, may be designed to resist an equivalent fluid pressure of 45 pounds per cubic foot. Drained site retaining walls that support slopes with a gradient of 2:1 (horizontal:vertical) should be designed to resist an equivalent fluid pressure of at least 65 pounds per cubic foot. The minimum active pressure to be used for design of retaining walls supporting slopes between level and 2:1 may be interpolated from the design values indicated above. Where the retaining walls will be subjected to surcharge loads, such as from nearby foundations, vehicle traffic, or construction equipment, the walls should be designed for an additional uniform lateral pressure equal to at least one-third of the surcharge pressure.

Based on site peak ground acceleration, on Seed and Whitman (1970), Al Atik and Sitar (2010), and Lew et al. (2010), the seismic load on retaining walls that can yield, such as the retaining walls along the sides of the proposed road extension, may be simulated by a line load of $8H^2$ (in pounds per foot, where H is the wall height in feet). This seismic surcharge line load may be assumed to act at 1/3H above the base of the wall (in addition to the active wall design pressure of 45 pounds per cubic foot for level wall backfill or 65 pounds per cubic foot for 2:1 sloping backfill).

To prevent buildup of water pressure from surface water infiltration, a subsurface drainage system should be installed behind the retaining walls. The drainage system should consist of a 4-inch diameter perforated pipe (perforations facing down) embedded in a section of ½- to ¾-inch, clean, crushed rock at least 12 inches wide. Backfill above the perforated pipe should also consist of ½- to ¾-inch, clean, crushed rock to within about 1½ feet below finished grade. A filter fabric, such as Mirafi 140N, should be wrapped around the crushed rock to protect it from infiltration of native soil and backfill. The upper 1½ feet of the backfill should consist of compacted native soil. The perforated pipes should discharge to a suitable location on-site. Damp-proofing of the walls should be included in areas where wall dampness and efflorescence would be undesirable.

Miradrain, Enkadrain, or other drainage panels approved by our staff may be used for retaining wall drainage as an alternative to the gravel drainage system described above. If used, drainage panels should extend from a depth of about 1 foot below the top of the wall backfill down to the perforated drain pipe at the base of the wall. A minimum 12-inch wide section of ½- to ¾-inch, clean, crushed rock surrounded by filter fabric, such as Mirafi 140N, should be installed around the perforated pipe, as recommended previously.

Backfill placed behind the retaining walls should be compacted to at least 90 percent relative compaction using light compaction equipment. If heavy equipment is used for compaction of wall backfill, the walls may need to be temporarily braced. Ideally, backfill behind the walls should be placed and compacted on level benches, rather than on sloping ground.

The top of the retaining wall along the upslope side of the proposed road extension should extend at least 6 to 12 inches above the wall backfill to reduce the potential for soil debris and storm water runoff flowing over the top of the wall.

For improved stability, stitch piers designed for the lateral loads and creep forces recommended in the section of this report titled “Reinforced Concrete Piers” should be installed along the perimeter of the proposed road extension, and across the southern end of the road extension, even where the height of the retaining walls is less than 1 foot.

FOUNDATIONS FOR ROADWAY RETAINING WALLS

Spread Footings

The retaining wall along the upslope (east) side of proposed road extension will retain a cut into the hillside and will have relatively level ground along its downslope side. This wall may be supported on a conventional foundation embedded in weathered sandstone bedrock or very stiff residual soil. The wall foundation should have a width of at least 30 inches and should be embedded at least 27 inches below adjacent finished grade and at least 12 inches into weathered bedrock or very stiff residual soil, whichever is deeper. Retaining wall footings with at least these minimum dimensions may be designed for an allowable bearing pressure up to 3,000 pounds per square foot for dead plus live loads with a one-third increase allowed when considering additional short-term wind or seismic loading.

Where bedrock and/or residual soil is deeper than about 3 to 4 feet below the pavement subgrade elevation along the upslope side of the road extension, such as may occur between about Stations 2+90 and 3+80, the retaining wall along the upslope side of the road may be supported on reinforced concrete piers.

All footings located adjacent to utility trenches should bear below a 1:1 plane extending up from the bottom edge of the utility trench. Continuous foundations should be reinforced both top and bottom to provide structural continuity and to permit spanning of local irregularities.

A member of our staff should observe the footing excavations prior to placement of reinforcing steel to confirm that they extend at least the minimum depth required, extend into competent bedrock, and have been properly cleaned of soil and debris. If soil, disturbed bedrock, or debris is present in the foundation excavations, our field representative will require this material to be removed and may recommend a deeper footing embedment depth before reinforcing steel and concrete are placed.

Lateral Loads for Spread Footings

Lateral loads may be resisted by friction between the bottom of the footings and the supporting subgrade, and by passive earth pressure acting against footings cast neat in foundation excavations or weathered bedrock. The values for coefficient of friction and passive soil resistance presented below are ultimate values. We recommend applying a factor of safety of 1.5 to these values during design.

An ultimate coefficient of friction of 0.50 may be assumed for footings bearing directly on competent bedrock or very staff residual soil. An ultimate passive resistance of 400 pounds per cubic foot beginning at the ground surface may be assumed for design. The upper one foot of passive soil resistance should be neglected where soil adjacent to the foundation is not covered and protected by a relatively level concrete slab or pavement.

Reinforced Concrete Piers

The retaining wall along the downslope (west) side of the proposed road extension will support fill and will generally have sloping ground along its downslope side. This retaining wall, and if needed, the retaining wall along the upslope side of the road between about Stations 2+90 and 3+80, should be supported on reinforced concrete piers extending into weathered bedrock below the fill, colluvium, and any landslide debris. A row of stitch piers designed for the loads recommended below should be installed just beyond the southern end of the road alignment. Piers should have a diameter of at least 16 inches and should generally be embedded at least 12 feet below the bottom of the retaining wall and at least 8 feet into competent weathered bedrock, whichever is deeper. Between about Stations 2+00 and 4+00, piers below the downslope retaining wall should extend at least 16 feet below the bottom of the wall and at least 10 feet into bedrock. The structural engineer may require deeper pier embedment to resist vertical and lateral loads.

The bottom of the retaining wall/grade beam along the downslope side of the road extension should be embedded at least 12 inches below adjacent finished grade.

Foundation piers may be designed for an allowable skin friction of 250 pounds per square foot for dead plus live loads within the fill and for an allowable skin friction of 500 pounds per square foot for dead plus live loads within the underlying weathered bedrock. These values may be increased by one-third when considering additional short-term wind or seismic loading. End-bearing support and skin friction against the upper 4 feet of the piers should be neglected in design. From a geotechnical viewpoint, the piers should be reinforced with the equivalent of at least four No. 5 bars in the vertical direction and should be spaced at least three pier diameters apart.

Pier drilling should be observed by a member of our staff to confirm that the pier holes extend the required minimum depth, expose competent bedrock, and are properly cleaned of all soil, disturbed bedrock, and debris. The pier depths recommended above may require adjustment if differing conditions are encountered during drilling. While we expect that moderate size drilling equipment can achieve the required depths, due to the hardness of the bedrock present below at least portions of the site, a drill bit equipped with carbide or other teeth, or a rock core barrel may be required.

Reinforcing steel and concrete should be placed in pier excavations as soon as practical after drilling. Seepage of perched ground water into the pier holes may occur during or after pier drilling if pier drilling occurs during or soon after the rainy season. Ground water seepage into the pier holes could cause some sloughing or caving of the pier hole sidewalls. In the event that water seeps into the pier holes and the water cannot be effectively pumped from the pier holes, concrete should be placed in the pier holes by the tremie method. This can be evaluated during drilling of the initial pier holes.

Lateral Loads for Drilled Piers

Due to the potential for lateral creep of the near-surface soil, we recommend the upper 4 feet of the piers supporting the retaining walls along the downslope (west) side of the road extension be designed to resist an active lateral creep pressure equal to 85 pounds per cubic foot acting in the downslope direction against 2 times the diameter of the piers. The active pressure and other lateral loads may be resisted by passive earth pressure simulated by an equivalent fluid pressure of 350 pounds per cubic foot acting against 2 times the diameter of the pier starting 4 feet below the top of the pier. Passive earth pressure acting against the upper 4 feet of the piers should be neglected in design.

Settlement

Thirty-year post-construction differential settlement due to static loads is not expected to exceed 3/4-inch in 30 feet along site retaining walls supported on relatively deep piers or on spread footings embedded in competent weathered bedrock or very stiff residual soil, as recommended in this report.

VEHICLE PAVEMENT SECTION

Since future traffic loading on the proposed road extension is expected to include weekly trash collection vehicles, the civil engineer has recommended the pavement section be designed for a Traffic Index of 5.5. Based on subsurface conditions encountered in our borings and on the proposed grading along the road extension, variable pavement subgrade conditions are expected to be present after rough grading of the road extension is completed. Depending on location, the rough-graded road subgrade is expected to be composed of clayey fill, clayey fill mixed with rock debris, pulverized sandstone, and/or in-place sandstone bedrock. Minimum recommended pavement section thicknesses based on a design Traffic Index of 5.5 and subgrade R-values of 8, 35, and 78+ to simulate these subgrade conditions are presented on Table 1 on the following page.

The recommended minimum pavement section thicknesses listed on Table 1 below are based on the pavement design procedure summarized in Chapter 630 of the Caltrans Highway Design Manual. Asphalt concrete and aggregate base should conform to and be placed in accordance with the requirements of Caltrans Standard Specifications, latest edition, except that compaction should be based on ASTM Test D1557.

Table 1. Minimum Asphalt Concrete Pavement Section Thicknesses
Monte Cresta Drive Road Extension
Design Traffic Index (TI) = 5.5
Belmont, California

Subgrade Condition	R-Value (Assumed)	AC Thickness (inches)	Aggregate Base* (inches)	Total Section (inches)
Clayey Soil/	8	3.0	11.0	14.0
Clayey Soil Fill	8	4.0	9.0	13.0
Pulverized Bedrock Fill	35	3.0	6.0	9.0
(minimum 4 inches thick)	35	4.0	4.0	8.0
Weathered Bedrock**	78+	3.0	2.0**	5.0
	78+	4.0	1.0**	5.0

* Class 2 aggregate base with minimum R-value of at least 78.
** Where the subgrade consists of competent weathered bedrock, aggregate base is not required but may be used as a leveling course over the bedrock surface.

After rough grading of the road extension is completed, a member of our staff could obtain representative samples of the exposed pavement subgrade materials for R-value testing. Based on our site observations, the condition of the pavement subgrade, and the results of R-value testing, the minimum asphalt concrete pavement section thicknesses listed on Table 1 could be modified, if appropriate.

EARTHWORK

Clearing and Subgrade Preparation

All deleterious materials, such as utilities to be abandoned, existing under-compacted fill, loose or soft soil, vegetation, root systems, organic soil, etc., should be cleared from areas of the site to be built on or paved. The actual stripping depth should be determined by a member of our staff at the time of construction. Excavations that extend below finished grade should be backfilled with structural fill that is water-conditioned, placed, and compacted as recommended in the section of this report titled “Compaction.”

After the site has been properly cleared, stripped, and excavated to the required grades, exposed soil surfaces in areas to receive structural fill, slabs-on-grade, or pavements should be scarified to a depth of 6 inches, moisture conditioned, and compacted as recommended in the section of this report titled "Compaction."

Fill Removal and Reconstruction

Ideally, the existing fill between the proposed site retaining walls along the road extension should be excavated and recompacted to modern day construction standards on a series of nearly-level benches extending into weathered bedrock or very stiff residual soil. In areas where bedrock and/or very stiff residual soil is deeper than about 8 feet below finished pavement grade, such as in portions of the mapped landslide areas, the depth of fill removal may be limited to 8 feet below finished grade. In these areas, benches may be cut into the exposed subgrade and the surface of the benches compacted as recommended for structural fill. The benches should be sloped to the back of the benches at a gradient of about 1.5 percent. If perched water seeps onto the benches during construction, we may recommend installation of a subdrain along some of the benches. The location and depth of the benches should be approved by a member of our staff in the field at the time of construction. Romig Engineers should be retained to observe removal of existing fill, excavation of benches, installation of a subdrain (if needed), and placement and compaction of structural fill.

If and where subdrains are to be installed within the reconstructed fill, the subdrains should consist of a 4-inch diameter pipe surrounded by a minimum 12-inch wide section of free-draining Class 2 Permeable Material or clean crushed rock surrounded by filter fabric, such as Mirafi 140N. The perforated pipe (Schedule 40 PVC, SDR 35 or equal) should be placed with perforations facing down on a thin layer of Class 2 Permeable Material or crushed rock. The Class 2 Permeable Material or crushed rock around the perforated drain pipe should extend to a height of at least 18 inches. A solid drain pipe should be used to convey water by gravity from the perforated pipe to a suitable discharge location. Clean-outs should be installed at appropriate locations in the subdrain system.

Material for Fill

All on-site soil and pulverized bedrock containing less than 3 percent organic material by weight (ASTM D2974) should be suitable for use as structural fill. Structural fill should not contain rocks or pieces larger than 6 inches in greatest dimension and no more than 15 percent larger than 2.5 inches. Imported fill should have a Plasticity Index no greater than 15 percent or should be predominately granular. A member of our staff should observe and approve proposed import materials before they are delivered to the site.

Compaction

Scarified soil surfaces and all structural fill should be placed and compacted in uniform lifts no thicker than 8 inches in pre-compacted thickness, conditioned to the appropriate moisture content, and compacted as recommended for structural fill in Table 2 below. The relative compaction and moisture content recommended in Table 2 are relative to ASTM Test D1557, latest edition.

Table 2. Compaction Recommendations
Monte Cresta Drive Road Extension
Belmont, California

General	Relative Compaction*	Moisture Content*
• Scarified subgrade in areas to receive structural fill.	90 percent	Above optimum
• Structural fill composed of on-site clayey soil.	90 percent	Above optimum
• Structural fill composed of bedrock or non-expansive fill.	90 percent	Near optimum
• Structural fill below a depth of 4 feet.	93 percent	Near optimum
Pavement Areas		
• Upper 12-inches of soil below aggregate base.	95 percent	Near optimum
• Aggregate base.	95 percent	Near optimum
Utility Trench Backfill		
• On-site clayey soil.	90 percent	Above optimum
• Pulverized bedrock.	90 percent	Near optimum
• Imported sand	95 percent	Near optimum

* Relative to ASTM Test D1557, latest edition.

Temporary Slopes and Excavations

The contractor should be responsible for the design and construction of all temporary slopes and any required shoring. Shoring and bracing should be provided in accordance with all applicable local, state, and federal safety regulations, including current OSHA excavation and trench safety standards. Protection of structures near excavations and trenches will also be the responsibility of the contractor.

Because of the potential for variation of the on-site fill, native soil, and bedrock, field modification of temporary cut slopes and shoring may be required. Unstable materials encountered on or near slopes during and after excavation should be shored or trimmed off even if this requires cutting the slopes back to a flatter inclination.

Surface Drainage

Finished grades should be designed to prevent ponding of water and to direct surface water runoff away from foundations and the edges of pavement, and toward suitable collection and discharge facilities. Slopes of at least 2 percent are recommended for pavement areas with a 5 percent gradient preferred in landscape areas within 8 feet of structures, where possible.

To reduce the potential for surface erosion and adverse influence on the stability of the hillside downslope of the road extension, we recommend not discharging large quantities of surface water runoff onto the hillside below the downslope retaining wall, particularly in the mapped landslide area between about Stations 2+00 and 4+00. Water from retaining wall backdrains, area drains, and surface water runoff should be conveyed in a closed-pipe system that is routed to a flow-through planter and metering device for discharge to an appropriate City storm drain, such as the storm drain system along Alhambra Drive.

Drainage facilities should be observed to verify that they are adequate and that no adjustments need to be made, especially during the first two years following construction. An as-built plan showing the locations of surface and subsurface drain lines and clean-outs should be prepared during construction. Drainage facilities should be periodically checked to verify that they are continuing to function properly. It is likely the drainage facilities will need to be periodically cleaned of silt and debris that may build up in the lines.

It would be desirable for the existing clogged storm drain inlet north of the road right-of-way adjacent to Station 4+00 to be cleaned of soil, litter, and debris.

Finished Slopes

We recommend that finished slopes be cut or filled to an inclination no steeper than 2:1 (horizontal:vertical). Exposed slopes and soil surfaces disturbed during construction may be subject to minor sloughing and erosion that could require periodic maintenance. We recommend that all freshly-graded slopes and soil surfaces disturbed during construction be planted to with erosion-resistant vegetation.

FUTURE SERVICES

Plan Review

Romig Engineers should review the completed grading, foundation, and retaining wall plans for conformance with the recommendations presented in this report. We should be provided with these plans as soon as possible upon their completion in order to limit the potential for delays in the permitting process that might otherwise be attributed to our review process. In addition, it should be noted that many of the local building and planning departments now require "clean" geotechnical plan review letters prior to acceptance of plans for their final review. Since our plan reviews often result in recommendations for modification of the plans, our generation of a "clean" review letter often requires two iterations. At a minimum, we recommend the following note be added to the plans:

"Earthwork, excavation and recompaction of existing fill, pier drilling, foundation and pavement construction, retaining wall drainage and backfilling, utility trench backfilling, and site drainage should be performed in accordance with the geotechnical report prepared by Romig Engineers, Inc., dated August 9, 2018. Romig Engineers should be notified at least 48 hours in advance of any earthwork and should observe and test during earthwork, foundation, retaining wall, and pavement construction as recommended in the geotechnical report."

Construction Observation and Testing

Earthwork, foundation, retaining wall, and pavement construction should be observed and tested by us to: 1) confirm that subsurface conditions are compatible with those used in the analysis and design; 2) observe compliance with the design concepts, specifications, and recommendations, and; 3) allow design changes in the event that subsurface conditions differ from those anticipated. The recommendations presented in this report are based on a limited amount of subsurface exploration. The nature and extent of variation across the site may not become evident until construction. If variations are exposed during construction, it will be necessary to reevaluate our recommendations.



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Lew, M., Al Atik, L., Sitar, N., Pourzanjani, M., & Hudson, M., 2010, Seismic Earth Pressures on Deep Building Basements, SEAOC 2010 Convention Proceedings.

Romig Engineers, Inc., June 30, 2008, Geologic and Geotechnical Engineering Feasibility Study, Monte Cresta Drive Through Road, Belmont, California, private consultant report.

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APPENDIX A

GEOLOGIC AND GEOTECHNICAL FEASIBILITY STUDY
MONTE CRESTA DRIVE ROAD EXTENSION
BELMONT, CALIFORNIA
DATED APRIL 30, 2018

ROMIG ENGINEERS

GEOLOGIC AND GEOTECHNICAL FEASIBILITY STUDY

MONTE CRESTA DRIVE ROAD EXTENSION

BELMONT, CALIFORNIA 94002

Prepared for

Mr. Meng Huang

226 Coleman Street

San Francisco, California 94124

April 2018

Project No. 4268-1A

April 30, 2018
4268-1A

Mr. Meng Huang
226 Coleman Street
San Francisco, California 94124

RE: GEOLOGIC AND GEOTECHNICAL FEASIBILITY STUDY
MONTE CRESTA DRIVE
ROAD EXTENSION
BELMONT, CALIFORNIA

Dear Mr. Huang:

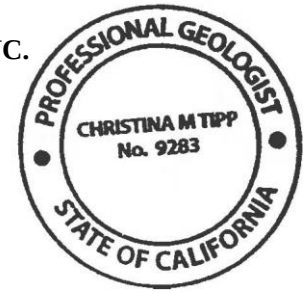
As requested, we have performed a geologic and geotechnical feasibility study for the proposed 320-foot-long extension of Monte Cresta Drive in Belmont, California. The accompanying report summarizes the results of our geologic and geotechnical review and field mapping, subsurface exploration, and laboratory testing, and provides our opinion regarding the feasibility of the proposed road extension.

A design-level geotechnical report presenting our recommendations for the proposed road extension will be prepared after the City of Belmont grants planning approval for the proposed road extension.

Thank you for the opportunity to work with you on this project. Please call if you have questions or comments about site conditions or our findings and conclusions regarding the geologic and geotechnical feasibility of the proposed Monte Cresta Drive road extension.

Very truly yours,

ROMIG ENGINEERS, INC.

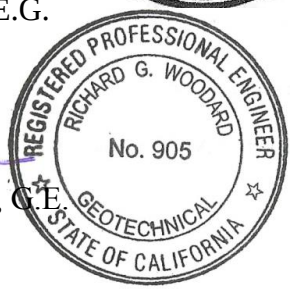


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Lea & Braze Engineering, Inc. (via email)
Attn: Mr. Ryan Barton and Mr. Pete Carlino

GEOLOGIC AND GEOTECHNICAL FEASIBILITY STUDY
MONTE CRESTA DRIVE ROAD EXTENSION
BELMONT, CALIFORNIA 94002

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APRIL 2018

ROMIG ENGINEERS

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GEOLOGIC AND GEOTECHNICAL FEASIBILITY STUDY
FOR
MONTE CRESTA DRIVE ROAD EXTENSION
BELMONT, CALIFORNIA

INTRODUCTION

This report presents the results of our geologic and geotechnical feasibility study for the proposed extension of Monte Cresta Drive Belmont, California. The approximate location of the proposed road extension is shown on the Vicinity Map, Figure 1. The purpose of this study was to evaluate geologic and subsurface conditions along the alignment of the proposed road extension and to provide an opinion regarding the geologic and geotechnical feasibility of constructing the proposed road extension.

Project Description

The proposed project consists of extending Monte Cresta Drive to the south from its present terminus adjacent to the northern end of Sequoia Way. The road extension will be located within the existing Monte Cresta Drive right-of-way and will extend approximately 320-feet to the south where site topography and existing landslides present excessive cost and risk for extending the roadway further. The road extension will provide access to several unimproved lots, including your property at APN 043-234-170, APN 043-234-210, and APN 043-232-090, where suitable building areas for residences are located. The proposed road extension includes a hammer-head turn-around for fire trucks at the southern end. Site retaining walls will be constructed along both sides of the proposed road extension and as needed for the fire truck turn-around.

Scope of Work

The scope of our work for this feasibility study is summarized in our agreement with Mr. Meng Huang, dated February 2, 2018. As part of our feasibility study, we performed the following work.

- Review of geologic, geotechnical, and seismic conditions in the vicinity of the proposed road extension, including our Geologic and Geotechnical Engineering Feasibility Study for the Monte Cresta Drive Through Road, dated June 30, 2008.

- Reconnaissance of the roadway alignment and the surrounding area by a Certified Engineering Geologist and our geologic and geotechnical engineering staff.

- Review and interpretation of stereo-pair aerial photographs of the site.

- Subsurface exploration consisting of drilling, sampling, and logging of eight exploratory borings in the area for the proposed road extension.

- Laboratory testing of selected samples to aid in soil classification and to help evaluate the engineering properties of the soil and bedrock encountered at the site.

- Preparation of this report presenting our findings and opinion regarding the geologic and geotechnical feasibility of the proposed road extension.

Limitations

This report was prepared for the exclusive use of Mr. Meng Huang for specific application to presenting geologic and geotechnical feasibility-level findings and conclusions regarding the proposed Monte Cresta Drive road extension in Belmont, California. We make no warranty, expressed or implied, for the services we perform for this project. Our services are performed in accordance with geologic and geotechnical engineering principles generally accepted at this time and location. This report was prepared to summarize the findings and conclusions from the feasibility study described herein. In the event there are changes in the nature, design, or location of the proposed road extension, or if any future improvements are planned, the conclusions presented in this report should not be considered valid unless: 1) the changes are reviewed by us, and; 2) the conclusions presented in this report are modified or verified in writing.

The findings and conclusions presented in this report are based on site conditions as they existed at the time of our study; the currently proposed road extension plans; review of readily available reports relevant to the site conditions; and laboratory test results. In addition, it should be recognized that certain limitations are inherent in the evaluation of subsurface conditions and that certain conditions may not be detected during an investigation of this type. Changes in the information or data gained from any of these sources could result in changes in our conclusions. If such changes occur, we should be advised so that we can review our report in light of those changes.

SITE RECONNAISSANCE AND SUBSURFACE EXPLORATION

Reconnaissance and geologic mapping of the site for the proposed road extension was performed by our Certified Engineering Geologist on March 2, 2018. Subsurface exploration was performed using a track-mounted drill rig equipped with 6-inch solid flight augers and an automatic trip hammer. Eight exploratory were drilled and sampled along the proposed roadway extension at the approximate locations shown on the Engineering Geologic Site Plan, Figure 2. The borings were terminated in bedrock at depths ranging from 8.8 to 20 feet. The boring logs and the results of our laboratory tests are attached in Appendices A and B, respectively.

Surface Conditions

The proposed 320-foot-long road extension is located within the existing Monte Cresta Drive right-of-way extending south from the current terminus of Monte Cresta Drive near the northern end of Sequoia Way. Surface conditions along the proposed road extension consist of an unimproved walking trail. This trail was originally graded during the 1930s by cutting and filling along a moderately to steeply sloping hillside. The locations of the existing cuts and fills are shown on the Engineering Geologic Site Plan, Figure 2.

The ground surface adjacent to the walking trail along the majority of the proposed road extension alignment slopes down to the west and northwest at inclinations ranging from about 1.5:1 to 3:1 (horizontal:vertical). Several landslides of various size and age are present along the alignment of the proposed road extension, as shown on the Engineering Geologic Site Plan, Figure 2. The majority of the road right-of-way is covered with native grass and weeds, and small to large trees.

Residences are located along both sides of the paved portion of Monte Cresta Drive north of the proposed road extension and adjacent to approximately the northern 150 foot long portion of the proposed roadway extension. The lots located more than about 150 feet south of the existing terminus of Monte Cresta Drive and along the sides of the proposed road extension are currently vacant.

Subsurface Conditions

Eight exploratory borings were drilled and sampled to depths ranging from about 9 to 20 feet along the alignment of the proposed road extension at the locations shown on the Engineering Geologic Site Plan, Figure 2. The majority of these borings were located along or near the crest of the existing fill slope.

At the locations of the exploratory borings, we generally encountered fill consisting of firm to very stiff, sandy lean clay underlain by moderately to severely weathered, fractured sandstone bedrock of the Franciscan Complex. The thickness of the existing fill varied from about 3 to 8 feet in the northern portion of the proposed road extension, and from about 1 to 3 feet in the southen portion of the proposed road extension. In Boring EB-7, approximately 2 feet of residual soil composed of very stiff, sandy lean clay of low plasticity was encountered between the fill and the sandstone bedrock.

Since evidence of shearing and/or a landslide plane was not evident in Borings EB-2 and EB-3, it appears that the mapped landslide in the area of these borings occurred in surface soil or at the top of the sandstone bedrock prior to placement of the existing fill.

A Liquid Limit of 34 and a Plasticity Index of 15 were measured on a sample of the fill obtained from Boring EB-3. These test results suggest the fill and native soil along the proposed road extension have relatively low plasticity and a low potential for expansion.

Ground Water

Ground water was not encountered in our borings during drilling and sampling. Since the borings were backfilled with grout immediately after sampling was completed, sufficient time may not have been allowed for ground water to seep into the bore holes. Please be cautioned that fluctuations in the level of ground water can occur due to variations in rainfall, landscaping watering on upslope property, surface and subsurface drainage patterns, and other factors. In our opinion, it is likely that perched ground water conditions can develop in the surface soils and near the bedrock surface, particularly in low areas and along drainage swales during and after significant rainfall.

GEOLOGIC SETTING

Regional and Site Geology

The site is located within the central region of the Coast Ranges Geomorphic Province, which extends from the Oregon border south to the Transverse Ranges. The general topography is characterized by sub-parallel, northwest trending mountain ranges and intervening valleys. The region has undergone a complex geologic history of faulting, folding, volcanic activity, uplift, erosion, and sedimentation. The relatively flat-lying, alluviated San Francisco Bay Plain is situated to the east of the site; the uplifted Santa Cruz Mountains are located to the west of the site.

The site for the proposed road extension is located in an area mapped as underlain by Cretaceous and Jurassic-aged sandstone of the Franciscan Complex, map unit fs (Pampeyan, 1994), as shown on the Vicinity Geologic Map, Figure 3. The geologic map includes two nearby bedding plane orientations: the sandstone bedrock north of the project in the immediate vicinity of the proposed road extension strikes N35°E and dips (is inclined) into the hillside toward the southeast at 30°; at another nearby location west/downslope of the site, the bedrock strikes N64°W and dips northeast with the contour of the hillside at 20°. Neither bedding orientation is dipping out of slope, parallel to slope, or considered to be an adverse bedding condition, although it should be noted that the Franciscan Complex strata commonly vary in orientation over short distances.

The Engineering Geologic Map of the San Juan Canyon Study Area (William Cotton and Associates, 1985) shown on Figure 4 indicates the site is underlain by colluvium (map unit Col), described as an unconsolidated to moderately consolidated heterogeneous

mixture of thick soil, slope wash debris, and fragments of bedrock that mantle the lower reaches of nearly all slopes. The colluvium is considered potentially unstable and has variable thickness.

The Engineering Geologic Map indicates the colluvium is underlain by Franciscan Complex sandstone (map unit KJfs). The sandstone unit is described as highly consolidated, cemented, tan to dark gray, thin to thickly bedded, poorly sorted, fine to coarse grained sandstone commonly interlayered with thin sequences of dark siltstone and shale.

The Ground Movement Potential Map of the San Juan Canyon Study Area (William Cotton and Associates, 1985) shown on Figure 5 identifies the potential geologic hazards and materials in the area of the proposed road extension. A portion of the road extension site is mapped as "Ps," relatively unstable materials susceptible to shallow slope failures. Mapped "Ps" areas are typically considered areas of potentially unstable material, including landslide debris, slope materials, and weak bedrock, commonly less than 10 feet in thickness on gentle to moderately steep slopes. Portions of the road extension site are also mapped as "Pdf," "Pd," and "Ms." Mapped "Pdf" areas include steep to very steep terrain mantled with a thick soil cover, colluvium, and landslide debris flows or earth flows. "Pd" areas include unstable landslide debris, more than 10 feet in thickness on steep to very steep slopes and areas within this zone are subject to renewed deep slow moving landsliding. Mapped "Ms" areas are moving shallow landslides less than 10 feet in thickness and slow moving.

The site and the nearby hillside areas to the north, west, and south are located within the State Seismic Hazard Zone for earthquake-induced landslides (CGS, 2018). The site is not located within a zone of potential ground surface fault rupture (CDMG, 1974), and there are no identified potentially active faults within the immediate vicinity of the site.

Site Geology Reconnaissance Observations

As part of our feasibility study, we performed a surface reconnaissance consisting of walking the subject site, and traversing the slope above and below the proposed road extension, nearby roads, and properties (where accessible) to observe surficial features. A graded trail is present along the Monte Cresta Drive right-of-way where the proposed road extension will be located. The upslope (east) side of the trail has generally been cut into the hillside and exposes sandstone bedrock in localized areas. Variably oriented fractures were observed in the exposed bedrock (refer to Figure 2) although there were no clear indications of bedding and no observed preferential fracture or joint pattern. A variable thickness of fill was present along the downslope (west) side of the trail. The hillside areas upslope and downslope of the trail generally slope down moderately to

steeply to the west/northwest. Subsurface conditions encountered in our borings at the site generally consisted of surface fill and residual soil overlying sandstone bedrock.

Within the northern 80 feet of the proposed road extension, we observed shallow soil slumps at three areas along the upslope (east) side of the trail where shown on Figure 2. These soil slumps appeared to be confined to the upper few feet of soil. Based on our air photo interpretation, we mapped a broad, subdued landslide on the downslope (west) side of the road alignment. There were no obvious visible indications of this landslide. We interpret that the majority of the landslide debris was removed during grading and construction of the existing residences. This mapped landslide feature is not expected to impact the proposed road extension.

Starting approximately 80 feet south of the northern end of the proposed road extension, we observed a second subdued landslide feature. This landslide appeared to extend from the upslope (east) side of the trail to beyond the downslope (west) side of the road right-of-way. Two smaller landslides were incised within the larger landslide mass. Borings EB-2 and EB-3 were drilled and sampled within the area of the larger mapped landslide. The two smaller landslides appeared to be relatively recent and confined to the near-surface soil. The larger landslide and the two smaller landslides are designated as "recent landslides" (Rls) and are shown on Figure 2. There was no vegetation or visible bedrock within the limits of the smaller landslides. The majority of the mass of these landslides appears to have been removed during grading and construction of the relatively new residence downslope of the road right-of-way. The slope between this residence and the downslope side of the proposed road extension appears to have been partially stabilized with a series of soldier beam and lagging walls, and concrete retaining walls. Cleanouts along this portion of the hillside may indicate a previous landslide repair. Significant additional movement of the slope and landslides upslope of the residence do not appear to have occurred since construction was performed in this area. The mapped Rls landslide features at this location are not expected to impact the proposed road extension.

South of the landslide features described above, the trail traverses to the west and south along and across a broad stable ridge. In this ridge area, sandstone bedrock was observed at localized areas along the upslope (east) side of the trail and fill was observed along the downslope (west) side of the trail.

Recent and active landslides were mapped just beyond the southern end of the proposed road extension, as shown on Figure 2. A large old landslide feature with subtle bowl-shaped topography was observed on the upslope (east) side of the trail. This mapped landslide extended down to a more recent active landslide beyond the downslope (west) side of the trail. We noted younger, more pronounced landslide features, such as hummocky topography and scarps, within the confines of a larger landslide complex.

On Figure 2, the relatively old landslide feature upslope of the trail is designated as "recent landslide" (Rls), and the smaller, relatively young, landslide feature downslope of the trail is designated as "active landslide" (Als). Bedrock was exposed along the upslope (east) side of the trail within the "Rls" older landslide feature. Defined head scarps and side scarps were observed along the periphery of the "Als" landslide. The active landslide has undercut the fill along the downslope (west) side of the trail and extends well downslope beyond the western side of the right-of-way.

The hillside above the proposed road extension appeared to be underlain primarily by a thin layer of colluvium overlying sandstone bedrock. A relatively small area of fill was present upslope (east) of the road right-of-way, as shown on Figure 2. This fill appeared to extend out from a neighboring upslope property. This small area of fill will not impact the proposed road extension.

We did not observe indications of springs, seeps, or unusually shallow ground water conditions at the subject site.

Figure 6 was included in our 2008 geologic and geotechnical feasibility report for the Monte Cresta Road Through Road. This figure shows the large landslide complex that is present beyond the southern end of the proposed road extension. This landslide complex is one of the features that was judged by Romig Engineers and the City Geologist to preclude affordable construction of the Monte Cresta Drive Through Road. This large landslide complex also prevents extending the road extension further to the south.

Aerial Photographs

Ten sets of stereo pair aerial photographs were viewed and interpreted for this feasibility study. The images were flown from 1937 through 2000 and ranged in scale from 1:10,000 to 1:23,600. The images are listed in the References section of this report.

Monte Cresta Drive and much of the surrounding road network, except for Alhambra Drive, were present in 1937. The roads were rough graded and generally did not appear to be in active use. There were no residences along the roads. The various landslide features portrayed on Figures 2 and 6 were present, although the landslides were more evident and pronounced in subsequent imagery. The relatively young landslides exhibited hummocky topography downslope (west) of the northern portion of the subject site. The drainage transected by the proposed road extension at the locations of Borings EB-2 and EB-3 was obscured by tree canopy. The active and recent landslides near the southern terminus of the proposed road extension were characterized by hummocky

topography. The trail alignment was similar to the current trail alignment within the northern portion of the right-of-way.

The proposed road extension site and the general vicinity appear to be essentially unchanged in the 1946 imagery. Several residences were present along All View Way south and east of the Monte Cresta Drive right-of-way in the 1955 imagery. We noted a shallow landslide near Boring EB-3 within the tree canopy that appeared to disrupt the western side of the trail. Since the trees remained in-place, we expect this landslide was not laterally extensive or particularly deep. The 1969 imagery indicated the trail had been widened within the area for the proposed road extension, and the landslide that was evident in the 1955 imagery near Boring EB-3 appeared to have been filled-in and/or repaired. The trail alignment in the 1969 imagery appeared to be similar to the current trial alignment.

No significant changes were observed along and within the right-of-way for the proposed road extension in the post-1969 imagery that we viewed.

Faulting and Seismicity

There are no mapped through-going faults within or adjacent to the site and the site is not located within a State of California Earthquake Fault Zone, an area where the potential for fault rupture is considered probable. The closest active fault is the San Andreas fault, which is located approximately 2 miles southwest of the property. Thus, the likelihood of surface rupture occurring from active faulting along the proposed road extension is low.

The San Francisco Bay Area is an active seismic region. Earthquakes in the region result from strain energy constantly accumulating because of the northwestward movement of the Pacific Plate relative to the North American Plate. On average about 1.6-inches of movement occur per year. Historically, the Bay Area has experienced large, destructive earthquakes in 1838, 1868, 1906, and 1989. The faults considered most likely to produce large earthquakes in the area include the San Andreas, San Gregorio, Hayward, and Calaveras faults. The San Gregorio fault is located approximately 9.8 miles southwest of the site. The Hayward and Calaveras faults are located approximately 16 and 24 miles northeast of the site, respectively. These faults and significant earthquakes that have been documented in the Bay Area are listed on Table 1 on the following page and are shown on the Regional Fault and Seismicity Map, Figure 6.

In the future, the Monte Cresta Drive alignment will undoubtedly experience severe ground shaking during moderate and large magnitude earthquakes produced along the San Andreas fault or other active Bay Area fault zones. The Working Group on California Earthquake Probabilities, a panel of experts that are periodically convened to estimate the likelihood of future earthquakes based on the latest science and ground

motion prediction modeling, concluded there is a 72 percent chance for at least one earthquake of Magnitude 6.7 or larger in the Bay Area before 2045.

The Hayward fault has the highest likelihood of producing an earthquake greater than or equal to magnitude 6.7 in the Bay Area, estimated at 14 percent, while the likelihood of a similar magnitude earthquake along the San Andreas and Calaveras faults is estimated at approximately 6 and 7 percent, respectively (Working Group, 2015).

Table 1. Earthquake Magnitudes and Historical Earthquakes
Monte Cresta Drive Road Extension
Belmont, California

Fault	Maximum Magnitude (Mw)	Historical Earthquakes		Estimated Magnitude
San Andreas	7.9	1989	Loma Prieta	6.9
		1906	San Francisco	7.9
		1865	N. of 1989 Loma Prieta Earthquake	6.5
		1838	San Francisco-Peninsula Segment	6.8
		1836	East of Monterey	6.5
Hayward	7.1	1868	Hayward	6.8
		1858	Hayward	6.8
Calaveras	6.8	1984	Morgan Hill	6.2
		1911	Morgan Hill	6.2
		1897	Gilroy	6.3
San Gregorio	7.3	1926	Monterey Bay	6.1

Earthquake Design Parameters

The State of California currently requires that buildings and structures be designed in accordance with the seismic design provisions presented in the 2016 California Building Code and in ASCE 7-10, "Minimum Design Loads for Buildings and Other Structures."

Based on site geologic conditions and on information from our subsurface exploration along the site for the proposed road extension, the site may be classified as Site Class C, very dense soil and soft rock, in accordance with Chapter 20 of ASCE 7-10. Spectral response acceleration parameters and site coefficients may be taken directly from the U.S.G.S. website based on the longitude and latitude of the site. For site latitude (37.5211 degrees), longitude (-122.3098 degrees), and Site Class C, seismic design parameters for the project are presented on Table 2 on the following page.

Table 2. 2016 CBC Seismic Design Criteria
Monte Cresta Drive Road Extension
Belmont, California

Spectral Response Acceleration Parameters		Design Value
Mapped Value for Short Period	S_S	2.179
Mapped Value for 1-sec Period	S_1	1.038
Site Coefficient	F_a	1.0
Site Coefficient	F_v	1.3
Adjusted for Site Class	S_{MS}	2.179
Adjusted for Site Class	S_{M1}	1.349
Value for Design Earthquake	S_{DS}	1.453
Value for Design Earthquake	S_{D1}	0.900

Geologic Hazards

As part of our feasibility study, we reviewed the potential for geologic hazards to impact the site and the proposed Monte Cresta Drive road extension considering the geologic setting and the subsurface materials encountered during our investigation. The results of our review are summarized below.

- Fault Rupture - The proposed road extension is not located in a State of California Earthquake Fault Zone or area where fault rupture is considered likely. Therefore, active faults are not believed to exist beneath the site and the potential for fault rupture to occur along the road extension is considered low.

- Ground Shaking – The City of Belmont and Monte Cresta Drive are located in an active seismic area. Moderate to large earthquakes are probable along several active faults in the greater Bay Area over a 30 to 50 year design life. Strong ground shaking should therefore be expected several times during the design life of proposed structures, as is typical for sites throughout the Bay Area. Structures along the proposed road extension should be designed and constructed in accordance with current earthquake resistance standards.

- Liquefaction - Liquefaction occurs when saturated, sandy soils lose strength during earthquake shaking. Ground settlement and lateral ground deformation often accompany liquefaction. The soils most susceptible to liquefaction are saturated, loose, silty sands, sandy silts, and uniformly graded sands. Since relatively shallow bedrock was encountered in our borings and observed within the Monte Cresta Drive right-of-way, and no saturated, loose silty sands and other types of soil prone to liquefaction were encountered over the bedrock, the likelihood of liquefaction occurring along the proposed road extension is low.

- Differential Compaction - Differential compaction occurs during moderate and large earthquakes when soft or loose, natural or fill soils are densified and settle, often unevenly across a site. The materials encountered during our exploration generally consisted of stiff clay and weathered bedrock, which are not prone to differential compaction. In our opinion, the likelihood of significant differential compaction affecting the proposed road extension is low provided the mitigation measures summarized later in this report and in the design-level geotechnical report are properly implemented during design and construction of the proposed road extension.

- Slope Stability - The primary geologic and geotechnical concerns for the proposed road extension are the presence of undocumented fill along the downslope side of the existing trail, the presence of landslides on the upslope and downslope sides of the proposed road extension, and the likelihood of severe ground shaking at the site caused by a major earthquake. The landslides range from subdued bowl-shaped features to shallow soil slumps confined to the surface soil to well-defined active landslides. Since bedrock was encountered in our borings at depths of about 1 to 8 feet along the proposed road extension, it is our opinion that the potential for future deep-seated landsliding along the road extension is low. Existing fill along the road extension will need to be removed and recompacted, and retaining walls will need to designed and constructed as recommended in the design-level geotechnical report for the road extension project.

CONCLUSIONS REGARDING PROPOSED ROAD EXTENSION

Based on the findings from the geologic and geotechnical study summarized in this report, we reached the following conclusions regarding the feasibility of constructing the proposed extension of Monte Cresta Drive.

1. The Monte Cresta Drive right-of-way is suitable for the proposed Monte Cresta Drive road extension described in this report and shown on the roadway extension plans, dated February 16, 2018, prepared by Lea & Braze Engineering, Inc.

2. Extending Monte Cresta Drive further to the south than shown on Figure 2 and on the roadway extension plans prepared by Lea & Braze Engineering, Inc. does not appear to be practical, reasonable, or affordable due to the steep native hillside, the existing steep cut and fill slopes on both sides of the existing trail, and the presence of the existing deep-seated landslides south and west of the proposed road extension. More information regarding the condition of the landslides and unstable slopes south of the proposed road extension is presented in Romig Engineers' June 30, 2008 report titled "Geologic and Geotechnical Engineering Feasibility Study for the Monte Cresta Drive Through Road."

3. The steep slopes and active landslides south of the currently proposed road extension are expected to make access to and development of suitable building sites on individual lots south of the proposed road extension extremely difficult and probably cost prohibitive.

ANTICIPATED MITIGATION MEASURES

Based on the work performed for this feasibility study, we anticipate that the following mitigation measures will be required to construct the proposed road extension.

1. Excavation and repair of existing landslides or construction of retaining structures for support of the landslides where the presence of the landslides could affect the stability of the roadway or adjacent structures.

2. Excavation and recompaction of existing fill and construction of retaining walls along the upslope and downslope sides of the proposed road extension, as needed.

3. Flattening of existing cut slopes to a more stable configuration, where required.

4. Construction of surface and subsurface drainage systems for the proposed road extension and retaining structures.

5. Implementation of a Storm Water Pollution and Prevention Plan during construction. The details for this work will be particularly important if construction takes place in the rainy season.

6. Construction and maintenance of relatively erosion-resistant surfaces along existing and proposed cut and fill slopes along the proposed road extension.

PRELIMINARY RECOMMENDATIONS FOR ROAD EXTENSION

Based on the work we have performed to date, we offer the following preliminary recommendations for the proposed road extension.

1. Due to the limited number of lots the proposed road extension will serve and the steepness of the adjacent slopes, we recommend the proposed road extension be constructed with the minimum width permitted by the City consistent with vehicle and pedestrian safety, emergency vehicle access, and the San Juan Hills Area Plan. Constructing the proposed road extension no wider than the existing section of Monte Cresta Drive, or less, will avoid excessive grading and vegetation removal, reduce the height of retaining walls along the sides of the roadway, and reduce the risk of soil erosion, flooding, and slope deformation.

2. If on-street parking is required, we recommend the City and design team consider constructing parking bays with permeable pavement at appropriate locations along the road extension, rather than increasing the entire road width to accommodate a continuous lane for parking.

3. Support retaining walls along the downslope side of the proposed road extension on reinforced concrete piers embedded in sandstone bedrock. We expect the retaining walls along the majority of the upslope side of the road extension will be able to be supported on conventional shallow foundations bearing on sandstone bedrock.

4. A design-level geotechnical report presenting recommendations for earthwork, retaining wall design and construction, roadway pavement section, site drainage, and mitigation measures should be prepared after planning approval of the proposed road extension is received from the City of Belmont.

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Aerial Photographs

United States Geologic Survey Library, Menlo Park, California (USGS); USDA (United States Department of Agriculture Adjustment Administration (CIV series); WAC Corporation, Eugene, Oregon (WAC); and Pacific Aerial Surveys, Oakland, California (PAS): black and white vertical stereo pairs, except as noted.

Source	Imagery	Date	Scale
PAS	AV-01-01-30/31	6/18/37	1:12,000
PAS	AV-9-16-9/10	7/29/46	1:23,600
PAS	AV-170-12-09/10	5/10/55	1:10,000
PAS	AV-933-11-08/09	10/28/69	1:12,000
PAS	AV-1705-10-09/10	5/30/79	1:12,000
PAS	AV-2020-10-09/10	6/19/81	1:12,000
PAS	AV-2265-10-08-09	6/06/83	1:12,000
PAS	AV-2670-10-8/9	10/15/85	1:12,000
PAS	AV-4916-11-8/9	9/07/95	1:12,000
PAS	SMT-AV-6600-11-8/9	8/16/00	1:12,000

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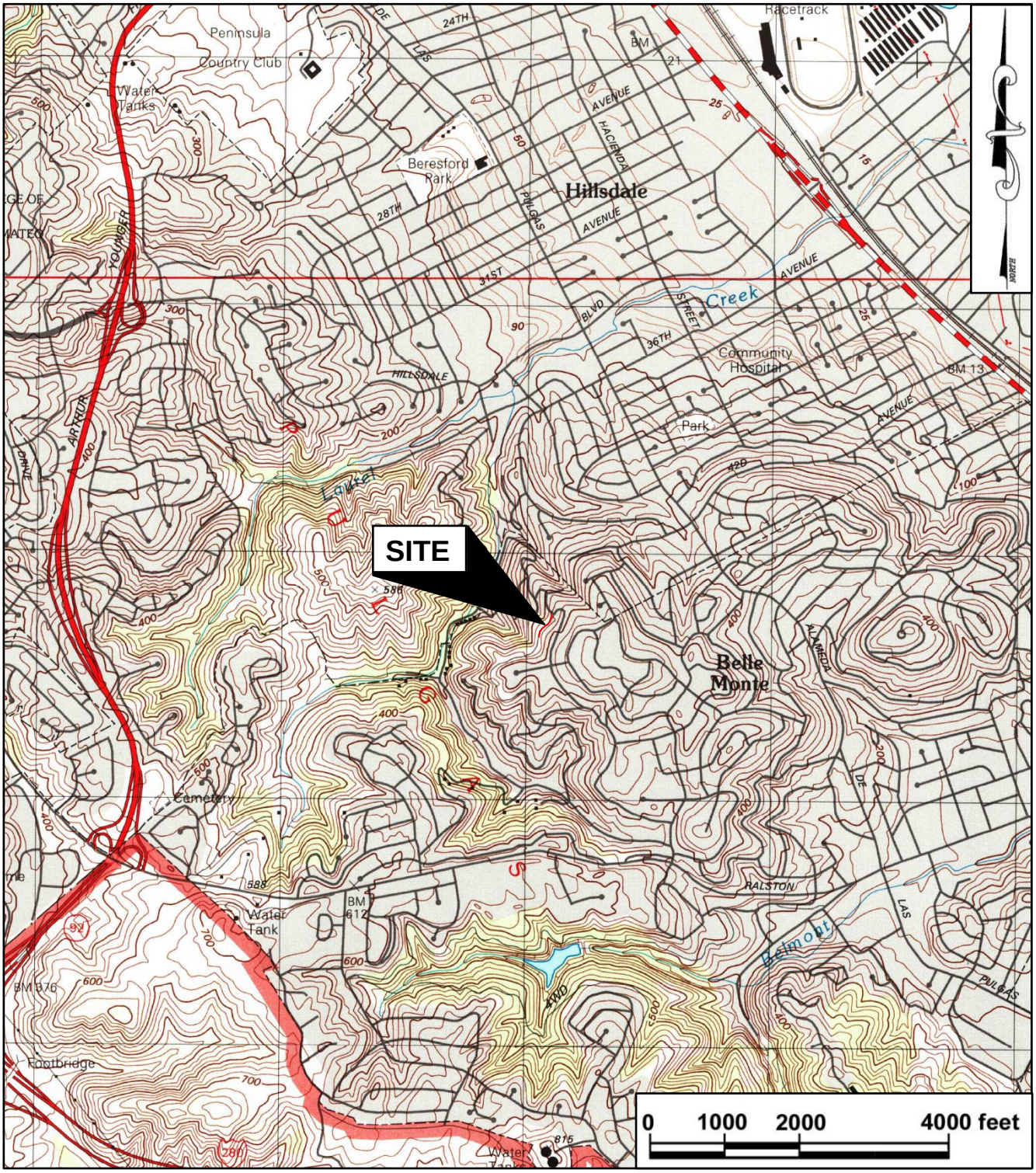
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William Cotton and Associates, April 1985, Geologic Hazard Analysis of the San Juan Canyon Study Area, Belmont, California.

William Cotton and Associates, April 1985, Ground Movement Potential and Geologic Hazard Policy Map, San Juan Canyon Study Area, Belmont, California, Scale 1:2,400.

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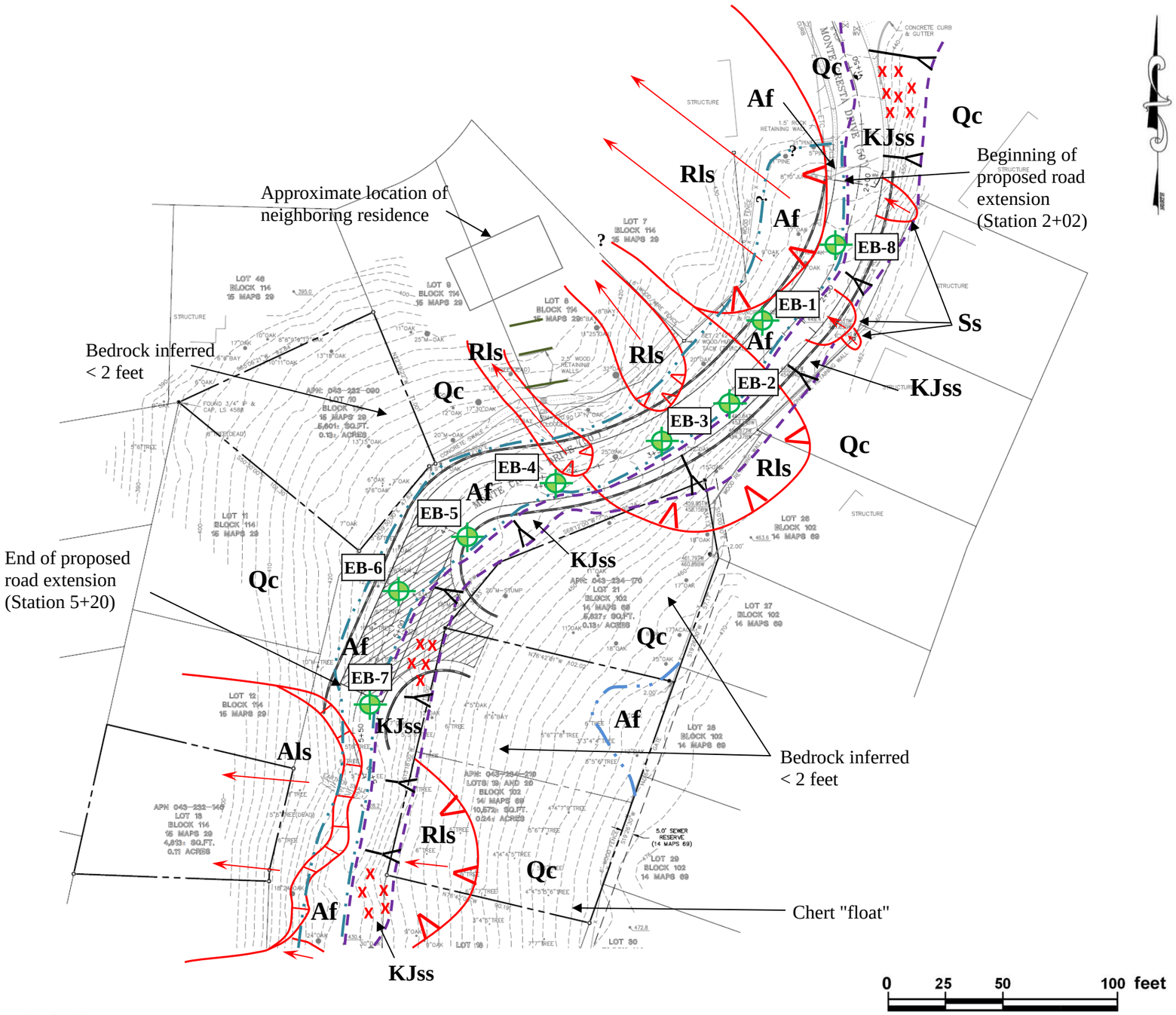
Scale: 1 inch = 2000 feet
Base is United States Geological Survey San Mateo 7.5 Minute Quadrangle, dated 1997.

VICINITY MAP **FIGURE 1**
MONTE CRESTA DRIVE ROAD EXTENSION APRIL 2018
BELMONT, CALIFORNIA PROJECT NO. 4268-1A

ROMIG ENGINEERS

LEGEND

- **Af** — Artificial Fill
- **Ss** — Shallow Soil Slumps
- **Als** — Active Landslide
- **Rls** — Recent Landslide
- **Qc** — Colluvial Soil
- Cut Slope
- Headscarp of Active Landslide
- Boundary and Headscarp of Recent Landslide
- x **KJss** — Outcrop - Sandstone - Franciscan Complex
- **EB-8** — Approximate Location of Exploratory Borings
- Recently constructed retaining walls for downslope residence

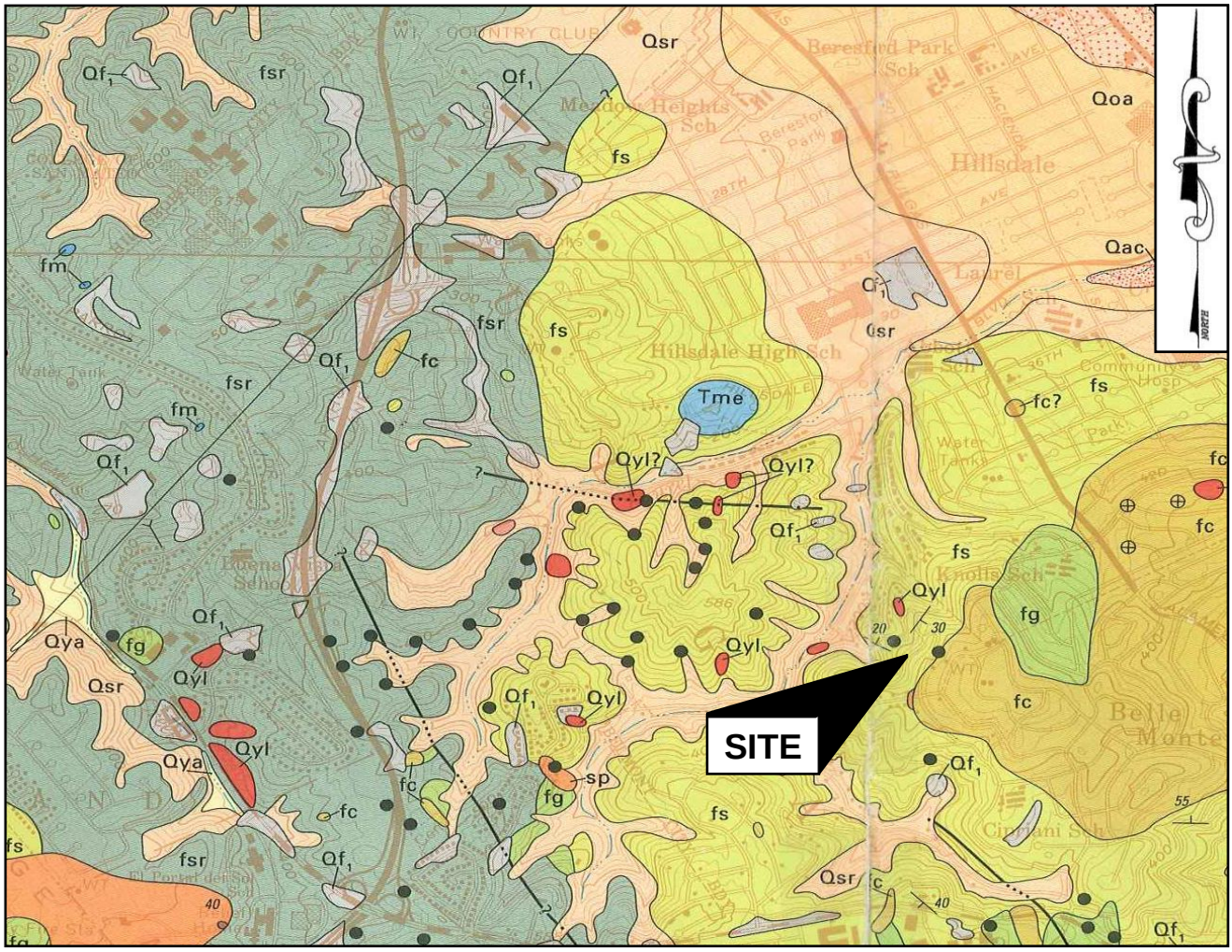


Base is site plan prepared by Lea & Braze Engineering, Inc., dated February 16, 2018.

ENGINEERING GEOLOGIC SITE PLAN
MONTE CRESTA DRIVE ROAD EXTENSION
BELMONT, CALIFORNIA

ROMIG ENGINEERS

FIGURE 2
APRIL 2018
PROJECT NO. 4268-1A



LEGEND

Qsr	Slope wash, ravine fill, and colluvium
Qyl	Young Landslide Deposits
Qf_1	Artificial Fill
fs	Franciscan Complex, Sandstone
fg	Franciscan Complex, Greenstone
fc	Franciscan Complex, Chert
fsr	Franciscan Complex, Sheared Rock

Geologic Contact - dashed where approximate, dotted where inferred.

Fault - dashed where approximate, dotted where inferred.

35 Strike and dip of bedding

0 1000 2000 4000 feet

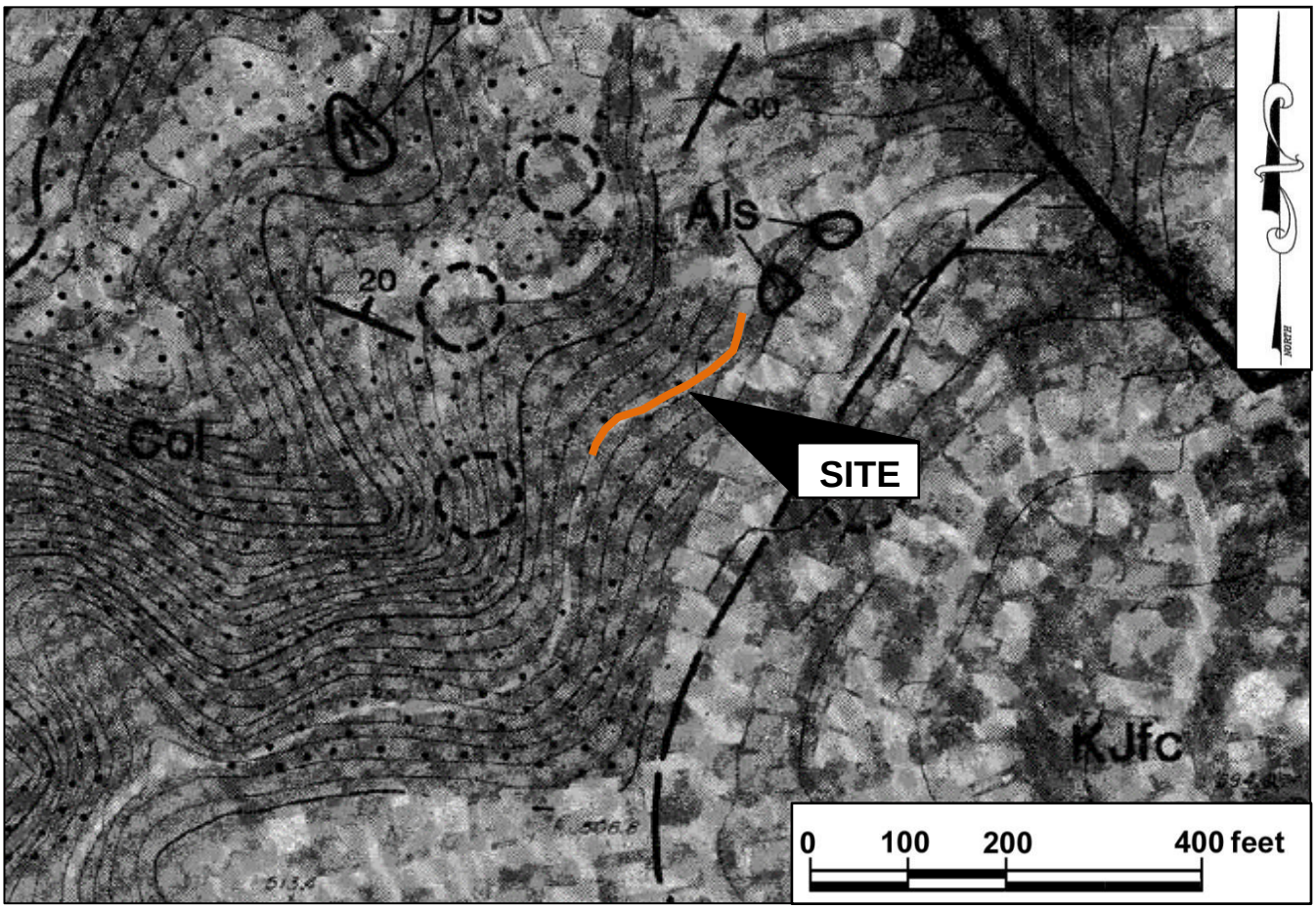
Scale: 1 inch = 2000 feet

Base is USGS Geologic Map of San Mateo County, Pampeyan, dated 1994.

VICINITY GEOLOGIC MAP
MONTE CRESTA DRIVE ROAD EXTENSION
BELMONT, CALIFORNIA

FIGURE 3
APRIL 2018
PROJECT NO. 4268-1A

ROMIG ENGINEERS



LEGEND

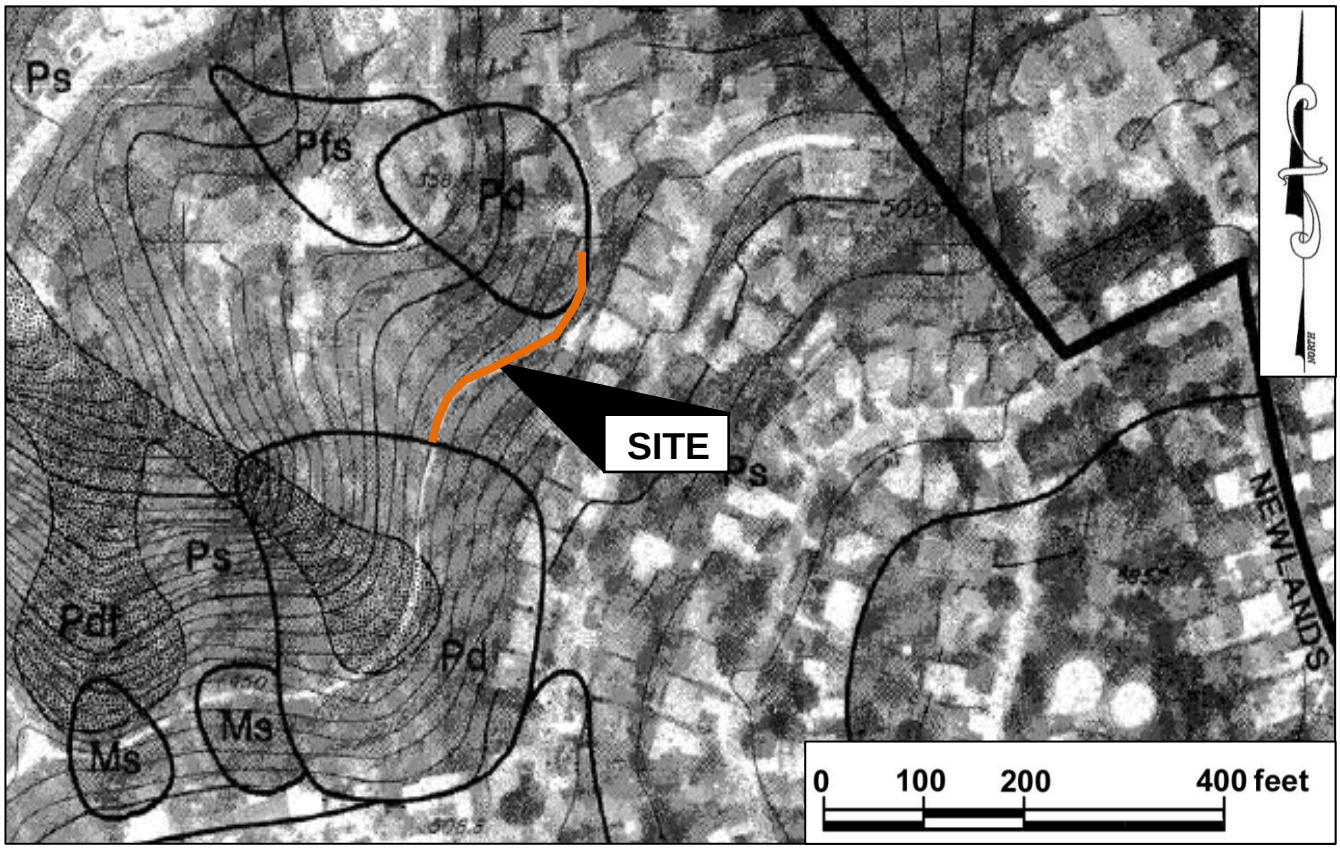
Col	Colluvium
Als	Active Landslide
Dls	Dormant Landslide
KJfs	Sandstone
KJfc	Chert

—— —?—	Geologic Contact - dashed where approximate, dotted where inferred.
40	Strike and dip of bedding.
	Boundary of lanslide deposit - dashed where approximate, arrows show direction.
	Approximate location of reported shallow landslide, whose existence or location was not verified in this study.
	Approximate location of Proposed Monte Cresta Drive road extension.

Scale: 1 inch = 200 feet
Base is Engineering Geologic Map of San Juan Canyon Study Area (William Cotton & Associates, 1985).

SAN JUAN CANYON ENGINEERING GEOLOGIC MAP **FIGURE 4**
MONTE CRESTA DRIVE ROAD EXTENSION APRIL 2018
BELMONT, CALIFORNIA PROJECT NO. 4268-1A

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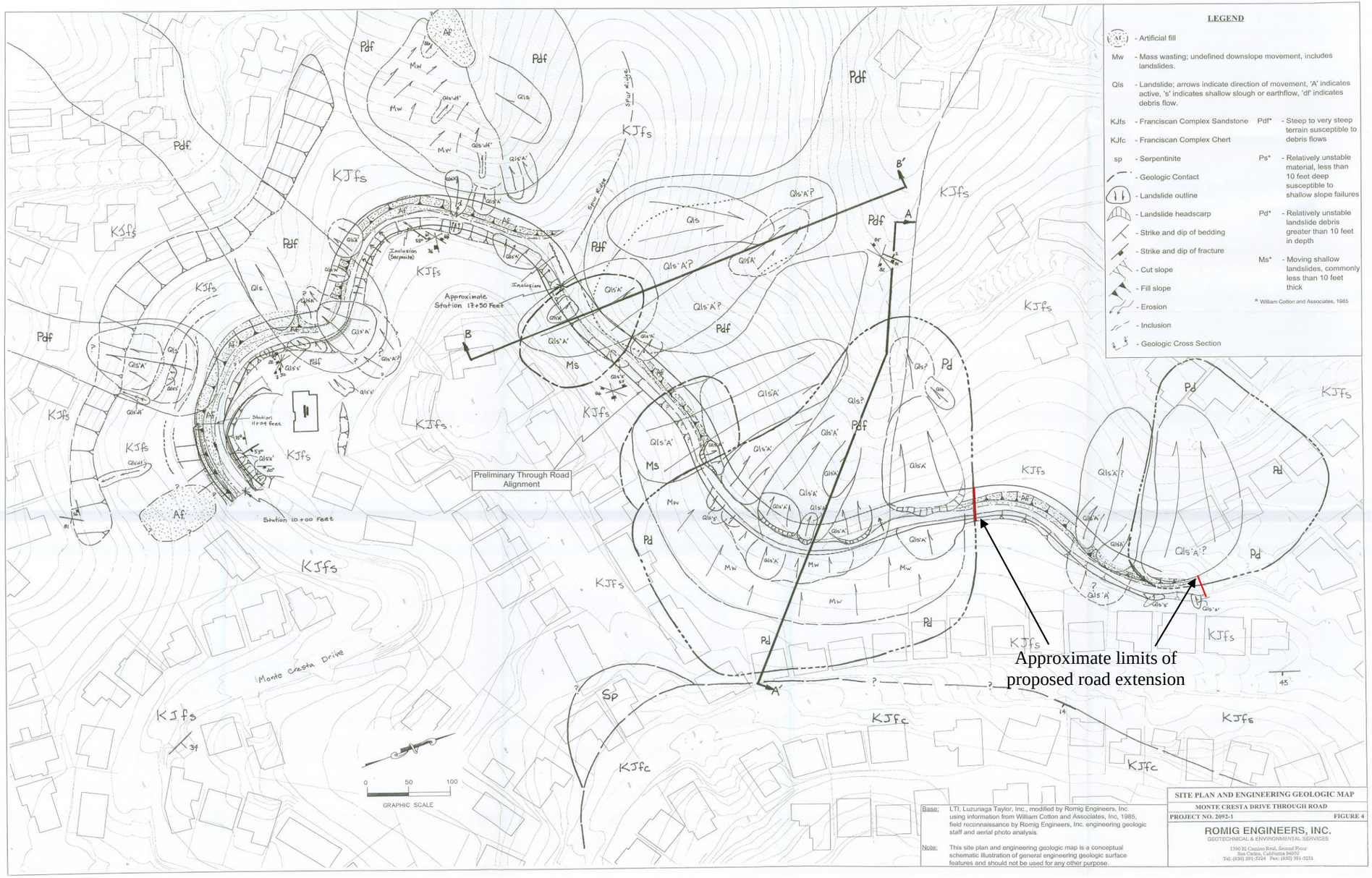
LEGEND

Sbr	Level ground to moderately steep slopes underlain by bedrock within several feet of the ground surface. Soil or alluvial cover may be subject to shallow sliding, soil creep, or settlement.
Ps	Relatively unstable material including landslide debris, slope materials, and weak bedrock, commonly less than 10 feet in thickness on gentle to moderately steep slopes. Subject to shallow slow moving landsliding, slumping, and soil creep.
Pd	Relatively unstable landslide debris, commonly more than 10 feet in thickness on moderately steep to very steep slopes. Subject to renewed deep slow moving landslide.
Pdf	Steep to very steep terrain mantled with a thick cover of soil, colluvium, and landslide debris that is susceptible to rapid downslope movement in the form of debris flows or earth flows. Includes high energy flow path and runout depositional areas on lower gradient areas.
Pfs	Potential failure within large areas of engineered fill that was placed upon moderately steep to steep ground. Subject to localized settlment, alndsliding, and debris flow ativity where placement might not have met engineering specifications
Ms	Moving shallow landslides, commonly less than 10 feet in thickness and slow moving.
	Approximate location of Proposed Monte Cresta Drive road extension.

Scale: 1 inch = 200 feet
Base is Ground Movement Potential Map of San Juan Canyon Study Area (William Cotton & Associates, 1985).

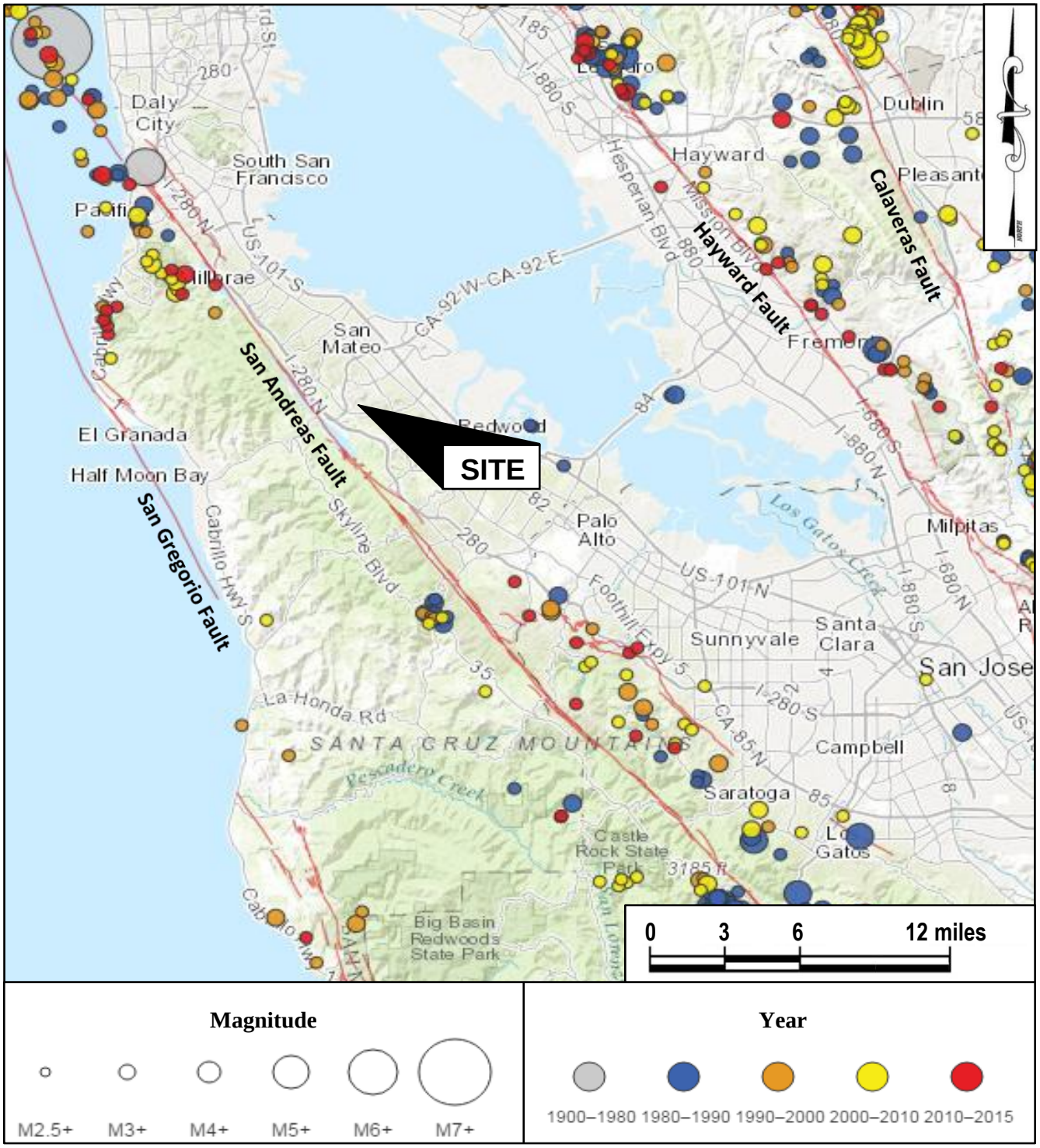
SAN JUAN CANYON GROUND MOVEMENT POTENTIAL MAP **FIGURE 5**
MONTE CRESTA DRIVE ROAD EXTENSION APRIL 2018
BELMONT, CALIFORNIA PROJECT NO. 4268-1A

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SITE PLAN AND ENGINEERING GEOLOGY MAP MONTE CRESTA DRIVE THROUGH ROAD (2008)
MONTE CRESTA DRIVE ROAD EXTENSION
BELMONT, CALIFORNIA

FIGURE 6
APRIL 2018
PROJECT NO. 4268-1A



Earthquakes with M5+ from 1900 to 1980, M2.5+ from 1980 to January 2015. Faults with activity in last 15,000 years. Based on data sources from Northern California Earthquake Data Center and USGS Quaternary Fault and Fold Database, accessed May 2015.

REGIONAL FAULT AND SEISMICITY MAP
MONTE CRESTA DRIVE ROAD EXTENSION
BELMONT, CALIFORNIA

FIGURE 7
APRIL 2018
PROJECT NO. 4268-1A

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APPENDIX A

FIELD INVESTIGATION

The soils encountered during drilling were logged by our representative and samples were obtained at depths appropriate to the investigation. The samples were taken to our laboratory where they were evaluated and classified in accordance with the Unified Soil Classification System. The logs of our borings, and a summary of the soil classification system (Figure A-1) and bedrock descriptions used on the boring logs (Figure A-2) are attached.

Several tests were performed in the field during drilling. The standard penetration test resistance was determined by dropping a 140-pound hammer through a 30-inch free fall and recording the blows required to drive the 2-inch (outside diameter) sampler 18 inches. The standard penetration test (SPT) resistance is the number of blows required to drive the sampler the last 12 inches and is recorded on the boring logs at the appropriate depths. Soil samples were also collected using a 3-inch O.D. drive sampler. The blow counts shown on the logs for this larger sampler do not represent SPT values and have not been corrected in any way.

The locations and elevations of the exploratory borings were determined by pacing using the site plan, dated February 16, 2018, prepared by Lea & Braze Engineering, Inc. and should be considered accurate only to the degree implied by the method used.

The boring logs and related information depict our interpretation of subsurface conditions only at the specific location and time indicated. Subsurface conditions and ground water levels at other locations may differ from conditions at the locations where sampling was conducted. The passage of time may also result in changes in the subsurface conditions.



USCS SOIL CLASSIFICATION

PRIMARY DIVISIONS			SOIL TYPE	SECONDARY DIVISIONS
COARSE GRAINED SOILS (< 50 % Fines)	GRAVEL	CLEAN GRAVEL (< 5% Fines)	**GW**	Well graded gravel, gravel-sand mixtures, little or no fines.
			GP	Poorly graded gravel or gravel-sand mixtures, little or no fines.
		GRAVEL with FINES	**GM**	Silty gravels, gravel-sand-silt mixtures, non-plastic fines.
			GC	Clayey gravels, gravel-sand-clay mixtures, plastic fines.
	SAND	CLEAN SAND (< 5% Fines)	**SW**	Well graded sands, gravelly sands, little or no fines.
			SP	Poorly graded sands or gravelly sands, little or no fines.
		SAND WITH FINES	**SM**	Silty sands, sand-silt mixtures, non-plastic fines.
			SC	Clayey sands, sand-clay mixtures, plastic fines.
FINE GRAINED SOILS (> 50 % Fines)	SILT AND CLAY Liquid limit < 50%		**ML**	Inorganic silts and very fine sands, with slight plasticity.
			CL	Inorganic clays of low to medium plasticity, lean clays.
			OL	Organic silts and organic clays of low plasticity.
	SILT AND CLAY Liquid limit > 50%		**MH**	Inorganic silt, micaceous or diatomaceous fine sandy or silty soil.
			CH	Inorganic clays of high plasticity, fat clays.
			OH	Organic clays of medium to high plasticity, organic silts.
HIGHLY ORGANIC SOILS			**Pt**	Peat and other highly organic soils.
BEDROCK			**BR**	Weathered bedrock.

RELATIVE DENSITY

SAND & GRAVEL	BLOWS/FOOT*
VERY LOOSE	0 to 4
LOOSE	4 to 10
MEDIUM DENSE	10 to 30
DENSE	30 to 50
VERY DENSE	OVER 50

CONSISTENCY

SILT & CLAY	STRENGTH^	BLOWS/FOOT*
VERY SOFT	0 to 0.25	0 to 2
SOFT	0.25 to 0.5	2 to 4
FIRM	0.5 to 1	4 to 8
STIFF	1 to 2	8 to 16
VERY STIFF	2 to 4	16 to 32
HARD	OVER 4	OVER 32

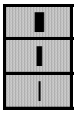
GRAIN SIZES

BOULDERS	COBBLES	GRAVEL		SAND			SILT & CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE	
	12 "	3"	0.75"	4	10	40	200
	SIEVE OPENINGS			U.S. STANDARD SERIES SIEVE			

Classification is based on the Unified Soil Classification System; fines refer to soil passing a No. 200 sieve.

* Standard Penetration Test (SPT) resistance, using a 140 pound hammer falling 30 inches on a 2 inch O.D. split spoon sampler; blow counts not corrected for larger diameter samplers.

^ Unconfined Compressive strength in tons/sq. ft. as estimated by SPT resistance, field and laboratory tests, and/or visual observation.



KEY TO SAMPLERS

Modified California Sampler (3-inch O.D.)

Mid-size Sampler (2.5-inch O.D.)

Standard Penetration Test Sampler (2-inch O.D.)

KEY TO EXPLORATORY BORING LOGS **FIGURE A-1**

MONTE CRESTA DRIVE ROAD EXTENSION APRIL 2018

BELMONT, CALIFORNIA PROJECT NO. 4268-1A

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WEATHERING

Fresh
Rock fresh, crystals bright, few joints may show slight staining. Rock rings under hammer if crystalline.

Very Slight
Rock generally fresh, joints stained, some joints may show thin clay coatings, crystals in broken face show bright. Rock rings under hammer if crystalline.

Slight
Rock generally fresh, joints stained, and discoloration extends into rock up to 1 inch. Joints may contain clay. In granitoid rocks some occasional feldspar crystals are dull and discolored. Crystalline rocks ring under hammer.

Moderate
Significant portions of rock show discoloration and weathering effects. In granitoid rocks, most feldspars are dull and discolored; some are clayey. Rock has dull sound under hammer and shows significant loss of strength as compared with fresh rock.

Moderately Severe
All rock except quartz discolored or stained. In granitoid rocks, all feldspars dull and discolored and majority show kaolinization. Rock shows severe loss of strength and can be excavated with geologist's pick. Rock goes "clunk" when struck.

Severe
All rock except quartz discolored or stained. Rock "fabric" clear and evident, but reduced in strength to strong soil. In granitoid rocks, all feldspars kaolinized to some extent. Some fragments of strong rock usually left.

Very Severe
All rock except quartz discolored and stained. Rock "fabric" discernible, but mass effectively reduced to "soil" with only fragments of strong rock remaining.

Complete
Rock reduced to "soil". Rock fabric not discernible or discernible only in small scattered locations. Quartz may be present as dikes or stringers.

HARDNESS

Very hard
Cannot be scratched with knife or sharp pick. Hand specimens requires several hard blows of geologist's.

Hard
Can be scratched with knife or pick only with difficulty. Hard blow of hammer required to detach hand specimen.

Moderately Hard
Can be scratched with knife or pick. Gouges or grooves to 1/4 inch deep can be excavated by hard blow of point of a geologist's pick. Hard specimen can be detached by moderate blow.

Medium
Can be grooved or gouged 1/16 inch deep by firm pressure on knife or pick point. Can be excavated in small chips to pieces about 1 inch maximum size by hard blows of the point of a geologist's pick.

Soft
Can be gouged or grooved readily with knife or pick point. Can be excavated in chips to pieces several inches in size by moderate blows of a pick point. Small thin pieces can be brocken by finger pressure.

Very Soft
Can be carved with knife. Can be excavated readily with point of pick. Pieces 1 inch or more in thickness can be broken with finger pressure. Can be scratched readily by fingernail.

JOINT BEDDING AND FOLIATION SPACING

Spacing	Joints	Bedding and Foliation
Less than 2 in.	Very Close	Very Thin
2 in. to 1 ft.	Close	Thin
1 ft. to 3 ft.	Moderately Close	Medium
3 ft. to 10 ft.	Wide	Thick
More than 10 ft.	Very Wide	Very Thick

ROCK QUALITY DESIGNATOR (RQD)

RQD, as a percentage	Descriptor
Exceeding 90	Excellent
90 to 75	Good
75 to 50	Fair
50 to 25	Poor
Less than 25	Very Poor

KEY TO BEDROCK DESCRIPTIONS **FIGURE A-2**
MONTE CRESTA DRIVE ROAD EXTENSION APRIL 2018
BELMONT, CALIFORNIA PROJECT NO. 4268-1A

ROMIG ENGINEERS

DRILL TYPE: Track-mounted CME-55 with 6" Solid Flight Auger and Auto Hammer **LOGGED BY:** CT

DEPTH TO GROUND WATER: Not Encountered **SURFACE ELEVATION:** 447 feet **DATE DRILLED:** 3/2/18

CLASSIFICATION AND DESCRIPTION	SOIL CONSISTENCY/ DENSITY or ROCK HARDNESS* (Figure A-2)	SOIL TYPE	SOIL SYMBOL	DEPTH (FEET)	SAMPLE INTERVAL	PEN. RESISTANCE (Blows/ft)	WATER CONTENT (%)	SHEAR STRENGTH (TSF)*	UNCONFIN. COMP. (TSF)*
Fill: Brown, Sandy Lean Clay, moist, fine to coarse grained sand, fine to coarse angular to subrounded gravel, low plasticity, roots, asphalt debris, light brown to black mottling,	Stiff to Very Stiff	CL		**0**					
◆ Dry Density = 103 pcf						13	16 15		2.0
						11	13 15		4.3
				5					
Granite countertop fragment.						26	19		4.3
Franciscan Complex: Light brown to gray, Sandstone, moist, moderately to severely weathered, fractured, somewhat friable, orange mottling, manganese oxide staining on fractured surfaces, fine grained.	Soft	BR							
				10		31	8		
Shear surface at 9.5 feet.									
Note: The stratification lines represent the approximate boundary between soil and rock types, the actual transition may be gradual.									
*Measured using Torvane and Pocket Penetrometer devices.									
				15		29	12		
Thin calcite veins.									
				20		35	11		
Bottom of Boring at 20 feet.									

EXPLORATORY BORING LOG EB-1
MONTE CRESTA DRIVE ROAD EXTENSION
BELMONT, CALIFORNIA

BORING EB-1
APRIL 2018
PROJECT NO. 4268-1A

ROMIG ENGINEERS

DRILL TYPE: Track-mounted CME-55 with 6" Solid Flight Auger and Auto Hammer **LOGGED BY:** CT

DEPTH TO GROUND WATER: Not Encountered **SURFACE ELEVATION:** 452 feet **DATE DRILLED:** 3/2/18

CLASSIFICATION AND DESCRIPTION	SOIL CONSISTENCY/ DENSITY or ROCK HARDNESS* (Figure A-2)	SOIL TYPE	SOIL SYMBOL	DEPTH (FEET)	SAMPLE INTERVAL	PEN. RESISTANCE (Blows/ft)	WATER CONTENT (%)	SHEAR STRENGTH (TSF)*	UNCONFIN. COMP. (TSF)*
Fill: Brown, Sandy Lean Clay, moist, fine to coarse grained sand, fine angular gravel, low plasticity, roots, chert fragments.	Very Stiff	CL		**0**		16	14		3.0
Franciscan Complex: Light brown to gray, Sandstone and Claystone, moist, fine grained, orange mottling, fractured, some manganese oxide staining, small roots, somewhat friable. Primarily Sandstone.	Soft	BR		**5**		30	9		
						51	12		
				10		61	12		
Bottom of Boring at 10 feet.				**15**					
				20					

Note: The stratification lines represent the approximate boundary between soil and rock types, the actual transition may be gradual.

*Measured using Torvane and Pocket Penetrometer devices.

EXPLORATORY BORING LOG EB-2
MONTE CRESTA DRIVE ROAD EXTENSION
BELMONT, CALIFORNIA

BORING EB-2
APRIL 2018
PROJECT NO. 4268-1A

ROMIG ENGINEERS

DRILL TYPE: Track-mounted CME-55 with 6" Solid Flight Auger and Auto Hammer **LOGGED BY:** CT

DEPTH TO GROUND WATER: Not Encountered **SURFACE ELEVATION:** 438 feet **DATE DRILLED:** 3/2/18

CLASSIFICATION AND DESCRIPTION	SOIL CONSISTENCY/ DENSITY or ROCK HARDNESS* (Figure A-2)	SOIL TYPE	SOIL SYMBOL	DEPTH (FEET)	SAMPLE INTERVAL	PEN. RESISTANCE (Blows/ft)	WATER CONTENT (%)	SHEAR STRENGTH (TSF)*	UNCONFIN. COMP. (TSF)*
Fill: Brown, Sandy Lean Clay, moist, fine to coarse grained sand, low plasticity, roots, chert fragments.	Firm to Stiff	CL		0					
■ Liquid Limit = 34, Plasticity Index = 15.						6	20		1.0
						9	18		0.8
				5					
◆ Dry Density = 112 pcf						19	18		2.0
Franciscan Complex: Light brown to gray, Sandstone, moist, fractured, fine grained, severely weathered, orange mottling.	Medium	BR							
						50/5"	5		
				10					
						50/3"			
Bottom of Boring at 12.3 feet.				15					
				20					

Note: The stratification lines represent the approximate boundary between soil and rock types, the actual transition may be gradual.

*Measured using Torvane and Pocket Penetrometer devices.

EXPLORATORY BORING LOG EB-3
MONTE CRESTA DRIVE ROAD EXTENSION
BELMONT, CALIFORNIA

BORING EB-3
APRIL 2018
PROJECT NO. 4268-1A

ROMIG ENGINEERS

DRILL TYPE: Track-mounted CME-55 with 6" Solid Flight Auger and Auto Hammer **LOGGED BY:** CT

DEPTH TO GROUND WATER: Not Encountered **SURFACE ELEVATION:** 431 feet **DATE DRILLED:** 3/2/18

CLASSIFICATION AND DESCRIPTION	SOIL CONSISTENCY/ DENSITY or ROCK HARDNESS* (Figure A-2)	SOIL TYPE	SOIL SYMBOL	DEPTH (FEET)	SAMPLE INTERVAL	PEN. RESISTANCE (Blows/ft)	WATER CONTENT (%)	SHEAR STRENGTH (TSF)*	UNCONFIN. COMP. (TSF)*
Fill: Brown, Sandy Lean Clay, moist, fine to coarse grained sand, low plasticity, roots, orange mottling.	Stiff	CL		**0**					
							23		
Franciscan Complex: Light brown to gray, Sandstone, moist, fractured, fine grained, orange mottling, moderately to very severely weathered, manganese oxide staining on fracture surfaces, somewhat friable, minor gypsum crystallization.	Soft	BR				18	13		
						71	6		
				5					
Hard Drilling.									
Some interbedded Shale.									
						61	11		
				10					
Bottom of Boring at 9.5 feet.									
				15					
Note: The stratification lines represent the approximate boundary between soil and rock types, the actual transition may be gradual.									
*Measured using Torvane and Pocket Penetrometer devices.				**20**					

EXPLORATORY BORING LOG EB-4
MONTE CRESTA DRIVE ROAD EXTENSION
BELMONT, CALIFORNIA

BORING EB-4
APRIL 2018
PROJECT NO. 4268-1A

ROMIG ENGINEERS

DRILL TYPE: Track-mounted CME-55 with 6" Solid Flight Auger and Auto Hammer **LOGGED BY:** CT

DEPTH TO GROUND WATER: Not Encountered **SURFACE ELEVATION:** 435 feet **DATE DRILLED:** 3/2/18

CLASSIFICATION AND DESCRIPTION	SOIL CONSISTENCY/ DENSITY or ROCK HARDNESS* (Figure A-2)	SOIL TYPE	SOIL SYMBOL	DEPTH (FEET)	SAMPLE INTERVAL	PEN. RESISTANCE (Blows/ft)	WATER CONTENT (%)	SHEAR STRENGTH (TSF)*	UNCONFIN. COMP. (TSF)*
Fill: Brown, Sandy lean Clay, moist, fine to coarse grained sand, roots, orange mottling.	Very Stiff	CL		**0**					
Franciscan Complex: Gray, Sandstone, moist, fractured, fine grained, orange mottling, moderately weathered, manganese oxide staining on fracture surfaces, somewhat friable.	Soft	BR		**5**		50/6"	3		
						65	6		
				10		47	9		
Bottom of Boring at 9.5 feet.									
				15					
				20					

Note: The stratification lines represent the approximate boundary between soil and rock types, the actual transition may be gradual.

*Measured using Torvane and Pocket Penetrometer devices.

EXPLORATORY BORING LOG EB-5
MONTE CRESTA DRIVE ROAD EXTENSION
BELMONT, CALIFORNIA

BORING EB-5
APRIL 2018
PROJECT NO. 4268-1A

ROMIG ENGINEERS

DRILL TYPE: Track-mounted CME-55 with 6" Solid Flight Auger and Auto Hammer **LOGGED BY:** CT

DEPTH TO GROUND WATER: Not Encountered **SURFACE ELEVATION:** 440 feet **DATE DRILLED:** 3/2/18

CLASSIFICATION AND DESCRIPTION	SOIL CONSISTENCY/ DENSITY or ROCK HARDNESS* (Figure A-2)	SOIL TYPE	SOIL SYMBOL	DEPTH (FEET)	SAMPLE INTERVAL	PEN. RESISTANCE (Blows/ft)	WATER CONTENT (%)	SHEAR STRENGTH (TSF)*	UNCONFIN. COMP. (TSF)*
Fill: Brown, Sandy Lean Clay, moist, low plasticty, fine to coarse grained sand, sandstone fragments, roots.	Very Stiff	CL		0		17	13		
Franciscan Complex: Light brown to gray, Sandstone, moist, moderately weathered, fractured, fine grained, orange mottling, manganese oxide staining on fracture surfaces, somewhat friable, small roots.	Soft	BR		5		40	10		
Some interbedded Shale.				10		61	11		
						78	8		
Bottom of Boring at 11 feet.				15					
Note: The stratification lines represent the approximate boundary between soil and rock types, the actual transition may be gradual.				20					
*Measured using Torvane and Pocket Penetrometer devices.									

EXPLORATORY BORING LOG EB-6
MONTE CRESTA DRIVE ROAD EXTENSION
BELMONT, CALIFORNIA

BORING EB-6
APRIL 2018
PROJECT NO. 4268-1A

ROMIG ENGINEERS

DRILL TYPE: Track-mounted CME-55 with 6" Solid Flight Auger and Auto Hammer **LOGGED BY:** CT

DEPTH TO GROUND WATER: Not Encountered **SURFACE ELEVATION:** 424 feet **DATE DRILLED:** 3/2/18

CLASSIFICATION AND DESCRIPTION	SOIL CONSISTENCY/ DENSITY or ROCK HARDNESS* (Figure A-2)	SOIL TYPE	SOIL SYMBOL	DEPTH (FEET)	SAMPLE INTERVAL	PEN. RESISTANCE (Blows/ft)	WATER CONTENT (%)	SHEAR STRENGTH (TSF)*	UNCONFIN. COMP. (TSF)*
Fill: Brown, Sandy Lean Clay, moist, low plasticty, fine to coarse grained sand, chert fragments, roots.	Firm to Stiff	CL		**0**		6	15		3.8
Residual Soil: Brown, Sandy Lean Clay, moist, low plasticity, fine to coarse grained sand, roots, orange mottling, some sandstone fragments. ◆ Dry Density = 102 pcf.	Very Stiff	CL		**5**	◆	18	13 12		
Franciscan Complex: Light brown to gray, Sandstone, moist, moderately weathered, fractured, orange mottling, manganese oxide staining on fracture surfaces, somewhat friable, small roots, fine grained.	Medium	BR		**10**		50/3"	4		
						50/3"	11		
Bottom of Boring at 12.75 feet.				**15**					
Note: The stratification lines represent the approximate boundary between soil and rock types, the actual transition may be gradual. *Measured using Torvane and Pocket Penetrometer devices.				**20**					

EXPLORATORY BORING LOG EB-7
MONTE CRESTA DRIVE ROAD EXTENSION
BELMONT, CALIFORNIA

BORING EB-7
APRIL 2018
PROJECT NO. 4268-1A

ROMIG ENGINEERS

DRILL TYPE: Track-mounted CME-55 with 6" Solid Flight Auger and Auto Hammer **LOGGED BY:** CT/LF

DEPTH TO GROUND WATER: Not Encountered **SURFACE ELEVATION:** 451 feet **DATE DRILLED:** 3/2/18

CLASSIFICATION AND DESCRIPTION	SOIL CONSISTENCY/ DENSITY or ROCK HARDNESS* (Figure A-2)	SOIL TYPE	SOIL SYMBOL	DEPTH (FEET)	SAMPLE INTERVAL	PEN. RESISTANCE (Blows/ft)	WATER CONTENT (%)	SHEAR STRENGTH (TSF)*	UNCONFIN. COMP. (TSF)*
Fill: Brown, Sandy Lean Clay, moist, fine to medium grained sand, fine to coarse angular to rounded gravel, low plasticity, sandstone and shale fragments.	Stiff	CL		0					
● 56% Passing No. 200 Sieve.					●	11	13		
						12	13		
				5					
Franciscan Complex: Gray to light brown, Sandstone, moist, fractured, orange mottling, severely weathered, fine grained.	Soft	BR				65	10		
Interbedded Claystone lense at 6 feet.									
						50/3"	6		
				10					
Bottom of Boring at 8.8 feet.									
				15					
				20					

Note: The stratification lines represent the approximate boundary between soil and rock types, the actual transition may be gradual.

*Measured using Torvane and Pocket Penetrometer devices.

EXPLORATORY BORING LOG EB-8
MONTE CRESTA DRIVE ROAD EXTENSION
BELMONT, CALIFORNIA

BORING EB-8
APRIL 2018
PROJECT NO. 4268-1A

ROMIG ENGINEERS

APPENDIX B

LABORATORY TESTS

Samples from the subsurface exploration were selected for tests to help evaluate the physical and engineering properties of the soils and bedrock encountered at the site. The tests that were performed are briefly described below.

The natural moisture content was determined in accordance with ASTM D2216 on nearly all of the samples recovered from the borings. This test determines the moisture content, representative of field conditions, at the time the samples were collected. The results are presented on the boring logs at the appropriate sample depths.

The amount of silt and clay-sized material present was determined on one sample of fill in accordance with ASTM D422. The result is presented on the log of Boring EB-8 at the appropriate sample depth.

The Atterberg Limits were determined on one sample of fill in accordance with ASTM D4318. The Atterberg limits are the moisture content within which the soil is workable or plastic. The results of these tests are presented in Figure B-1 and on the log of Boring EB-3 at the appropriate sample depth.

The dry densities were determined on three samples of soil recovered from the borings. The results of these tests are presented on the logs of Borings EB-1, EB-3, and EB-7 at the appropriate sample depths.



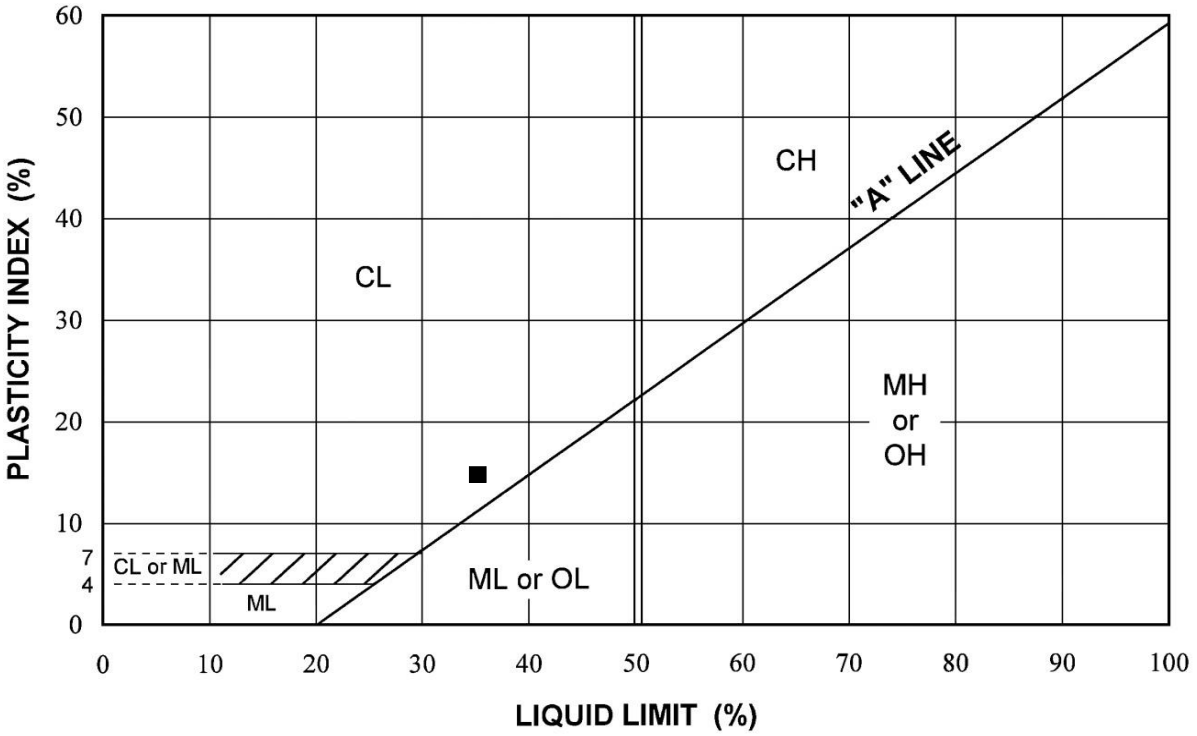


Chart Symbol	Boring Number	Sample Depth (feet)	Water Content (percent)	Liquid Limit (percent)	Plasticity Index (percent)	Liquidity Index (percent)	Passing No. 200 Sieve (percent)	USCS Soil Classification
■	EB-3	1-2.5	20	34	15	7		CL

PLASTICITY CHART **FIGURE B-1**
MONTE CRESTA DRIVE ROAD EXTENSION APRIL 2018
BELMONT, CALIFORNIA PROJECT NO. 4268-1A

ROMIG ENGINEERS

ROMIG ENGINEERS, INC.

1390 El Camino Real, 2nd Floor

San Carlos, California 94070

Phone: (650) 591-5224

www.romigengineers.com

Appendix D

Intent to Serve

Will Serve AT&T

Will Serve Comcast

Will Serve Mid-Pen Water

Will Serve PG&E

Date 9/25/2018

870 N McCarthy Bl
Milpitas, CA 95035

Meng Huang
226 Coleman Street
San Francisco, CA 94124

RE: APN's: **043-234-210, 043-234-170, 043-232-090 Monte Cresta Drive, Belmont CA 94002**

To whom it may concern,

The owners have requested that we furnish a statement of our policy for providing communications facilities to the above project.

Communication facilities will be extended to and within the parcel in accordance with our Tariff Schedule No. 2, Rule 15 and 16. These rules are on file with the California Public Utilities Commission and are available at our Marketing office upon request.

These facilities will be installed in accordance with the tariff applicable at the time of construction.

Sincerely,

Dave Clark
Manager, BIC/TRACT Engineer
AT&T, Construction & Engineering
870 N McCarthy Bl
Milpitas, CA 95035
T: 408.635.8824
DC9651@att.com

COMCAST

Comcast Cable
3055 Comcast Place
Livermore, CA 94551

October 1, 2018

Meng Huang
226 Coleman Street
San Francisco, CA 94124

RE: Comcast Broadband Communications Services Availability at - **043-234-210, 043-234-170, 043-232-090 Monte Cresta Drive, Belmont, CA 94002**

Dear Meng:

This letter is to confirm that your proposed project located at - **043-234-210, 043-234-170, 043-232-090 Monte Cresta Drive, Belmont, CA 94002** is within Comcast's service territory.

Under its present plans, and upon owner's/developer's completion of the service application documents, Comcast expects to be in a position to provide its services to occupants in the referenced projects. Our broadband services include television, high-speed internet, and telephone services.

Arrangements to install the necessary service facilities are being made in accordance with Comcast's wiring infrastructure specifications and requirements.

If you have any further questions, please feel free to give me a call. I look forward to working with you in the near future.

Sincerely,

David T. Higginbotham

David Higginbotham
Comcast
MDU Operations
MDU_Opsteam@cable.comcast.com
(925) 424-0117

MID-PENINSULA
WATER DISTRICT

3 Dairy Lane, Belmont, CA 94002
tel: 650.591.8941 fax: 650.591.4998 MidPeninsulaWater.org

October 10, 2018

Meng Huang
226 Coleman Street
San Francisco, CA 94124

RE: "Intent to Serve" Letter for three (3) APN's, 043234210, 043234170, 043232090 located on Monte Cresta Drive Belmont, CA

Dear Meng:

In response to your request for the Mid-Peninsula Water District (MPWD) to issue the "Intent to Serve" letter for the referenced project, please accept this letter as confirmation of the MPWD intent to serve the referenced project water.

This project is proposed to be on a privately maintained roadway, and will require a separate Water Service Agreement with the Mid-Peninsula Water District. Upon review of the final project plans, the MPWD can provide the calculation of fees for the requested service.

After review and approval, including receipt of all applicable fees and charges, and in full accordance with all applicable rules and regulations, the MPWD will provide water for the referenced project.

We look forward to working with you. Please contact me at (650) 591-8941, regarding any further questions.

Sincerely,

Rene Ramirez
Operations Manager
Mid-Peninsula Water District

BOARD OF DIRECTORS
DAVE WARDEN
President
LOUIS J. VELLA
Vice-President
BETTY L. LINVILL
Director
MATTHEW P. ZUCCA
Director
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Director

OFFICERS
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General Manager
CANDY PIÑA
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Operations Manager
JOAN L. CASSMAN
JULIE SHERMAN
District Counsel
JOUBIN PAKPOUR
District Engineer
JEFF IRA
Treasurer

GREEN BUSINESS

Produced with eco-friendly printing and paper

9/21/18

Meng Huang
226 Coleman St
San Francisco, CA 94124

Dear Mr. Meng Huang:

Will Serve Letter – APN#'s: 043-234-210, 043-234-170, 043-232-090

It has been requested that we furnish a statement of our policy for providing gas and electric services to the above referenced development.

Gas and Electric Distribution Facilities will be extended to and within this development in accordance with our Gas Rules 15 and 16, and our Electric Rules 15, 16 and 20c in effect at the time service is requested. These rules are on file with the California Public Utilities Commission and are available through this office upon request.

We will be able to provide service to the above project pending your filing an application and our review of the applicable drawings.

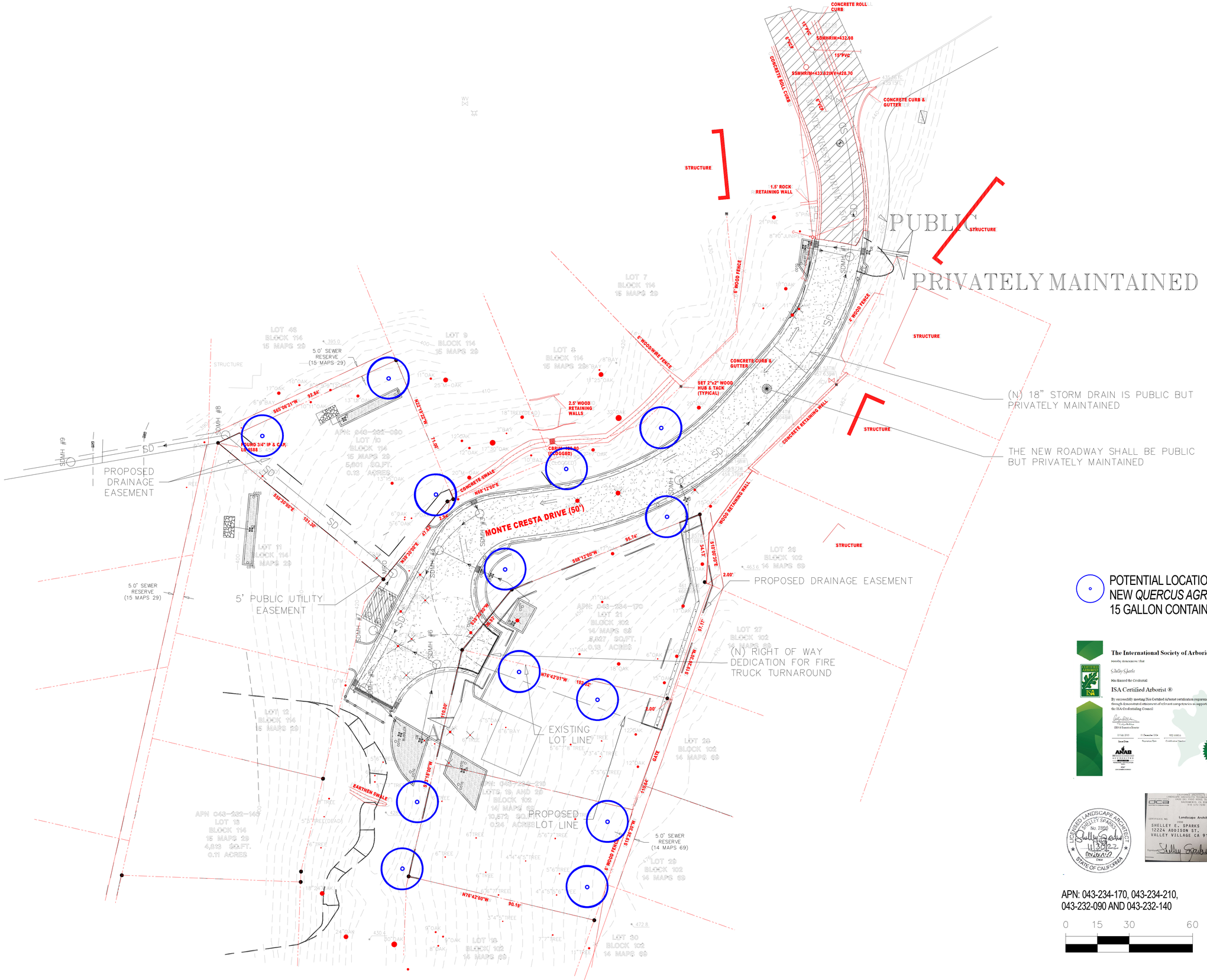
If there are any questions or if I can be of any assistance, please call me at (559)347-5263.

Sincerely,

Robert Luna| PG&E Express Connect |
8 River Park Place East, Fresno, CA 93720 |

Appendix E

Oak Planting Plan



POTENTIAL LOCATION FOR NEW *QUERCUS AGRIFOLIA* 15 GALLON CONTAINERS

APN: 043-234-170, 043-234-210, 043-232-090 AND 043-232-140

0 15 30 60



Harmony Gardens, Inc.
Shelley Sparks, RLA #2896
6620 Murietta Avenue
Van Nuys, CA 91405
(818) 505-9783
Shelley@Harmonygardens.net

REVISION LOG:

SUBMITTAL: NO:	DATE:

PROJECT ADDRESS:
MONTE CRESTA DRIVE
BELMONT, CA 94002
SAN MATEO COUNTY

OWNER ADDRESS:
Meng Huang
mhyale@gmail.com
(628) 225-9999

OAK REPLACEMENT PLAN

Date: 05/26/2022
Scale: 1" = 20'
Drawn by: PG

Sheet No.
T1

Appendix F

Parking and Sidewalk Exception Request Memo

LEA & BRAZE ENGINEERING, INC.
CIVIL ENGINEERS | LAND SURVEYORS

Main Office:
2495 Industrial Pkwy. West
Hayward, CA 94545
Ph: 510.887.4086
Fx: 510.887.3019

Sacramento Region:
3017 Douglas Blvd., Ste. 300
Roseville, CA 95661
Ph: 916.966.1338
Fx: 916.797.7363

Date: March 18, 2019

Dear Mrs Alvarez,

We are requesting exception to the on-street parking and sidewalk for the proposed 335 ft segment (between 2+00 and 5+35) along the northern end of Monte Cresta Drive. We'd like to match the width (24 ft) and characteristic of the existing section of Monte Cresta Drive (20 ft Traffic Lanes + 2 ft Curbs & Gutters on both sides). Per the geotechnical report and geotechnical peer review, the road cannot be extended further than currently showing, due to the documented geo hazard. The geotechnical report also recommended to construct the road no wider than the existing section of Monte Cresta Drive due to the **"Recent Landsides" between 2+00 and 4+00** mapped by Romig Engineers and Cotton Shires & Associates.

This letter provides the side-by-side comparison of the impacts, e.g. retaining walls, tree removal, grading, and more. Please find attached EXH-1 and EXH-2 show parking lane and sidewalk on both sides, as well as EXH-3 and EXH-4 shows parking lane and sidewalk on one side of the road. For context, the Cross-Slope Analysis is showing **43.79%** based on the formula established by the City Code, Section 7-13. Due to the hilly nature of Monte Cresta Drive and the site's complex geo condition, a wider road would not only deviate from the City's guideline on Hillside Road Width Related to Cross Slopes, but also against the Spirit of San Juan Hills Area Plan.

1. Retaining Walls

Feet	Current Proposal	Sidewalk & Parking on Both Sides	Sidewalk & Parking on One Side
Average Fill Wall Height	3.75 ft	**7.5 ft**	**4.5 ft**
Average Cut Wall Height	4.75 ft	**7.75 ft**	**7.25 ft**
Maximum Fill Wall Height	6 ft	**12 ft**	**6 ft**
Maximum Cut Wall Height	6 ft	**12 ft**	**12 ft**

LEA & BRAZE ENGINEERING, INC.
CIVIL ENGINEERS | LAND SURVEYORS

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Sacramento Region:
3017 Douglas Blvd., Ste. 300
Roseville, CA 95661
Ph: 916.966.1338
Fx: 916.797.7363

2. Tree Removal

#	Current Proposal	Sidewalk & Parking on Both Sides	Sidewalk & Parking on One Side
Number of Oak Trees	9	**17**	**14**
Total Number of Trees	14	**24**	**20**

3. Grading

Cubic Yards	Current Proposal	Sidewalk & Parking on Both Sides	Sidewalk & Parking on One Side
Cut	880	**2,000**	**2,000**
Fill	240	**950**	**450**
Export	640	**1,050**	**1,550**

4. Encroaching into Neighboring Properties

Per the current San Mateo County Fire Standards for residential roadways, the centerline turning radius for emergency apparatus access shall be 35'. This requirement for the turning radius does not allow for the full width roadway extension to stay within the 50 Foot Right-Of-Way for the full duration of the extension, whether sidewalk & parking are on both sides or just one side.

5. Geologic Condition

The proposed road extension is going through multiple "Recent Landsides". According to Romig Engineers' April, 2018 report titled "Geologic and Geotechnical Engineering Feasibility Study for Monte Cresta Drive Road Extension" Page 12 Recommendation Section, constructing the proposed road extension no wider than the existing section of Monte Cresta drive reduce the risk of soil erosion, flooding, and slope deformation. The recommendation has been reviewed and agreed by Cotton Shires & Associates.

LEA & BRAZE ENGINEERING, INC.
CIVIL ENGINEERS | LAND SURVEYORS

Main Office:
2495 Industrial Pkwy. West
Hayward, CA 94545
Ph: 510.887.4086
Fx: 510.887.3019

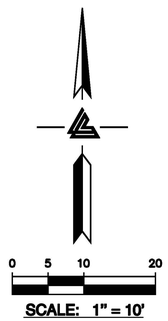
Sacramento Region:
3017 Douglas Blvd., Ste. 300
Roseville, CA 95661
Ph: 916.966.1338
Fx: 916.797.7363

CONCLUSIONS AND RECOMMENDATIONS

Due to the hilly nature of the project site, the unique geologic condition, the San Juan Hills Area Plan, and the City's current code, it is our professional opinion that a narrower road is much more preferable. As shown in the Exhibits and detailed in this letter, the steep slope that is located on both sides of the roadway, adding the sidewalk and parking lane, will significantly increase retaining wall heights, require more extensive grading, increase the number of trees required for removal, and per Romig Engineers' April 2018 report titled "Geologic and Geotechnical Engineering Feasibility Study for Monte Cresta Drive Road Extension", increase the risk of soil erosion, flooding, and slope deformation.

Sincerely,

Ryan Barton, Project Manager
Lea & Braze Engineering, Inc
Civil Engineer | Land Surveyors
San Francisco Bay Area Region
2495 Industrial Parkway West
Hayward, CA 94545
Phone: 510-887-4086 x150 Email: RBarton@leabraze.com
Roseville/Sacramento Region
3017 Douglas Blvd., Suite 300
Roseville, CA 95661
Phone: 916-966-1338
Dublin Office
7567 Amador Valley Blvd., Suite 210
Dublin, CA 94568
Phone: 925-452-2362
www.leabraze.com



ESTIMATED EARTHWORK QUANTITIES

CUBIC YARDS	WITHIN BUILDING FOOTPRINT	OUTSIDE BUILDING FOOTPRINT	TOTAL CUBIC YARDS
CUT	0	2,000	2,000
FILL	0	950	950
EXPORT			1,050

NOTE:
GRADING QUANTITIES REPRESENT BANK YARDAGE. IT DOES NOT INCLUDE ANY SWELLING OR SHRINKAGE FACTORS AND IS INTENDED TO REPRESENT IN-SITU CONDITIONS. QUANTITIES DO NOT INCLUDE OVER-EXCAVATION, TRENCHING, STRUCTURAL FOUNDATIONS OR PIERS, OR POOL EXCAVATION (IF ANY). NOTE ADDITIONAL EARTHWORKS, SUCH AS KEYWAYS OR BENCHING MAY BE REQUIRED BY THE GEOTECHNICAL ENGINEER IN THE FIELD AT TIME OF CONSTRUCTION. CONTRACTOR TO VERIFY QUANTITIES.

SYMBOL NOTE:

KILL TREE FROM ORIGINAL LEA & BRAZE GRADING DESIGN

KILL TREE FROM STREET PARKING & SIDEWALK EXHIBIT DESIGN.

CONCRETE ROLL CURB

15"PVC

SDMH RIM=432.98

SSMH RIM=433.62 INV=428.70

MONTE CRESTA DRIVE (PUBLIC)

CONCRETE CURB & GUTTER

STRUCTURE

RECENT LANDSLIDE: REMOVE-EXISTING FILL AND LANDSLIDE DEBRIS BEHIND AND BELOW THE PROPOSED RETAINING WALL; SUPPORT RETAINING WALL ON REINFORCED CONCRETE PIERS PER GEOTECHNICAL REPORT.

1.5' ROCK RETAINING WALL

SEE ARBORIST REPORT BY KIELTY ARBORIST SERVICES LLC DATED JULY 16, 2018 FOR TREE DETAIL.

(N) ROADWAY AC TIE-IN

LOT 7 BLOCK 114 15 MAPS 29

LOT 8 BLOCK 114 15 MAPS 29

KILL TREE PER ORIGINAL LEA & BRAZE GRADING PLAN -TYP.

(N) 5' SIDEWALK PER CITY OF BELMONT STANDARDS

(N) 5.5' PARKING LANE

(N) 2' ROLLED CURB PER CITY OF BELMONT STANDARDS

KILL TREE PER STREET PARKING AND SIDEWALK EXHIBIT. -TYP.

RECENT LANDSLIDE: REMOVE-EXISTING FILL AND LANDSLIDE DEBRIS BEHIND AND BELOW THE PROPOSED RETAINING WALL; SUPPORT RETAINING WALL ON REINFORCED CONCRETE PIERS PER GEOTECHNICAL REPORT.

LARGEST FILL RETAINING WALL OF 12'

LARGEST CUT RETAINING WALL OF 12'

(N) RETAINING WALL (DESIGN BY OTHERS) -TYP.

SHALLOW SOIL SLUMPS. NOT EXPECTED TO IMPACT THE PROPOSED ROAD EXTENSION PER GEOLOGIC AND GEOTECHNICAL FEASIBILITY STUDY

SET 2"X2" WOOD HUB TACK (TYPICAL)

16' WOOD/WIRE FENCE

24' WOOD FENCE

CONCRETE RETAINING WALL

2.5' WOOD RETAINING WALLS

LEA & BRAZE ENGINEERING, INC.
CIVIL ENGINEERS · LAND SURVEYORS
BAY AREA REGION
2495 INDUSTRIAL PKWY WEST
HAYWARD, CALIFORNIA 94545
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(F) (510) 887-3019

SACRAMENTO REGION
3017 DOUGLAS BLVD, # 300
ROSEVILLE, CA 95661
(P) (916)966-1338
(F) (916)797-7363
WWW.LEABRAZE.COM

REGISTERED PROFESSIONAL ENGINEER — No. C79555 — CIVIL — STATE OF CALIFORNIA — ORIGINAL SIGNATURES IN BLUE INK

MONTE CRESTA DRIVE
BELMONT, CALIFORNIA

SAN MATEO COUNTY

APN: 043-234-170, 043-234-210, 043-232-090 & 043-232-140

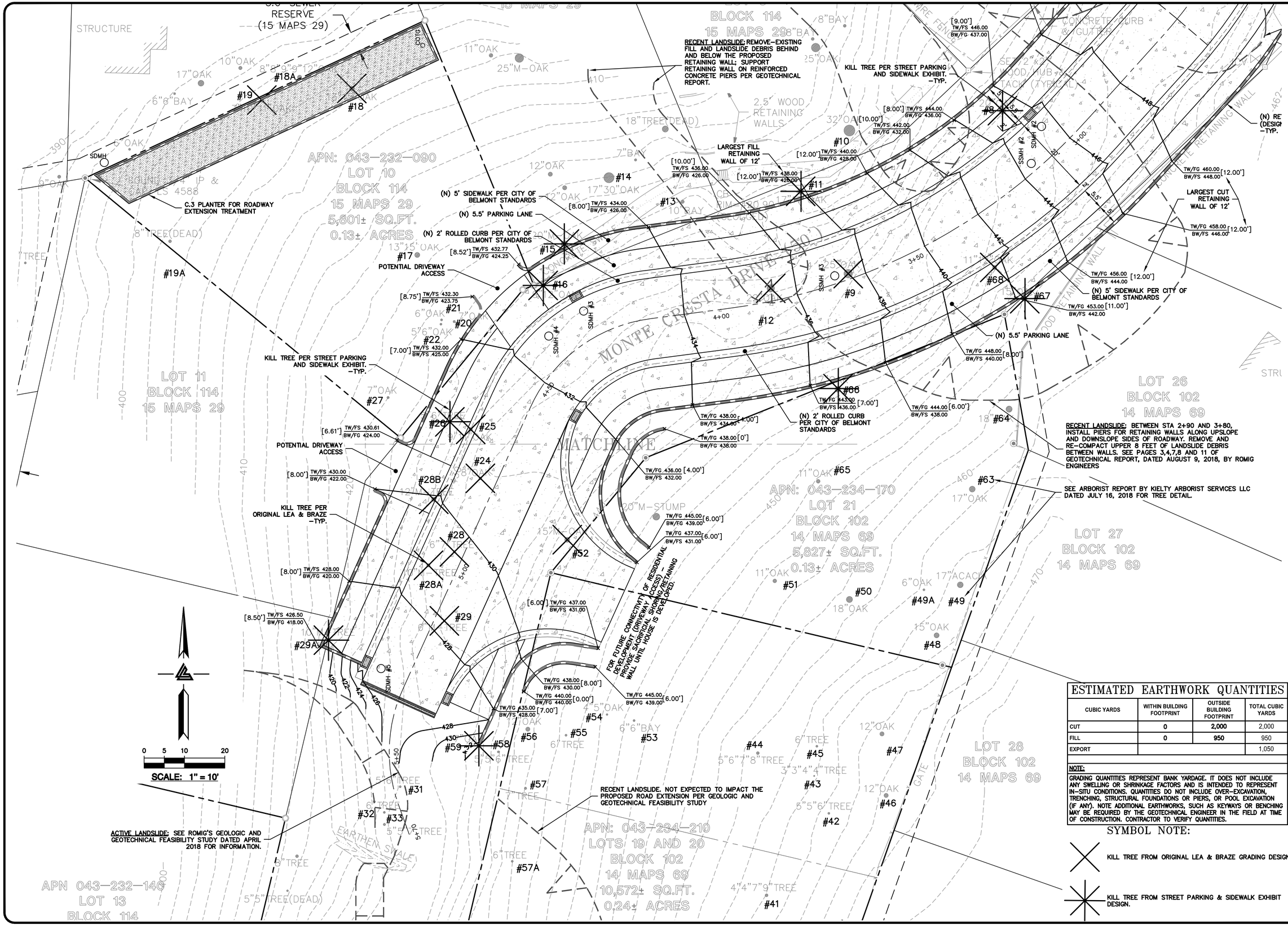
STREET PARKING & SIDEWALK EXHIBIT

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2	PLAN CHECK 2 09-19-2018	RB
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–		–
–		–
	REVISIONS	BY

JOB NO:	2180050
DATE:	2-16-18
SCALE:	AS NOTED
DESIGN BY:	RB
DRAWN BY:	WA
SHEET NO:	

EXH-1

01 OF 02 SHEETS



ESTIMATED EARTHWORK QUANTITIES

CUBIC YARDS	WITHIN BUILDING FOOTPRINT	OUTSIDE BUILDING FOOTPRINT	TOTAL CUBIC YARDS
CUT	0	2,000	2,000
FILL	0	950	950
EXPORT			1,050

NOTE:

GRADING QUANTITIES REPRESENT BANK YARDAGE. IT DOES NOT INCLUDE ANY SWELLING OR SHRINKAGE FACTORS AND IS INTENDED TO REPRESENT IN–SITU CONDITIONS. QUANTITIES DO NOT INCLUDE OVER–EXCAVATION, TRENCHING, STRUCTURAL FOUNDATIONS OR PIERS, OR POOL EXCAVATION (IF ANY). NOTE ADDITIONAL EARTHWORKS, SUCH AS KEYWAYS OR BENCHING MAY BE REQUIRED BY THE GEOTECHNICAL ENGINEER IN THE FIELD AT TIME OF CONSTRUCTION. CONTRACTOR TO VERIFY QUANTITIES.

SYMBOL NOTE:

KILL TREE FROM ORIGINAL LEA & BRAZE GRADING DESIGN

KILL TREE FROM STREET PARKING & SIDEWALK EXHIBIT DESIGN.

REGISTERED PROFESSIONAL ENGINEER PETER CLARK No. C79555 CIVIL STATE OF CALIFORNIA ORIGINAL SIGNATURES IN BLUE INK

LEA & BRAZE ENGINEERING, INC.
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MONTE CRESTA DRIVE BELMONT, CALIFORNIA

APN: 043–234–170, 043–234–210, 043–232–090 & 043–232–140

SAN MATEO COUNTY

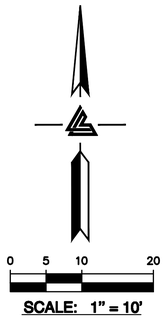
STREET PARKING & SIDEWALK EXHIBIT

1	PLAN CHECK 1 08–14–2018	RB
2	PLAN CHECK 2 09–19–2018	RB
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	REVISIONS	BY

JOB NO:	2180050
DATE:	2–16–18
SCALE:	AS NOTED
DESIGN BY:	RB
DRAWN BY:	WA
SHEET NO:	

EXH-2

02 OF 02 SHEETS



ESTIMATED EARTHWORK QUANTITIES

CUBIC YARDS	WITHIN BUILDING FOOTPRINT	OUTSIDE BUILDING FOOTPRINT	TOTAL CUBIC YARDS
CUT	0	2,000	2,000
FILL	0	450	450
EXPORT			1,550

NOTE:

GRADING QUANTITIES REPRESENT BANK YARDAGE. IT DOES NOT INCLUDE ANY SWELLING OR SHRINKAGE FACTORS AND IS INTENDED TO REPRESENT IN-SITU CONDITIONS. QUANTITIES DO NOT INCLUDE OVER-EXCAVATION, TRENCHING, STRUCTURAL FOUNDATIONS OR PIERS, OR POOL EXCAVATION (IF ANY). NOTE ADDITIONAL EARTHWORKS, SUCH AS KEYWAYS OR BENCHING MAY BE REQUIRED BY THE GEOTECHNICAL ENGINEER IN THE FIELD AT TIME OF CONSTRUCTION. CONTRACTOR TO VERIFY QUANTITIES.

SYMBOL NOTE:

KILL TREE FROM ORIGINAL LEA & BRAZE GRADING DESIGN

KILL TREE FROM STREET PARKING & SIDEWALK EXHIBIT DESIGN.

CONCRETE ROLL CURB

15"PVC

SDMH RIM=432.98

SSMH RIM=433.62 INV=428.70

MONTE CRESTA DRIVE

CONCRETE CURB & GUTTER

STRUCTURE

RECENT LANDSLIDE: REMOVE-EXISTING FILL AND LANDSLIDE DEBRIS BEHIND AND BELOW THE PROPOSED RETAINING WALL; SUPPORT RETAINING WALL ON REINFORCED CONCRETE PIERS PER GEOTECHNICAL REPORT.

1.5' ROCK RETAINING WALL

SEE ARBORIST REPORT BY KIELTY ARBORIST SERVICES LLC DATED JULY 16, 2018 FOR TREE DETAIL.

(N) ROADWAY AC TIE-IN

442.83 MATCH (E) FS

443.10 FS

TW/FG 454.00 [10.79'] BW/FS 443.21

TW/FG 456.00 [10.79'] BW/FS 444.00

TW/FG 457.50 BW/FS 446.00 [11.50']

TW/FG 458.00 [10.00'] BW/FS 448.00

[0'] TW/(E) FG 442.69 BW/(E) FG 442.69

[0.25'] TW/FS 446.00 BW/(E)FG 445.75

[0.50'] TW/FS 448.00 BW/(E) FG 447.50

[4.00'] TW/FS 448.00 BW/(E) FG 444.00

[4.00'] TW/FS 446.00 BW/(E) FG 442.00

[3.00'] TW/FS 444.00 BW/(E) FG 441.00

[4.00'] TW/FS 442.00 BW/(E) FG 439.00

[6.00'] TW/FS 440.00 BW/(E) FG 434.00

[6.00'] TW/FS 438.00 BW/FG 432.00

TW/FG 460.00 [12.00'] BW/FS 448.00

TW/FG 458.00 BW/FG 446.00

KILL TREE PER ORIGINAL LEA & BRAZE GRADING PLAN -TYP.

KILL TREE PER STREET PARKING AND SIDEWALK EXHIBIT. -TYP.

(N) 2' ROLLED CURB PER CITY OF BELMONT STANDARDS

(N) 5.5' PARKING LANE

(N) 5' SIDEWALK PER CITY OF BELMONT STANDARDS

(N) RETAINING WALL (DESIGN BY OTHERS) -TYP.

LARGEST CUT RETAINING WALL OF 12'

SHALLOW SOIL SLUMPS. NOT EXPECTED TO IMPACT THE PROPOSED ROAD EXTENSION PER GEOLOGIC AND GEOTECHNICAL FEASIBILITY STUDY

LOT 7 BLOCK 114 15 MAPS 29

LOT 8 BLOCK 114 15 MAPS 29

2.5' WOOD RETAINING WALLS

6' WOOD/WIRE FENCE

CONCRETE RETAINING WALL

SSMH #1

SSMH #2

SDMH #1

SDMH #2

#1 #2 #3 #4 #5 #6 #7 #8 #10 #11 #13 #14

LEA & BRAZE ENGINEERING, INC.
CIVIL ENGINEERS · LAND SURVEYORS
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WWW.LEABRAZE.COM

REGISTERED PROFESSIONAL ENGINEER — PETER CARLAND — No. C79555 — CIVIL — STATE OF CALIFORNIA — ORIGINAL SIGNATURES IN BLUE INK

MONTE CRESTA DRIVE
BELMONT, CALIFORNIA

SAN MATEO COUNTY

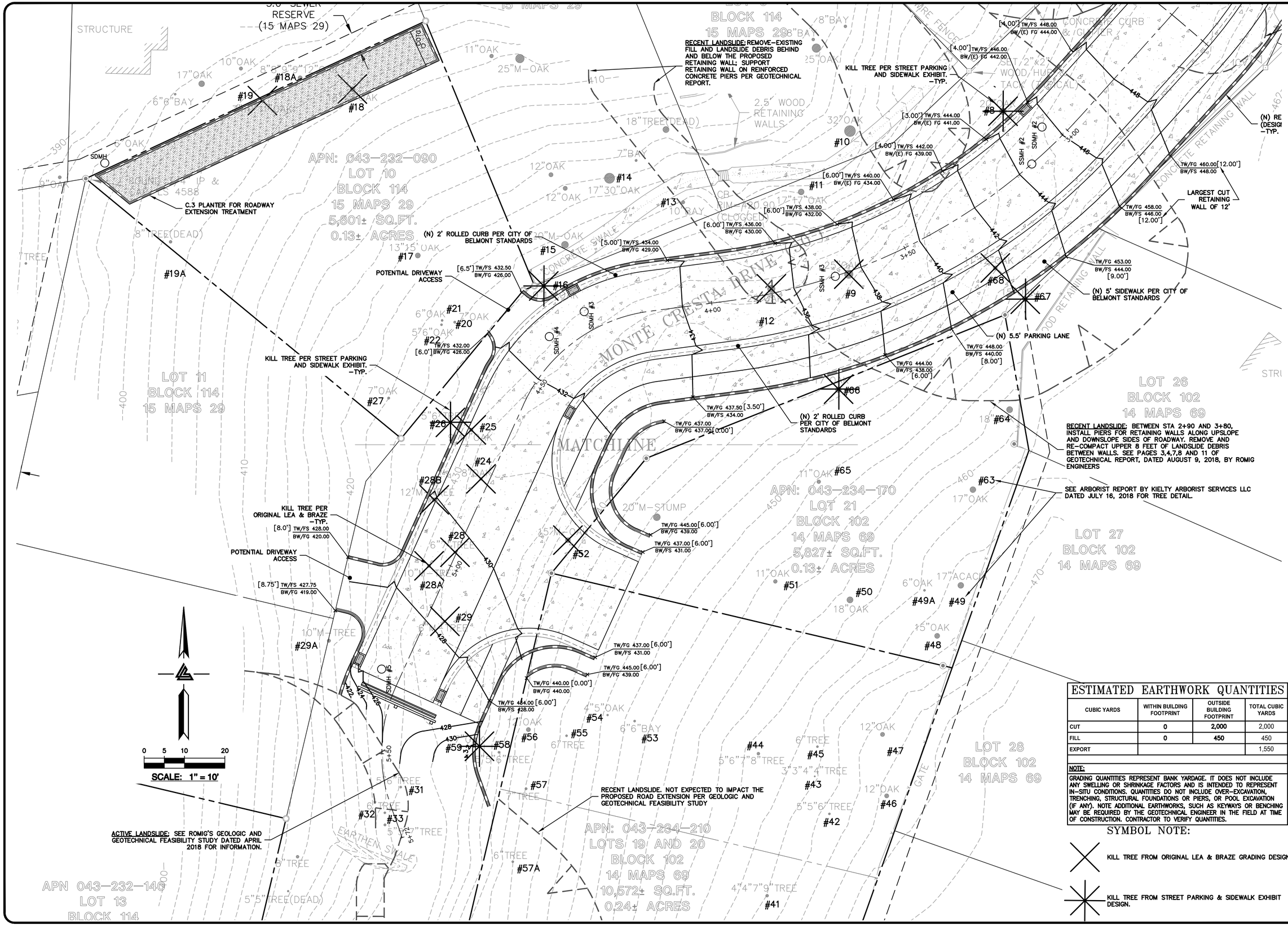
APN: 043-234-170, 043-234-210, 043-232-090 & 043-232-140

STREET PARKING & SIDEWALK EXHIBIT

REVISIONS	BY
1 PLAN CHECK 1 08-14-2018	RB
2 PLAN CHECK 2 09-19-2018	RB
-	-
-	-
-	-

JOB NO:	2180050
DATE:	2-16-18
SCALE:	AS NOTED
DESIGN BY:	RB
DRAWN BY:	WA
SHEET NO:	EXH-3

03 OF 04 SHEETS



ESTIMATED EARTHWORK QUANTITIES

CUBIC YARDS	WITHIN BUILDING FOOTPRINT	OUTSIDE BUILDING FOOTPRINT	TOTAL CUBIC YARDS
CUT	0	2,000	2,000
FILL	0	450	450
EXPORT			1,550

NOTE:

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SYMBOL NOTE:

KILL TREE FROM ORIGINAL LEA & BRAZE GRADING DESIGN

KILL TREE FROM STREET PARKING & SIDEWALK EXHIBIT DESIGN.

REGISTERED PROFESSIONAL ENGINEER PETER CLEARY No. C79555 CIVIL STATE OF CALIFORNIA ORIGINAL SIGNATURES IN BLUE INK

LEA & BRAZE ENGINEERING, INC.
CIVIL ENGINEERS · LAND SURVEYORS
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WWW.LEABRAZE.COM

MONTE CRESTA DRIVE
BELMONT, CALIFORNIA

SAN MATEO COUNTY

APN: 043–234–170, 043–234–210, 043–232–090 & 043–232–140

STREET PARKING & SIDEWALK EXHIBIT

REVISIONS	BY
1 PLAN CHECK 1 08–14–2018	RB
2 PLAN CHECK 2 09–19–2018	RB
–	–
–	–
–	–

JOB NO:	2180050
DATE:	2–16–18
SCALE:	AS NOTED
DESIGN BY:	RB
DRAWN BY:	WA
SHEET NO:	EXH–4

04 OF 04 SHEETS