Vallco Town Center Specific Plan

Environmental Assessment

Appendices

April 2016

Prepared By:

Kimley»Horn

Appendix AES

The Town Center/Community Park Shadow Study

March 21 - Shadow Study

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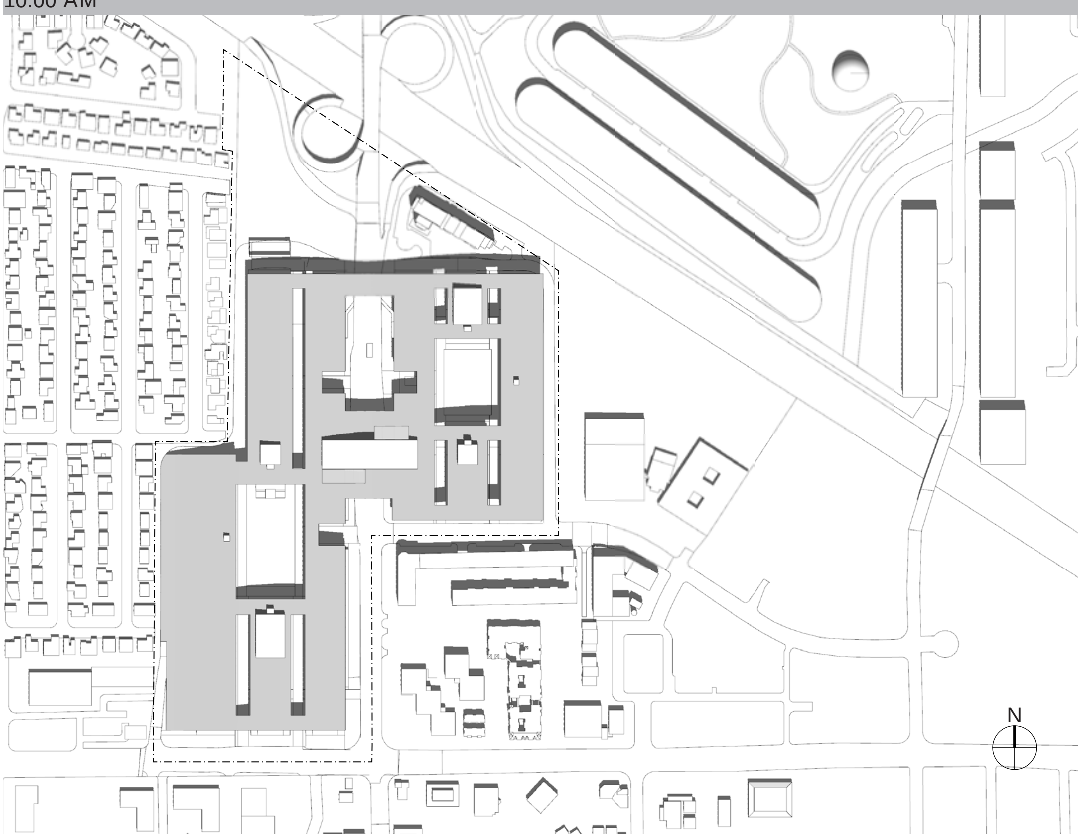

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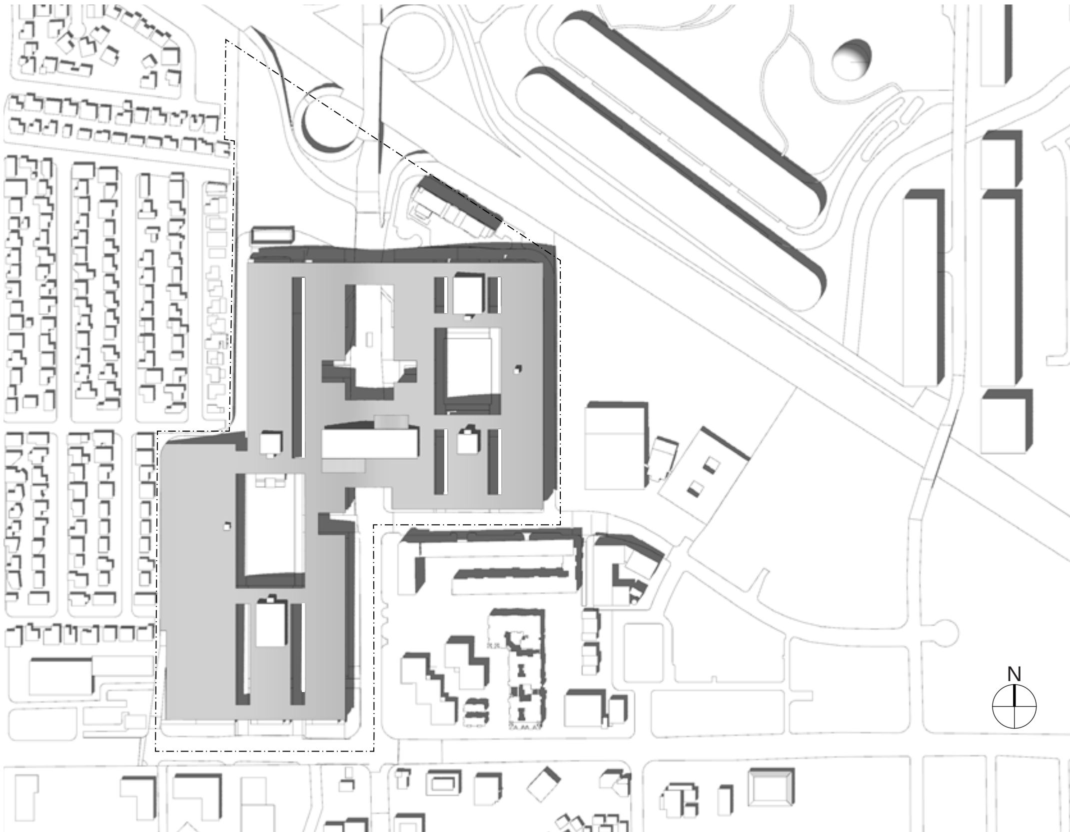

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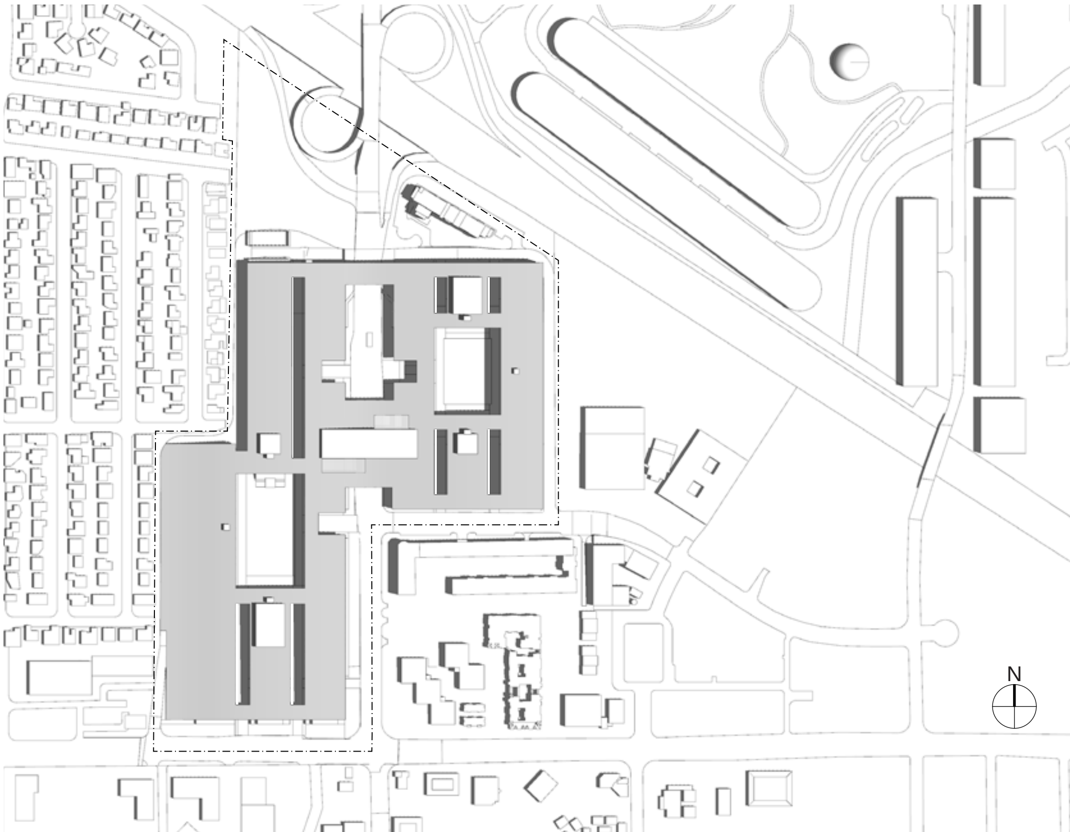

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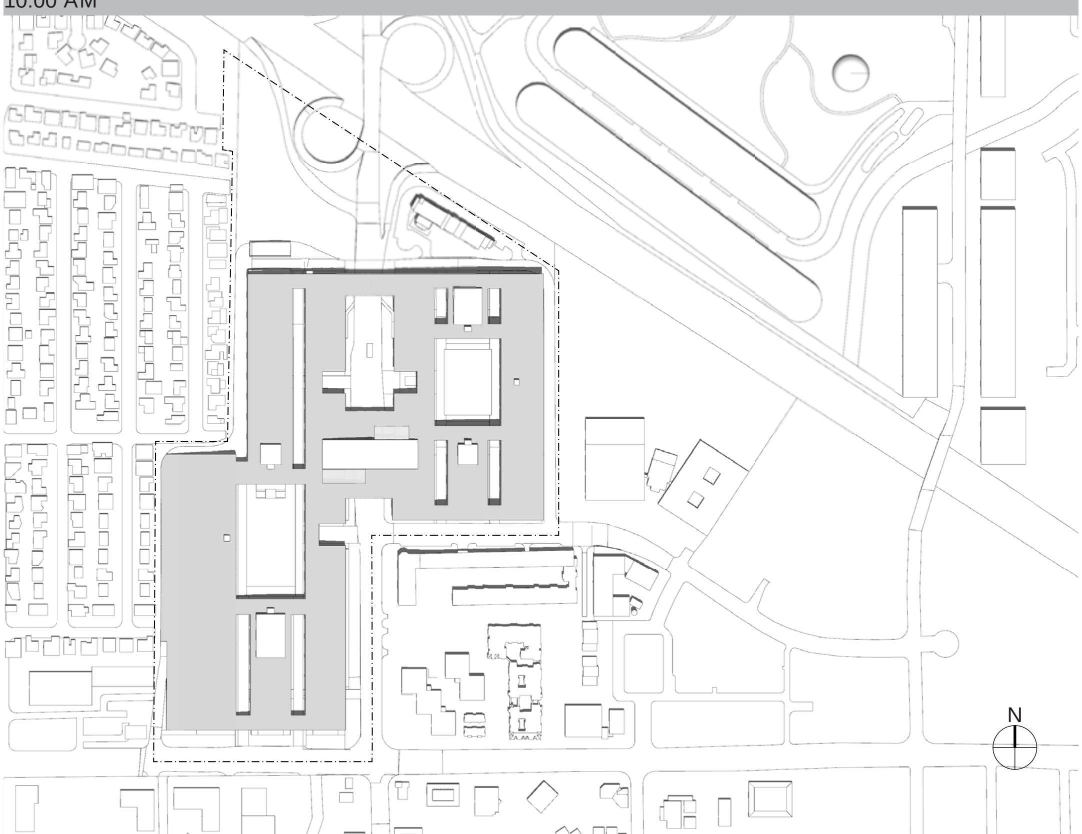

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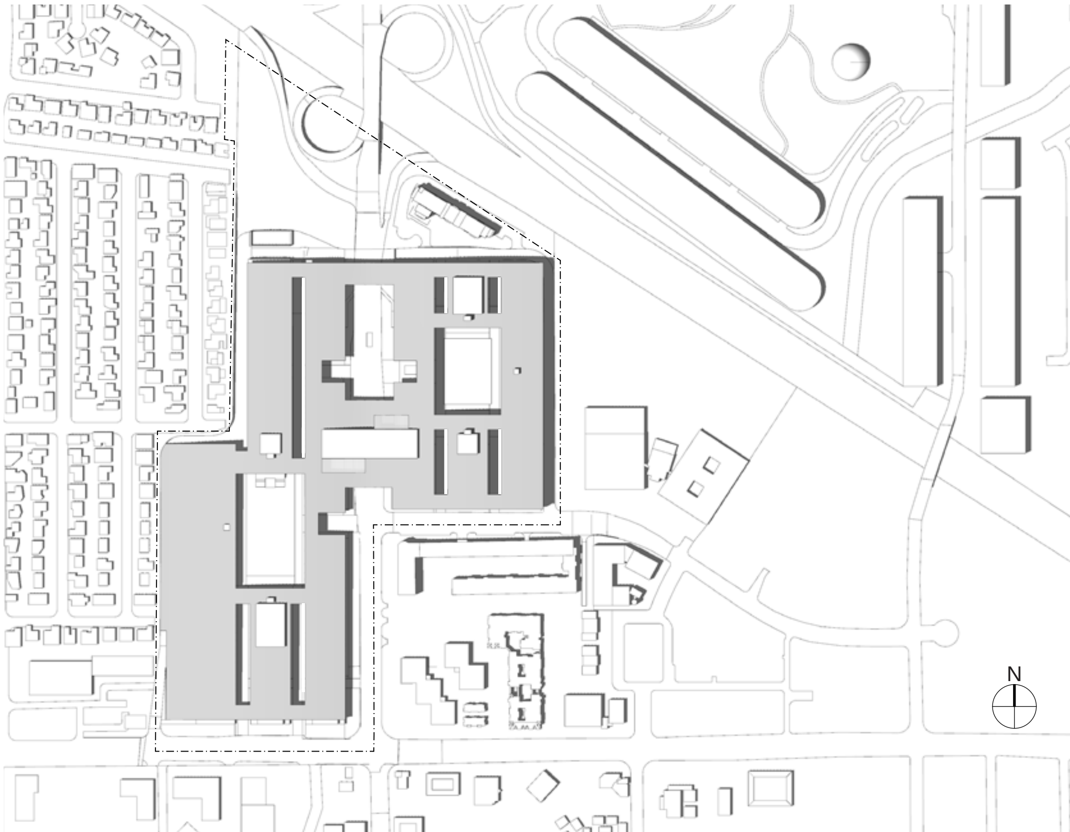

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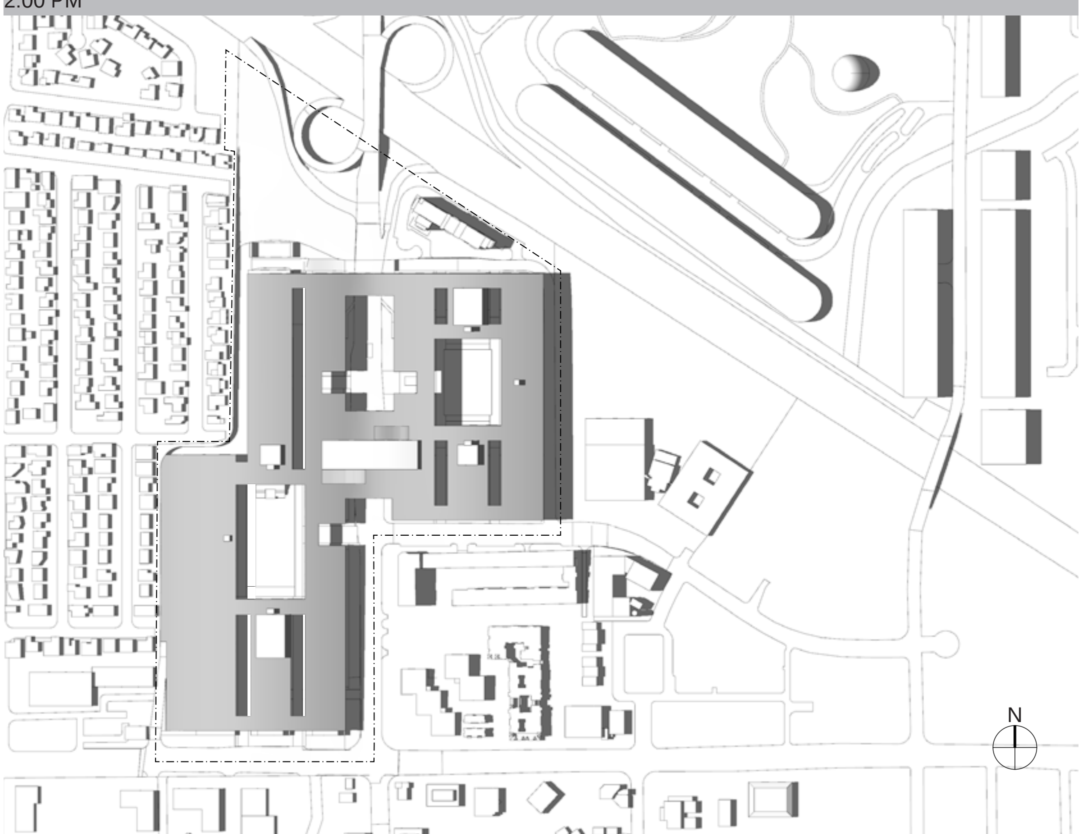

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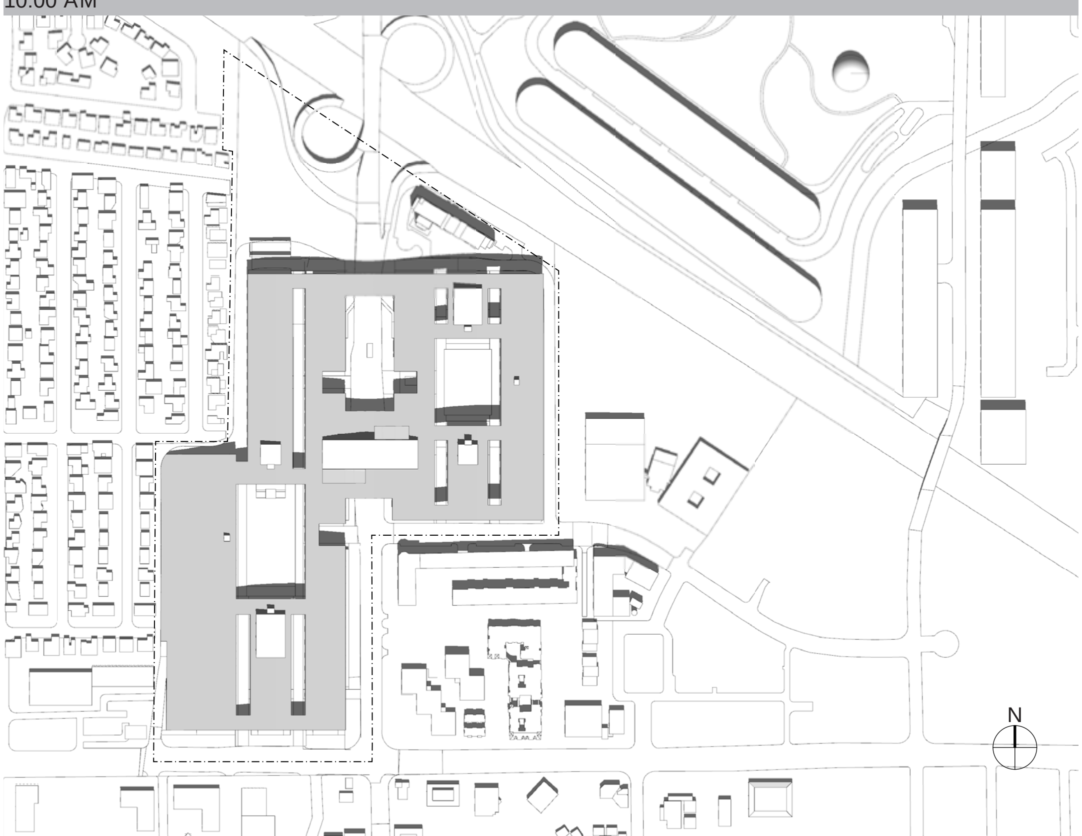

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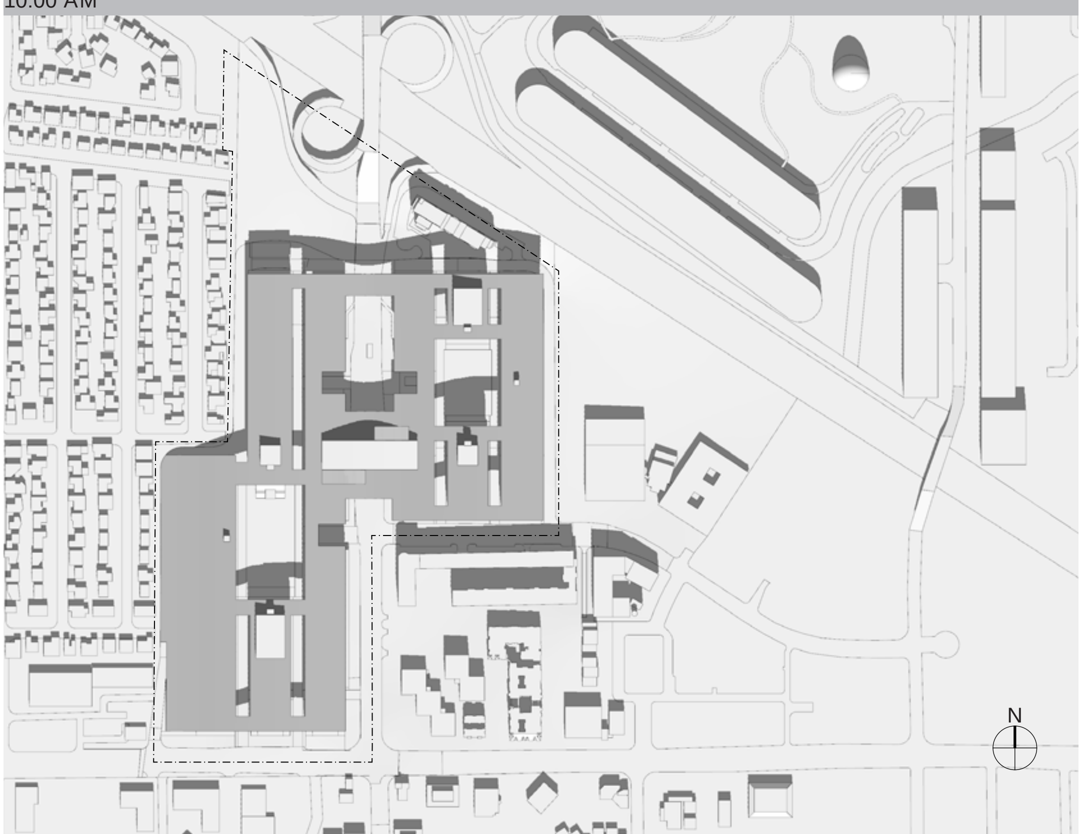

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December 21 - Shadow Study

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Appendix AQ

The Vallco Town Center Specific Plan Air Quality and Greenhouse Gas Technical Report

Prepared By:
Ramboll Environ US Corporation
San Francisco, California

Date
March 2015

VALLCO TOWN CENTER SPECIFIC PLAN

AIR QUALITY AND GREENHOUSE GAS ANALYSIS TECHNICAL REPORT

CONTENTS

TABLES

1. INTRODUCTION

Ramboll Environ US Corporation ("Ramboll Environ") prepared this Air Quality and Greenhouse Gas (GHG) Analysis Technical Report for the Vallco Town Center Specific Plan Area in Cupertino, CA ("Specific Plan"). The Vallco Town Center Specific Plan Area includes a proposed Town Center/Community Park mixed-use development (the "Town Center") as well as two parcels (13 and 14) which are slated for hotel use but are not part of the Town Center. This Air Quality and GHG Analysis Technical Report covers emissions estimation and a Health Risk Assessment (HRA) for two areas, the entire Specific Plan Area as well as the Town Center only. The analysis includes evaluation of emissions of criteria air pollutants (CAPs), toxic air contaminants (TACs), and GHGs, as well as local health impacts. The HRA includes the construction and operational emissions sources of both the Specific Plan Area and Town Center. This report describes the methodology for estimating emissions, estimating the health risk, and estimating the cumulative risk results in the health risk assessment.

1.1 Project Understanding

The Specific Plan Area is approximately 58 acres in the City of Cupertino bounded to the north by Highway I-280, bounded to the west by Perimeter Road, and bounded to the South by Stevens Creek Boulevard. North Wolfe Road runs through the Specific Plan Area and is the eastern boundary on the southern portion of the site. For the northern parcel of the site, Vallco Parkway is the southern boundary and Perimeter Road is the eastern boundary. The Specific Plan Area is currently developed with a shopping mall ("The Mall"), which is approximately 1.2 million square feet.

A Town Center/Community Park mixed-use development is proposed at the site of the existing Mall in the Specific Plan Area. Town Center uses are expected to be fully occupied in 2022 ("Town Center build-out"). Ramboll Environ understands that the Town Center is expected to be constructed over a five year period (60 months), with the first year of construction assumed to be 2017. The Town Center/Community Park site is approximately 50 acres and will be redeveloped with approximately 2 million square feet of office space, 600,000 square feet of retail, related amenity spaces, and 800 residences.[1] Project design features include two town squares and a 30-acre green roof. Input data relied upon for this

[1] Although the Specific Plan contemplates 389 residential units, it also notes that units may be increased through issuance of a Conditional Use Permit and the transfer of units from other planning areas. To account for this potential increase in units, this analysis assumes 800 residential units, an amount that is consistent with the General Plan Environmental Impact Report.

Air Quality and GHG analysis is included as Tables CON-1 through CON-8 and Tables OP-1 and OP-2. Some input data are from the Project Description while other input data are from the transportation impact analysis prepared for the Transportation & Circulation chapter of the Environmental Assessment. Construction-specific input data are based in Project design features.

There are two parcels in the Specific Plan Area not related to the Town Center, known as Blocks 13 and 14. Block 13 is fully entitled for a 148-room hotel and as such is not considered further in this report. Under the Vallco Town Center Specific Plan, Block 14 can be developed with a hotel of up to 191 rooms. For the purposes of this analysis, to estimate a conservatively high impact, Block 14 is assumed to be fully operational in 2022, at the time of full build-out of the Town Center/Community Park.

The Specific Plan implements Environmental Design Features (EDFs) relating to Air Quality, namely EDF-25 and EDF-26. EDF-25, Dust Control, incorporates the Bay Area Air Quality Management District (BAAQMD) Best Management Practices for control of fugitive dust during construction. EDF-26, Construction Emissions Minimization, lists the requirements for the construction Emissions Reduction Plan, which affects off-road engines.

2. EMISSIONS ESTIMATES

Ramboll Environ estimated CAP, TAC, and GHG emissions from the proposed Specific Plan Area and for the baseline existing conditions at the Specific Plan Area. The emissions estimates cover construction and Specific Plan Area operation, including mobile and stationary sources. The methods used to estimate these emissions are described below. Ramboll Environ's analysis is consistent with the California Emission Estimator Model version 2013.2.2 (CalEEMod®), a model developed by the California Air Pollution Control Officers Association (CAPCOA) in collaboration with Ramboll Environ (as ENVIRON International Corporation) for use in developing emission inventories suitable for California Environmental Quality Act (CEQA) analyses. The analysis relies heavily on the CalEEMod® methodology described in Appendix A of the CalEEMod® User's Guide and the tables of default data in Appendix D of the CaleEEMod® User's Guide.

Table AQ-1 presents the emissions calculations methodology for the sources considered here. Tables AQ-2 and AQ-3 summarize emissions estimates of criteria air pollutants from Project construction with and without application of EDF AIR-3b: Construction Emissions Minimization, respectively. Tables AQ-4 and AQ-5 summarize emissions estimates of criteria air pollutants from construction of the Block 14 hotel, with and without application of EDF AIR-3b, respectively. Table AQ-6 summarizes Specific Plan Area and existing use criteria air pollutant operational emissions, while Table AQ-7 does the same for the Town Center/Community Park. Table GHG-1 summarizes one-time GHG emissions from Project construction and vegetation change. Table GHG-2 summarizes emissions estimates of GHG from construction of the Block 14 hotel. Table GHG-3 summarizes Specific Plan Area and existing use GHG operational emissions, while Table GHG-4 does the same for the Town Center/Community Park.

2.1 Calculation Methodologies for Construction Emission Sources

Construction emission calculation methodologies cover off-road equipment (primarily diesel-fueled), on-road vehicles, and area sources such as architectural coatings. Town Center/Community Park construction will span five years and will be continuous. To allow for certain existing land uses to remain operating while construction of the Town Center/Community Park beings, the site will be divided into two construction phases, called Phase 1 and Phase 2, which may overlap. The analysis described here does not rely on the default construction phasing data from CalEEMod®. As described in CalEEMod® User's Guide Appendix A, for projects above 34 acres, the default phase duration in CalEEMod® is extrapolated from data collected at smaller sites. This extrapolation is not appropriate for the Town Center/Community Park, so a realistic, project-specific schedule is used to estimate construction duration.

Calculation methodologies for each type of emissions are explained separately. The methodology used to calculate emissions from each category is presented in Table AQ-1. Specific construction phase inputs for the Town Center/Community Park such as schedule, the equipment list, and the count of on-road vehicle trips are in Tables CON-1 through CON-8.

2.1.1 Off-road Equipment

Tables CON-7 and CON-8 show a project-specific construction equipment inventory for the Town Center/Community Park that includes details on the type, quantity, schedule, and hours of operation anticipated for each piece of equipment for each construction phase. For the Block 14 hotel construction, CalEEMod® was used to identify the equipment list and duration of construction, and to estimate off-road construction emissions.

For the diesel-fueled equipment, Ramboll Environ used methodologies consistent with CalEEMod® to estimate emissions. The CalEEMod® emissions methodology for off-road construction equipment relies on the California Air Resources Board (ARB) In-Use Off-Road Equipment model (OFFROAD2011), which incorporates statewide survey data to develop emission factors based on the fleet average for each year of construction. The OFFROAD2011 model also identifies average horsepower and load factor for each type of equipment. Where Project-specific equipment information is not available, CalEEMod® default values from OFFROAD2011 are used. Load factors for each piece of equipment are based on the default load factor in OFFROAD2011, which are included in CalEEMod® (ARB 2013a). The methodology used to calculate emissions from off-road equipment is presented in Table AQ-1. Greenhouse gas emissions from construction equipment were also calculated using methodologies consistent with CalEEMod®.

Emissions without EDFs are calculated assuming fleet average equipment, meaning the emission factors used reflect the fleet predicted to be in use in the OFFROAD2011 model. A scenario incorporating EDFs is also calculated, assuming Tier 4 Final engines on all equipment consistent with EDF AIR-3b. EDF AIR-3b also requires equipment idling to be limited to 2 minutes, consistent with the Additional Construction Mitigation Measures Recommended for Projects with Construction Emissions Above the Threshold in the BAAQMD CEQA Guidelines (BAAQMD 2011). This measure is incorporated into the "with EDFs" scenario emissions for the Town Center/Community Park (not Block 14) by reducing off-road equipment NOx by 20% and particulate matter (PM) by 45%.

Construction off-road equipment emissions from Block 14 are from CalEEMod®.

2.1.2 On-road Mobile Sources

On-road vehicle emissions are calculated consistent with CalEEMod® methodologies. The trip lengths in CalEEMod® are used, for example, for haul trucks, a 20-mile one-way trip length is used. For worker trips a 12.4-mile trip length is used based on the default worker trip length from CalEEMod®. For vendor trips a 7.3-mile trip length is used based on the regional default vendor trip length from CalEEMod®. The worker fleet is assumed to be 50% Light-Duty Automobiles (LDA), 25% Light-Duty Trucks 1 (LDT1) and 25% Light Duty Trucks 2 (LDT2), consistent with CalEEMod® default. Likewise, the vendor fleet is assumed to be 50% Medium Heavy Duty Trucks and 50% Heavy Heavy Duty Trucks. Hauling trips are assumed to be 100% Heavy Heavy Duty Trucks, consistent with CalEEMod®. For the Block 14 hotel construction, CalEEMod® was used to identify the trip generation rates and to estimate on-road construction emissions.

Ramboll Environ used a manpower count to estimate worker trip generation for construction of the Town Center/Community Park. A worker carpool rate of 17.5% was applied with an assumed two people per vehicle, based on US Census data for Cupertino (US Census Bureau 2013). Vendor and demolition hauling trip generation rates for construction of the Town Center/Community Park are calculated using the method described in CalEEMod® User's Guide Appendix A. The count of hauling trips for offhaul for construction of the Town Center/Community Park is based on a total offhaul amount of 1.8 million cubic yards.

The emission factors for running emissions for criteria pollutants in CalEEMod® are from EMFAC2014, released in December 2014. The emission factors used for construction of the Town Center/Community Park cover the years 2017 through 2021, the anticipated years of construction. EMFAC2014 reflects the emissions benefits of ARB rulemakings including on-road diesel fleet rules, Pavley Clean Car Standards, and the Advanced Clean Cars (ACC) program. The CalEEMod® model also includes updated information on California's car and truck fleets and travel activity (ARB 2013b).

Santa Clara County fleet emissions reported by the EMFAC2014 model for running, brakewear, tirewear, and running losses were converted to units of grams of pollutant emitted per vehicle mile traveled (VMT) using the daily VMT in the county. Santa Clara County fleet emissions reported by EMFAC2014 for idling, starting, and evaporative losses were converted to units of grams of pollutant emitted per trip for idling, starting, and evaporative emissions. This is a small overestimate of evaporative losses.

The methodology used to calculate emissions from on-road sources is presented in Table AQ-1. Construction on-road mobile source emissions from Block 14 are from CalEEMod®.

2.1.3 Architectural Coating and Asphalt Paving

Reactive Organic Gas (ROG) off-gassing emissions from architectural coating are calculated based on the square footage of the new buildings, an assumed Volatile Organic Compounds (VOC) content of the paint, and an application rate of 100%, consistent with CalEEMod®. The VOC content of the indoor and outdoor paints is consistent with the limits set in BAAQMD Regulation 8, Rule 3 (BAAQMD 2009). For the Block 14 parcel, CalEEMod® was used to estimate architectural coating construction emissions.

ROG off-gassing from paving is calculated based on the paved area, which is assumed to be the square footage of above-ground parking lots, as the underground lots will not be paved. The VOC emission factor per square foot of parking area is from CalEEMod® User's Guide Appendix A.

2.1.4 Vegetation Change

Per the Project Description, the Town Center/Community Park will result in a net gain of 1,282 trees. The Miscellaneous Species Class CO_2 accumulation rate per tree as reported in CalEEMod® User's Guide Appendix A was used to estimate CO_2 sequestration from the net new trees. The creation of 30 acres of open park space is also accounted for in the vegetation change emissions for the Town Center/Community Park. CalEEMod® treats vegetation change as a one-time GHG sequestration based on methods developed by the Intergovernmental Panel on Climate Change (IPCC) assuming a 20-year active growth period, so GHG sequestration from trees is reported with the one-time construction emissions.

2.2 Calculation Methodologies for Operational Emission Sources

Operational emission calculation methodologies cover Specific Plan Area proposed and existing stationary source, area source, energy use, and mobile source emissions. Operational emissions of GHG may also include emissions from water and waste. Operational Specific Plan Area emissions from the updated Specific Plan are assumed to commence in 2022.

The existing land use at the Specific Plan Area is a 1.2 million square foot regional shopping center. Baseline emissions from the existing uses are estimated for the year 2015 using a historical occupancy of 82.83%. Calculation methodologies for each category of emissions are explained separately. The methodology used to calculate emissions from each category is presented in Table AQ-1, Emissions Calculations Methodology. Specific operational phase inputs such as square footage per land use type, trip generation rates, and trip lengths are in Tables OP-1 through OP-3.

2.2.1 Specific Plan Area Sources

The proposed Specific Plan Area includes area sources such as architectural coatings, consumer products use, hearths, and landscaping equipment.

Reactive Organic Gas (ROG) off-gassing emissions from architectural coating were calculated based on the square footage of the new buildings in the Specific Plan Area, an assumed Volatile Organic Compounds (VOC) content of the paint, and an application rate of 10% per year, consistent with CalEEMod®. The VOC content of the indoor and outdoor paints is consistent with the limits set in BAAQMD Regulation 8, Rule 3 (BAAQMD 2009).

Consumer Product ROG emissions were calculated based on the square footage of the new buildings, and the emission factor in Appendix A of the CalEEMod® User's Guide.

Hearth emissions were calculated consistent with CalEEMod® methods. BAAQMD Rule 6-3-306 does not allow wood stoves in new building construction after November 1, 2016, so the percentage of dwelling units with wood stoves was assumed to be zero. The default count of dwelling units with wood stoves was assumed to instead have natural gas fireplaces. The count of hearths and the operation of hearths from CalEEMod® were used with the emission factors in Table D5.2 of Appendix D of the CalEEMod® User's Guide to estimate hearth emissions. The emission factor for NOx from natural gas fireplaces was corrected to be consistent with the AP-42 chapter cited in the CalEEMod® User's Guide.

The Town Center/Community Park is limited to all-electric landscaping equipment, so there are no area source emissions from Project landscaping. Landscaping emissions from Block 14 are from CalEEMod®.

2.2.2 Existing Area Sources

The existing Mall also includes area sources, such as those described in the previous section, with the exception of hearths, since there are no existing residential units in the Specific Plan Area. Emissions are estimated using the methods described in Section 2.2.1, based on 1.2 million square feet of regional shopping center land use.

The existing uses also use gasoline and diesel landscaping equipment. Emissions from lawn and garden equipment are estimated using CalEEMod®. CalEEMod®'s emissions estimates are based on OFFROAD2011 emission factors for the landscaping equipment.

2.2.3 Specific Plan Area Energy Use Emissions

The Specific Plan Area includes emissions associated with energy use from operations. Ramboll Environ estimated emissions using methodologies consistent with CalEEMod® based on the type and size of land uses associated with the Specific Plan Area. The electricity and natural gas usage for the Specific Plan Area are adjusted from Table D8.1 of Appendix D of the CalEEMod® User's Guide to account for the 2013 Title 24 building energy efficiency standards. CalEEMod® incorporates only the 2008 Title 24 standards. The adjustment is described in Table OP-11.

The emission factors used to estimate emissions from natural gas combustion are from Table D8.2 of the CalEEMod® User's Guide. To estimate GHG from Specific Plan Area electricity use, Ramboll Environ used a carbon dioxide (CO_2) intensity factor (lb/MWh) from PG&E's year 2020 emission estimate, which accounts for California's Renewable Portfolio Standards (PG&E 2013). The CH_4 (methane) and N_2O (nitrous oxide) emission factors used are from CalEEMod®. The global warming potentials for CH_4 and N_2O are 21 and 310, respectively, consistent with CalEEMod®.

2.2.4 Existing Energy Use Emissions

Ramboll Environ estimated existing use CAP and GHG emissions from the regional shopping center's energy use in the same way as for the Specific Plan Area. Emissions were estimated consistent with CalEEMod® methods based on 1.2 million square feet of retail land use. The existing-use analysis uses CalEEMod® emission factors for natural gas CAP emissions from Table D8.2 of the CalEEMod® User's Guide. For estimating GHG emissions from electricity use, the PG&E CO_2 intensity factor for 2015 was used in place of the default energy intensity in CalEEMod® (PG&E 2013). Using PG&E's 2015 CO_2 intensity factor is a conservative assumption, since it takes into account a higher renewable energy portion relative to the CalEEMod® default value and results in a lower baseline emissions estimate.

2.2.5 Specific Plan Area Mobile Sources

The Specific Plan Area would generate vehicle trips from residents traveling to and from the site and non-residents traveling to and from the site for work or commercial purposes. Ramboll Environ relied on the trip generation data in the transportation impact analysis prepared for the Transportation & Circulation chapter of the Environmental Assessment to estimate emissions using methodologies consistent with CalEEMod®. When only weekday and Saturday trip generation rates are provided, Ramboll Environ used the ITE Trip Generation Manual, 9th Edition, to estimate Sunday trip generation rates. The trip generation data accounts for a mixed-use development trip rate reduction which quantifies the shift in mode split from vehicles to other modes of transportation.

The emissions associated with on-road mobile sources include running and starting exhaust emissions, evaporative emissions, brake and tire wear, and fugitive dust from paved and unpaved roads. Starting and evaporative emissions are associated with the number of starts or time between vehicle uses and the assumptions used in determining these values are described below. All of the other emissions are dependent on VMT. Ramboll Environ estimated VMT using the trip generation rates described above and the overall average trip lengths from CalEEMod® for each land use type. Tables OP-3 and OP-25 show the weighted-average trip length for the Project.

Project traffic emission factors are from EMFAC2014 for the vehicle fleet mix in Santa Clara County. The emission factors represent the Project build-out year of 2022. Santa Clara County fleet emissions reported by the EMFAC2014 model for running, brakewear, tirewear, and running losses were converted to units of grams of pollutant emitted per VMT using the daily VMT in the County. Santa Clara County fleet emissions reported by EMFAC2014 for idling, starting, and evaporative losses were converted to units of grams of pollutant emitted per trip for idling, starting, and evaporative emissions. This is a small overestimate of evaporative losses.

The methodology used to calculate exhaust emissions from on-road sources is presented in Table AQ-1.

The mobile source emissions analysis for the Project includes the benefit of reductions from the regulatory programs such as Pavley Standards and ACC. AB 1493 ("the Pavley Standard") required CARB to adopt regulations by January 1, 2005, to reduce GHG emissions from non-commercial passenger vehicles and light-duty trucks of model year 2009 and thereafter. EMFAC2014 includes emission reductions for non-commercial passenger vehicles and light-duty trucks of model year 2017 – 2025.

The Advanced Clean Cars program, introduced in 2012, combines the control of smog, soot causing pollutants and GHG emissions into a single coordinated package of requirements for model years 2017 through 2025. This regulation has been incorporated into EMFAC2014.

2.2.6 Cumulative Mobile Sources

Ramboll Environ estimated emissions from non-Project related mobile sources for inclusion as part of the cumulative health risk assessment. Ramboll Environ used average annual daily traffic (AADT) data for nearby roadways from the transportation impact analysis prepared for the Transportation & Circulation chapter of the Environmental Assessment to estimate background mobile-source emissions in the zone of influence of the Project for the cumulative impact analysis. Emissions are calculated from the same emission factors for the Specific Plan Area-related emissions, using the vehicle fleet mix in Santa Clara County and the AADT for each roadway.

2.2.7 Existing Mobile Sources

The existing land use on the Project site generates vehicle trips and associated emissions. Ramboll Environ estimated these emissions using the same methods as for the Specific Plan Area in Section 2.2.5. The existing use trip generation rates are from the Transportation & Circulation chapter for the existing 1.2 million square foot regional shopping center operating at a 82.83% occupancy. The emission factors from EMFAC2014 represent operating year 2015. Tables OP-3 and OP-28 show the weighted-average trip length for the existing uses.

2.2.8 Specific Plan Area Stationary Sources

The proposed Specific Plan Area will include diesel- and propane-fueled back-up engines, with a current estimate of 14 on-site emergency backup engines for the Town Center/Community Park and one diesel-fired emergency backup engine for Block 14. Diesel engine emissions were estimated assuming Tier 2 ARB and USEPA off-road diesel emergency engine standards (ARB 2013a). These stationary sources will be permitted with the BAAQMD as required and all sources are expected to comply with applicable Best Available Control Technology (BACT) and Best Available Control Technology for Toxics (TBACT) requirements.

All emergency engines were assumed to be 400-horsepower engines with up to 50 hours per year of non-emergency maintenance and testing operation. Half are assumed to be diesel-fired and half are assumed to be propane-fired. Fifty hours per year of testing and maintenance operation is the maximum allowed under BAAQMD Rule 9-8 and the ARB Diesel Air Toxics Control Measure (ATCM). The emission factors for estimating CAP emissions from diesel engines are from the ARB tier standards. GHG emission factors for diesel engines are from AP-42 Chapter 3.3: Gasoline and Diesel Industrial Engines. The emission factors for the propane-fired engines are from AP-42 Chapter 1.5: Liquefied Petroleum Gas Combustion.

The Central Plant at the Town Center/Community Park is assumed to have 20 natural gas boilers rated 6 MMBTU/hr each, which are assumed to be used for the four-month heating season each year. The emission factors used for natural gas external combustion are from USEPA AP-42 Chapter 1.4: Natural Gas Combustion, except NOx which is set at the maximum emission limit allowed under BAAQMD Rule 9-7.

2.2.9 Existing Stationary Sources

Three permitted stationary sources exist at the regional shopping center: emergency generator engines supporting Sears, JC Penney, and Macy's. Emissions for these engines are estimated using publicly available information requested from the BAAQMD. The engines have manufacture or installation dates in the 1970s, so for the two diesel engines, emission factors from AP-42 Chapter 3.3 Gasoline and Diesel Industrial Engines are used. For the natural gas-fired engines, emission factors from AP-42 Chapter 3.2: Natural Gas-fired Reciprocating Engines are used. The hours of operation of each engine are the respective permit limits or, when not available, 50 hours per year to provide a conservative underestimate of baseline emissions.

The Mall has one natural gas boiler rated 1.99 MMBTU/hr each, which is used for approximately the four-month heating season each year. The emission factors used for natural gas external combustion are from USEPA AP-42.

2.2.10 Specific Plan Area Water and Wastewater GHG Emissions

Water supply, treatment, and distribution requires electricity, which is a source of GHG emissions. The amount of water required by the Town Center/Community Park is from Table 3-2 of the Luk Associates Town Center/Community Park – Water Demand Assessment Project Report. The amount of water required by Block 14 is estimated based on factors in Table D9.1 of CalEEMod® User's Guide Appendix D and the square footage of the proposed land uses. The electricity used to supply, treat, and distribute the water is estimated based on factors in Table D9.2 of CalEEMod® User's Guide Appendix D.

The amount of wastewater treated is assumed to be equal to the amount of Specific Plan Area indoor water use. The electricity used to treat the wastewater is estimated based on factors in Table D9.2 of CalEEMod® User's Guide Appendix D. The emission factors used for septic, aerobic, and anaerobic facultative GHG emissions are from Table D9.4 of CalEEMod® User's Guide Appendix D. The default distribution of treatment types from Table D9.3 of CalEEMod® User's Guide Appendix D was used for the project.

The GHG emission factors for electricity are the same as those used in the Specific Plan Area Energy Use analysis in Section 2.2.3.

2.2.11 Existing Water and Wastewater GHG Emissions

Water supply, treatment, and distribution and wastewater treatment GHG emissions for baseline uses are estimated using the same methods as for the Specific Plan Area, as described in Section 2.2.10. For the existing uses, the carbon intensity used is the PG&E carbon intensity for 2015 (PG&E 2013), as described in Section 2.2.4.

2.2.12 Specific Plan Area Solid Waste

Specific Plan Area solid waste generation rates and GHG emissions are estimated using methods consistent with CalEEMod®. The amount of waste generated is estimated based on Specific Plan Area square footage using factors in Table D10.1 of CalEEMod® User's Guide Appendix D. Table D10.1 also provides default waste treatment methods for Santa Clara County. Table D10.2 of CalEEMod® User's Guide Appendix D contains CO_2 and CH_4 emission factors for each respective type of waste treatment. The Global Warming Potential used for CH_4 is, consistent with CalEEMod®, 21.

2.2.13 Existing Solid Waste

Existing use solid waste generation rates and GHG emissions are estimated using methods consistent with CalEEMod®. The amount of waste generated is estimated based on 1.2 million square feet of regional shopping center using factors in Table D10.1 of CalEEMod® User's Guide Appendix D. Table D10.1 also provides default waste treatment methods for Santa Clara County. Table D10.2 of CalEEMod® User's Guide Appendix D contains CO_2 and CH_4 emission factors for each respective type of waste treatment. The Global Warming Potential used for CH_4 is, consistent with CalEEMod®, 21.

3. ESTIMATED AIR CONCENTRATIONS

Specific Plan Area construction and operational activities will generate emissions that will be transported outside of the physical boundaries of the Specific Plan Area, potentially impacting nearby residential areas. Methodologies to estimate concentrations resulting from Specific Plan Area emissions are provided below.

3.1 Chemical Selection

The cancer risk and chronic and acute hazard analyses in the HRA are based on TAC emissions from the proposed Specific Plan Area and existing land uses. Sources of TACs at the existing site and proposed Specific Plan Area include diesel construction and emergency standby engines, on-road gasoline and diesel engines, and stationary sources at proposed commercial uses. Accordingly, the chemicals to be evaluated in the health risk assessment are diesel particulate matter (DPM), speciated total organic gases (TOG) in diesel exhaust, and speciated TOG from gasoline vehicles (exhaust and evaporation). For the proposed propane-fired generators, the chemicals are from speciated TOG from propane combustion.

Diesel exhaust, a complex mixture that includes hundreds of individual constituents (Cal/EPA 1998), is identified by the State of California as a known carcinogen (Cal/EPA 2015a). Under California regulatory guidelines, DPM is used as a surrogate measure of carcinogen exposure for the mixture of chemicals that make up diesel exhaust as a whole (Cal/EPA 2015a). Cal/EPA and other proponents of using the surrogate approach to quantifying cancer risks associated with the diesel mixture indicate that this method is preferable to use of a component-based approach. A component-based approach involves estimating cancer risks for each of the individual components of a mixture. Critics of the component-based approach believe it will underestimate the risks associated with diesel as a whole mixture because the identity of all chemicals in the mixture may not be known and/or exposure and health effects information for all chemicals identified within the mixture may not be available. Furthermore, Cal/EPA has concluded that "potential cancer risk from inhalation exposure to whole diesel exhaust will exceed the multi-pathway cancer risk from the speciated components" (Cal/EPA 2003). The DPM analyses will be based on the surrogate approach, as recommended by Cal/EPA. In the absence of an acute toxicity value for diesel exhaust, speciated TOG will be used as a conservative estimate.

3.2 Specific Plan Area Sources

Near-field air dispersion modeling of Specific Plan Area construction and operation was conducted using the USEPA AERMOD model, version 15181. The pollutants of concern are DPM, speciated engine exhaust TOG from diesel, gasoline, and propane engines, and particulate matter with an aerodynamic diameter of less than 2.5 microns ($PM_{2.5}$).

Specific Plan Area sources are grouped into two types: construction-related activities and operational activities such as emergency standby generators and on-road traffic. Additionally, for new on-site receptors, impacts from roadways and stationary sources are considered. For each receptor location, the model generates air concentrations (or air dispersion factors as unit emissions will be modeled) that result from emissions from multiple sources.

Air dispersion models such as AERMOD require a variety of inputs such as source parameters, meteorological parameters, topographical information, and receptor parameters.

When site-specific information is unknown, Ramboll Environ used default parameter sets, given in Table AQ-8, that are designed to produce conservative (i.e., overestimated) air concentrations.

3.3 Off-site Sources

Sources located outside the Specific Plan Area may pose impacts upon the proposed residential areas. These sources include roads (Highway I-280, North Wolfe Road, and Stevens Creek Boulevard), a gas station (southwest corner of Stevens Creek Boulevard and North Wolfe Road), as well as two dry cleaners. A public records request to the BAAQMD regarding the dry cleaners resulted in a statement from the BAAQMD that these sources no longer have human health risk impacts, so they are not considered in this analysis. The roadways are modeled with AERMOD with emissions as discussed in Section 2.2.6. The gas station is discussed in more detail in the Risk Characterization section below.

3.4 Meteorological Data

Air dispersion modeling requires the use of meteorological data that ideally are spatially and temporally representative of conditions in the immediate vicinity of the site under consideration. Ramboll Environ used surface meteorological data from the San Jose Airport for years 2009 through 2013, with upper air data collected at the Oakland Airport for the same time period. The BAAQMD provided Ramboll Environ with processed meteorological data that can be used directly in AERMOD.

3.5 Terrain Considerations

Elevation and land use data were imported from the National Elevation Dataset (NED) maintained by the United States Geological Survey (USGS 2013). An important consideration in an air dispersion modeling analysis is the selection of whether or not to model an urban area. Here the model assumes an urban land use as has been done for similar projects in the area. Ramboll Environ will use 58,302, the 2010 population of the City of Cupertino, as the urban population in AERMOD (US Census Bureau 2010).

3.6 Emission Rates

Emitting activities are modeled to reflect the actual hours of construction. Emissions are modeled using the χ/Q ("chi over q") method, such that each phase has unit emission rates (i.e., 1 gram per second [g/s]), and the model estimates dispersion factors with units of [$\mu g/m^3$]/[g/s].

For annual average ambient air concentrations, the estimated annual average dispersion factors are multiplied by the annual average emission rates. The emission rates will vary day to day, with some days having no emissions, for example during weekends during project construction. For simplicity, the model will assume a constant emission rate during the entire year. For acute impacts, the maximum 1-hour ambient air concentrations are multiplied by the maximum hourly emission rate for a given activity.

Modeled construction activities will restrict meteorological hours of the day from 8:00 AM to 4:00 PM, the likely hours for emissions to occur. This way, only representative meteorological data was considered in determining the dispersion factors. Emission rates are adjusted such that on average unit emission rates are modeled, i.e. 1 g/s for 24 hours a day, 7 days a week. Thus, the model will provide an annual average concentration that can be incorporated directly into the health risk calculations assuming 24 hours of daily exposure.

Specific Plan Area and cumulative source operational emissions will be modeled assuming emissions are not restricted and can occur any time over the course of 24 hours. Operational traffic emissions are running exhaust and running loss emissions, consistent with BAAQMD guidance (BAAQMD 2010). The operational traffic emissions are distributed over the hours of the day following the hour-of-day distribution in EMFAC2014 for Santa Clara County.

3.7 Source Parameters

Source locations and release parameters are necessary to model the dispersion of air emissions from activities associated with the Specific Plan Area. For on-site construction sources, the Specific Plan Area is divided into a grid of volume sources. The site plan providing construction blocks for The Hills at Vallco was then used to assign the volume sources to the overlapping or closest construction block. Assignment of sources by construction block allows for modeling of the construction activities that occur as part of a given step in the overall sequence. Emissions from the respective sequence are distributed uniformly throughout the block(s) representing construction of that phase.

Construction activities also include on-road truck transport as well as vendor and worker trips. Off-site truck traffic on nearby roads (that is, trucks going to and from Project construction zones) is modeled as adjacent volume sources following guidance for this type of activity (SCAQMD 2008). Traffic on roadways are modeled out to 1,000 feet from the project boundary (BAAQMD 2012). Table AQ-8 summarizes the source parameters associated with the construction activities.

The Specific Plan Area includes several diesel- and propane-fired backup generators. For estimating the impact from these operational sources, emissions are modeled as point sources in appropriate locations based on information from Sand Hill Property Company. Representative engine modeling parameters provided by BAAQMD are used for exhaust characteristics (STI 2011).

Impacts to on-site residential areas also consider nearby traffic (Highway I-280, North Wolfe Road, and Stevens Creek Boulevard). As discussed for the construction traffic, passenger traffic on nearby roadways is modeled as adjacent volume sources, as described in Table AQ-8.

3.8 Receptors

Receptors are located both on residential sites of Town Center/Community Park and on off-site areas within 1,000 feet of the Specific Plan Area. Receptors are modeled at a height of 1.8 meters above terrain height, as recommended in BAAQMD guidance (BAAQMD 2012). Receptors are placed over all residential areas (both on and off-site) with 10-meter spacing and additionally are located on the boundaries of residential areas. As discussed previously, average annual and 1-hour maximum dispersion factors are estimated for each receptor location.

3.9 Modeling Adjustment Factors

Cal/EPA (2015) recommends applying an adjustment factor to the annual average concentration modeled assuming continuous emissions (i.e., 24 hours per day, 7 days per week), when the actual emissions are less than 24 hours per day and exposures are concurrent with construction activities occurring at the Project.

Off-site residents are assumed to be exposed to construction emissions 24 hours per day, 7 days per week. This assumption is consistent with the modeled emission rates (24 hours per day, 7 days per week), even though actual construction operations may occur for fewer than 24 hours per day and fewer than 7 days per week. Thus, the annual average concentration need not be adjusted. This approach simplifies the model set up, yet does not underestimate exposure.

4. RISK CHARACTERIZATION METHODS

Potential health impacts from the Specific Plan Area are evaluated both upon residents near the Specific Plan Area ("off-site residents") as well as residents who will move into the residential areas of the Town Center/Community ("on-site residents"). Risk assessment procedures are currently in a state of change, and thus this report evaluates impacts under the most recent 2015 OEHHA Hot Spots Guidance (Cal/EPA 2015), as it is more conservative, that is, health protective. This report assesses risk to residential receptors using the 2015 California Environmental Protection Agency Office of Environmental Health Risk Assessment (OEHHA) guidance. BAAQMD is currently reviewing the new methodology and is expected to adopt the 2015 OEHHA Hot Spots Guidance in early 2016.

4.1 Potentially Exposed Populations

The HRA evaluates Specific Plan Area impacts at the off-site receptors from both construction and operational activities. All construction activities are considered as potentially impacting the off-site residential locations. As the residential exposure assumptions are more conservative than those for other sensitive receptor types, a conservative approach of considering all receptors as residential receptors were used.

Future residents of the Town Center/Community are included in the operational HRA as they will be exposed to operational traffic and stationary source emissions.

4.2 Exposure Assumptions

Off-site child residents were assumed to be present at one location during the entire construction period and were evaluated for construction scenarios both with and without incorporation of the EDFs. Off-site and on-site residents were also evaluated for the operational scenario, assumed to be present at one location for a 30-year period. The exposure parameters used to estimate excess lifetime cancer risks for all potentially exposed populations for the construction and operation scenarios are based on the 2015 Hot Spots Guidance (Cal/EPA 2015), unless otherwise noted, and are presented in Table AQ-9.

4.3 Calculation of Intake

The dose estimated for each exposure pathway is a function of the concentration of a chemical and the intake of that chemical. The intake factor for inhalation, IF_{inh}, can be calculated as follows:

$$IF_{inh} = \frac{DBR * FAH * EF * ED * CF}{AT}$$

Where:

IF_{inh}	=	Intake Factor for Inhalation (m^3/kg-day)
DBR	=	Daily Breathing Rate (L/kg-day)
FAH	=	Fraction of Time at Home (unitless)
EF	=	Exposure Frequency (days/year)
ED	=	Exposure Duration (years)
AT	=	Averaging Time (days)
CF	=	Conversion Factor, 0.001 (m^3/L)

The chemical intake or dose is estimated by multiplying the inhalation intake factor, IF_{inh}, by the chemical concentration in air, C_i. When coupled with the chemical concentration, this calculation is mathematically equivalent to the dose algorithm given in the OEHHA Hot Spots guidance (Cal/EPA 2003).

4.4 Toxicity Assessment

The toxicity assessment characterizes the relationship between the magnitude of exposure and the nature and magnitude of adverse health effects that may result from such exposure. This HRA evaluated theoretical exposures to TACs for two categories of potential adverse health effects, cancer and non-cancer endpoints. Toxicity values used to estimate the likelihood of adverse effects occurring in humans at different exposure levels are identified as part of the toxicity assessment component of a risk assessment.

Excess lifetime cancer risk and chronic hazard quotient (HQs) calculations for both project construction and operation utilized the toxicity values for DPM and for TACs from speciated gasoline and propane total organic gases (TOGs). For on-road traffic, the TOG speciation for gasoline engine exhaust is different from the TOG speciation for gasoline evaporative losses, so two gasoline TOG speciation profiles were used. Acute HQ calculations utilized the toxicity values for TACs from both speciated diesel TOG for all source categories and TOGs from on-road gasoline-powered vehicles (Cal/EPA 2015a). Excess lifetime cancer risks[2] were estimated as the upper-bound incremental probability that an individual will develop cancer over a lifetime as a direct result of exposure to potential carcinogens. The estimated risk is expressed as a unitless probability. The cancer risk attributed to a chemical is calculated by multiplying the chemical intake or dose at the human exchange boundaries (e.g., lungs) by the chemical-specific cancer potency factor (CPF).

Speciation profiles used in this analysis are provided in Table AQ-10. Toxicity values are as presented in Table AQ-11. Ramboll Environ included toxicity for DPM and organic gases from on-road gasoline-powered vehicles, and acute toxicity values for speciated diesel TOG for all source categories (Cal/EPA 2015a). Ramboll Environ also included speciated propane exhaust and gasoline evaporative emissions.

4.5 Age Sensitivity Factors

The estimated excess lifetime cancer risks for residents will be adjusted using the age sensitivity factors (ASFs) recommended in the Cal/EPA OEHHA Hot Spots Guidance (Cal/EPA 2015). This approach accounts for an "anticipated special sensitivity to carcinogens" of infants and children. Cancer risk estimates are weighted by a factor of 10 for exposures that occur from the third trimester of pregnancy to two years of age and by a factor of three for exposures that occur from two years through 15 years of age. No weighting factor (i.e., an ASF of one, which is equivalent to no adjustment) is applied to ages 16 and above. Table AQ-12 shows the ASFs used for the residents.

4.6 Estimation of Cancer Risks

Excess lifetime cancer risks are estimated as the upper-bound incremental probability that an individual will develop cancer over a lifetime as a direct result of exposure to potential carcinogens. The estimated risk is expressed as a unitless probability. The cancer risk

[2] Excess cancer risk as a result of the proposed project is the risk generated by that project that exceeds the risk that would otherwise exist.

attributed to a chemical is calculated by multiplying the chemical intake or dose at the human exchange boundaries (e.g., lungs) by the chemical-specific CPF.

The equation used to calculate the potential excess lifetime cancer risk for the inhalation pathway is as follows:

$$Risk_{inh} = C_i \times CF \times IF_{inh} \times CPF \times ASF$$

Where:

$Risk_{inh}$	=	Cancer Risk; the incremental probability of an individual developing cancer as a result of inhalation exposure to a particular potential carcinogen (unitless)
C_i	=	Annual Average Air Concentration for chemical i (µg/m^3)
CF	=	Conversion Factor (mg/µg)
IF_{inh}	=	Intake Factor for Inhalation (m^3/kg-day)
CPF_i	=	Cancer Potency Factor for chemical i (mg chemical/kg body weight-day)$^{-1}$
ASF	=	Age Sensitivity Factor (unitless)

4.7 Estimation of Chronic and Acute Noncancer Hazard Quotients/Indices

Chronic HQ

The potential for exposure to result in adverse chronic noncancer effects is evaluated by comparing the estimated annual average air concentration (which is equivalent to the average daily air concentration) to the noncancer chronic reference exposure level (cREL) for each chemical. When calculated for a single chemical, the comparison yields a ratio termed a hazard quotient (HQ). To evaluate the potential for adverse chronic noncancer health effects from simultaneous exposure to multiple chemicals, the chronic HQs for all chemicals are summed, yielding a chronic HI.

$$HQ_i = C_i \ / \ cREL$$

Where:

HQ_i	=	Chronic hazard quotient for chemical i
HI	=	Hazard index
C_i	=	Annual average concentration of chemical i (µg/m^3)
$cREL_i$	=	Chronic noncancer reference exposure level for chemical i (µg/m^3)

Acute HI

The potential for exposure to result in adverse acute effects is evaluated by comparing the estimated one-hour maximum air concentration of chemical to the acute reference exposure level (aREL) for each chemical evaluated in this analysis. When calculated for a single chemical, the comparison yields an HQ. To evaluate the potential for adverse acute health effects from simultaneous exposure to multiple chemicals, the acute HQs for all chemicals are summed, yielding an acute HI.

$$HQ_i = C_i \, / \, aREL$$

Where:

HQ_i	=	Acute hazard quotient for chemical i
HI	=	Hazard index
Ci	=	One-hour maximum concentration of chemical i ($\mu g/m^3$)
$aREL_i$	=	Acute reference exposure level for chemical i ($\mu g/m^3$)

4.8 Off-site Stationary Source Screening

Stationary sources within 1,000 feet of the Specific Plan Area boundary were evaluated for potential impacts upon the planned on-site residential areas. Based on the BAAQMD tools published May 2012, the only stationary sources within 1,000 feet are two dry cleaners and one gas station. The dry cleaners are not included in this risk assessment as the BAAQMD has indicated they are no longer sources of risks. In addition, under the Dry Cleaning Air Toxics Control Measure, perchloroethylene will be phased out as a dry cleaning solvent by 2023, reducing cancer risk from dry cleaners. Ramboll Environ requested additional information on these sources from BAAQMD and used BAAQMD-provided tools[3] to estimate impacts from the stationary sources upon the planned residential areas.

[3] For gas stations, BAAQMD provides a screening tool to scale reported maximum impacts to those at other locations. Available online at: http://www.baaqmd.gov/plans-and-climate/california-environmental-quality-act-ceqa/ceqa-tools

5. RESULTS

5.1 Criteria Air Pollutants

Emissions from the Specific Plan Area are tabulated by source type for both construction and operation. For reference, each of these tables shows the BAAQMD CEQA threshold of significance, if applicable.

5.1.1 Construction CAPs

Tables AQ-2 through AQ-5 show CAP emissions totals for construction of the Town Center/Community Park (with and without EDF AIR-3b) and Block 14. As shown in Table AQ-2, construction emissions for the Town Center/Community Park without EDF AIR-3b exceed the BAAQMD's NOx average daily emission threshold; however, as shown in Table AQ-3, implementation EDF AIR-3b reduces all emissions below the threshold. As shown in Tables AQ-4 and AQ-5, construction emissions for Block 14 are below all applicable thresholds, both without and with EDF AIR-3b.

5.1.2 Operational CAPs

Tables AQ-6 and AQ-7 show operational CAP emissions totals for the Specific Plan Area and the Town Center/Community Park, respectively. As shown in AQ-6, the BAAQMD does not have numerical mass emissions thresholds for a plan level analysis. The thresholds of significance are consistency with the current Air Quality Plan control measures and that projected vehicle miles travelled (VMT) or vehicle trip increase is less than or equal to projected population increase.

Table AQ-7 shows the mass emissions for Town Center/Community Park Project and these are compared against the BAAQMD significance thresholds for a project. Compared with the existing land use, the Project shows a decrease in emissions of NOx and increases in emissions of PM_{10} and $PM_{2.5}$ below the significance thresholds. The incremental emissions of ROG are above the BAAQMD significance threshold, mostly due to the increased use of consumer products at the Project.

5.2 Health Risk Assessment

5.2.1 Construction HRA

A risk assessment was not conducted for construction of the Specific Plan Area separately, as the BAAQMD does not have significance thresholds for a plan-level analysis. However, a construction risk assessment was conducted for the Town Center/Community Park Project. Tables AQ-13 and AQ-14 show the human health endpoints for this construction both without and with EDF AIR-3b, respectively. As shown in Table AQ-13, the estimated incremental excess cancer risk exceeds the BAAQMD threshold without EDF AIR-3b. However, with implementation of EDF AIR-3b, the estimated incremental excess cancer risk drops below the threshold. All other human health endpoints (chronic and acute HIs and $PM_{2.5}$) are below thresholds both without and with implementation of EDF AIR-3b.

5.2.2 Operational HRA

Tables AQ-15 and AQ-16 show the Project-related human health endpoints from operational sources such as Project-generated traffic and emergency generators. Table AQ-15 shows impacts at existing offsite residential areas and Table AQ-16 shows at future residential areas proposed at part of the Town Center. The estimated incremental excess cancer risks, chronic HIs, acute HIs, and $PM_{2.5}$ concentrations do not exceed the BAAQMD thresholds at either existing offsite residential areas or at future residential areas proposed at part of the Town Center.

Tables AQ-17 and AQ-18 show the cumulative human health endpoints from operational sources within 1,000 feet of the Project. These include a gas station, background traffic, and Project sources such as Project-generated traffic, emergency generators and construction. Table AQ-17 shows impacts at existing offsite residential areas and Table AQ-18 shows impacts at future residential areas proposed at part of the Project. The estimated cumulative excess cancer risks, chronic HIs, acute HIs, and $PM_{2.5}$ concentrations do not exceed the BAAQMD thresholds at either existing offsite residential areas or at future residential areas proposed at part of the Town Center.

5.3 Greenhouse Gas

5.3.1 Construction GHGs

There is no BAAQMD CEQA threshold of significance for GHG emissions from construction, but Tables GHG-1 and GHG-2 show the construction and one-time GHG emissions for the Town Center/Community Park and Block 14, respectively.

5.3.2 Operational GHGs

Tables GHG-3 and GHG-4 show operational GHG emissions totals for the Specific Plan Area and the Town Center/Community Park, respectively. As shown in GHG-3, the BAAQMD threshold for a plan level analysis is 6.6 metric tons CO_2e per service population per year (MT CO_2e/SP/yr). The estimated GHG efficiency metric for the Specific Plan Area is 3.6 MT CO_2e/SP/yr, which is well below the threshold.

Table GHG-4 shows the GHG emissions for Town Center/Community Park Project and these are compared against the BAAQMD significance thresholds for a project, which is 4.6 MT CO_2e/SP/yr. The estimated GHG efficiency metric for the Town Center/Community Park Project is 3.5 MT CO_2e/SP/yr, which is well below the threshold.

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TABLES

Table AQ-1
Emissions Calculations Methodology for Air Quality and Greenhouse Gas
Vallco Town Center Specific Plan
Cupertino, California

Type	Source	Methodology and Formula	Reference
Construction Equipment and Landscaping Equipment	Off-Road Equipment[1]	$E_c = \Sigma(EF_c * HP * LF * Hr * C)$	OFFROAD2011 and ARB/USEPA Engine Standards
Construction and Operational On-Road Mobile Sources[2]	Running Exhaust and Running Losses	$E_R = \Sigma(EF_R * VMT * C)$, where VMT = Trip Length * Trip Number	EMFAC2014
	Starting Exhaust and Evaporative ROG	$E_S = \Sigma(EF_S * \text{Trip Number} * C)$	EMFAC2014
	Idling Exhaust	$E_I = \Sigma(EF_I * \text{Trip Number} * T_I * C)$	EMFAC2014
Operational On-Road Mobile Sources	Fugitive Road Dust from Paved Roads[3]	$E_{ext} = [k*(sL)^{0.91}*(W)^{1.02}]*(1-P/4N)$	USEPA 2011
Operational Stationary Sources	Generators[4]	E = EF * HP * Hr	USEPA AP-42 and ARB/USEPA Off-Road Engine Standards
	Central Plant[5]	E = EF * MMBTU * Hr	USEPA AP-42

Notes:

1. E_c: off-road equipment exhaust emissions (lb).
    EF_c: emission factor (g/hp-hr). CalEEMod 2011.2.2 default emission factors used.
    HP: equipment horsepower. OFFROAD2011.
    LF: equipment load factor. OFFROAD2011.
    Hr: equipment hours.
    C: unit conversion factor.

2. On-road mobile sources include truck and passenger vehicle trips. Emissions associated with mobile sources were calculated using the following formulas.

    E_R: running exhaust and running losses emissions (lb).
        EF_R: running emission factor (g/mile). From EMFAC2014.
        VMT: vehicle miles traveled
        C: unit conversion factor
        The calculation involves the following assumptions:
            a. All material transporting and soil hauling trucks are heavy-heavy duty trucks.
            b. Trip Length: The one-way trip length as calculated based on the truck route or the default length from CalEEMod.
            c. Trip Number: provided by the construction contractor or estimated in CalEEMod.

    E_s: vehicle starting exhaust and evaporative ROG emissions (lb).
        EF_s: vehicle starting or evaporative ROG emission factor (g/trip). From EMFAC2014. EMFAC reports emission rates in g/vehicle/day, vehicle population and trips in trips/day. The emission factor is calculated as the product of emission rates and vehicle population, divided by the daily trips.
        C: unit conversion factor.

    E_I: vehicle idling emissions (lb).
        EF_I: vehicle idling emission factor (g/hr-trip). From EMFAC2014.
        T_I: idling time.
        C: unit conversion factor.

Table AQ-1
Emissions Calculations Methodology for Air Quality and Greenhouse Gas
Vallco Town Center Specific Plan
Cupertino, California

3. E_{ext}: annual or other long-term average emission factor (lb/VMT).
   k: particle size multiplier for particle size range (lb/VMT).
   sL: road surface silt loading (g/m^2).
   W: average weight (tons) of all the vehicles traveling the road.
   P: number of "wet" days with at least 0.254 mm (0.01 in) of precipitation during the averaging period.
   N: number of days in the averaging period (365 for annual).
4. E: generator engine emissions
   EF: compression-ignition (diesel) engine emission factor. ARB/USEPA engine PM standard based on engine tier will be used.
   HP: generator horsepower.
   Hr: generator hours. If usage not known, will assume 50 hours of operation annually as a conservative assumption.
5. E: Central Plant boiler emissions
   EF: natural gas external combustion emission factor from AP-42 and BAAQMD Rule 9-7.
   MMBTU: Boiler rating
   Hr: boiler hours, based on a 4-month heating season

Abbreviations:

ARB: California Air Resources Board
BAAQMD: Bay Area Air Quality Management District
CalEEMod: CAlifornia Emissions Estimator MODel
EF: Emission Factor
EMFAC: EMission FACtor Model
EP: Environmental Planning
g: gram
HP: horsepower
lb: pound
LF: Load Factor
mi: mile
USEPA: United States Environmental Protection Agency
VMT: vehicle miles traveled

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Table AQ-2
Daily Construction Mass Emissions, Without EDFs
Town Center/Community Park
Cupertino, California

Project Construction	**CAP Emissions (lb)**			
	ROG	**NOx**	**Exhaust PM_{10}**	**Exhaust $PM_{2.5}$**
Off-Road Emissions	6,003	62,027	3,323	3,058
On-Road Emissions	5,282	90,773	4,188	1,956
Paving Off-Gas Emissions	60	-	-	-
Architectural Coating	43,726	-	-	-
Total	**55,071**	**152,801**	**7,512**	**5,013**
Length of Construction (calendar days)	1,825			
Average Daily Emissions (lb/day)	**30**	**84**	**4.1**	**2.7**
BAAQMD Significance Threshold (lb/day)	54	54	82	54

Abbreviations:
CAP: Criteria Air Pollutant
EDF: Environmental Design Feature
lb: pounds
NOx: nitrogen oxides
PM: particulate matter
ROG: reactive organic gases

Table AQ-3
Daily Construction Mass Emissions, With EDFs
Town Center/Community Park
Cupertino, California

Project Construction	CAP Emissions (lb)			
	ROG	NOx	Exhaust PM_{10}	Exhaust $PM_{2.5}$
Off-Road Emissions	1,225	6,890	136	125
On-Road Emissions	5,282	90,773	4,188	1,956
Paving Off-Gas Emissions	60	-	-	-
Architectural Coating	43,726	-	-	-
Total	**50,293**	**97,663**	**4,324**	**2,081**
Length of Construction (calendar days)	1,825			
Average Daily Emissions (lb/day)	**28**	**53.5**	**2.4**	**1.1**
BAAQMD Significance Threshold (lb/day)	54	54	82	54

Abbreviations:
CAP: Criteria Air Pollutant
EDF: Environmental Design Feature
lb: pounds
NOx: nitrogen oxides
PM: particulate matter
ROG: reactive organic gases

Table AQ-4
Daily Construction Mass Emissions, Without EDFs
Block 14
Cupertino, California

Project Construction	CAP Emissions (lb)			
	ROG	NOx	Exhaust PM_{10}	Exhaust $PM_{2.5}$
Off-Road Emissions	942	8,485	537	503
On-Road Emissions	200	1,048	15	14
Architectural Coating	2,892	0	0	0
Total	**4,034**	**9,533**	**552**	**517**
Length of Construction (calendar days)	446			
Average Daily Emissions (lb/day)	**9**	**21**	**1.2**	**1.2**
BAAQMD Significance Threshold (lb/day)	54	54	82	54

Abbreviations:
CAP: Criteria Air Pollutant
EDF: Environmental Design Feature
lb: pounds
NOx: nitrogen oxides
PM: particulate matter
ROG: reactive organic gases

Table AQ-5
Daily Construction Mass Emissions, With EDFs
Block 14
Cupertino, California

Project Construction	CAP Emissions (lb)			
	ROG	NOx	Exhaust PM_{10}	Exhaust $PM_{2.5}$
Off-Road Emissions	103	632	13	13
On-Road Emissions	200	1,048	15	14
Architectural Coating	2,892	0	0	0
Total	3,195	1,680	28	27
Length of Construction (calendar days)	446			
Average Daily Emissions (lb/day)	**7**	**4**	**0.063**	**0.061**
BAAQMD Significance Threshold (lb/day)	54	54	82	54

Abbreviations:
CAP: Criteria Air Pollutant
EDF: Environmental Design Feature
lb: pounds
NOx: nitrogen oxides
PM: particulate matter
ROG: reactive organic gases

Table AQ-6
Operational Mass Emissions - Specific Plan Area
Vallco Town Center Specific Plan
Cupertino, California

Emissions Source	CAP Emissions[1] [ton/year]				CAP Emissions[1] [lb/day]			
	ROG	NO_x	PM_{10} Total	$PM_{2.5}$ Total	ROG	NO_x	PM_{10} Total	$PM_{2.5}$ Total
Specific Plan								
Architectural Coating	2.5	-	-	-	14	-	-	-
Consumer Products	17	-	-	-	95	-	-	-
Hearths	2.7E-03	2.3E-02	1.9E-03	1.8E-03	1.5E-02	1.3E-01	1.0E-02	1.0E-02
Landscaping	1.6E-04	2.0E-05	1.0E-05	1.0E-05	8.8E-04	1.1E-04	5.5E-05	5.5E-05
Energy Use	0.08	0.69	0.05	0.05	0.42	3.8	0.29	0.29
On-Road Fugitive Dust	-	-	27	6.7	-	-	149	37
On-Road Exhaust	19	17	4.7	2.0	106	93	26	11
Central Plant Boilers	0.94	3.4	1.3	1.3	5.2	19	7.2	7.2
Emergency Generators	0.044	0.045	0.78	0.026	0.24	0.25	4.3	0.14
Total - Planning Area	**40**	**21**	**34**	**10**	**220**	**116**	**186**	**55**
Existing Land Use, at 82.83% Historical Occupancy								
Architectural Coating	0.63	-	-	-	3.4	-	-	-
Consumer Products	4.7	-	-	-	26	-	-	-
Landscaping	1.1E-03	1.1E-04	4.0E-05	4.0E-05	6.2E-03	6.0E-04	2.2E-04	2.2E-04
Energy Use	0.019	0.17	0.013	0.013	0.10	0.94	0.072	0.072
On-Road Fugitive Dust	-	-	17	4.1	-	-	92	23
On-Road Exhaust	21	23	3.0	1.4	118	124	17	7.5
Existing Boiler	0.02	0.06	0.02	0.02	0.086	0.31	0.12	0.12
Emergency Generators	0.01	0.11	0.008	0.008	0.05	0.63	0.04	0.04
Total - Existing Land Use	**27**	**23**	**20**	**5.5**	**147**	**126**	**109**	**30**
Difference (Project - Existing)	**13**	**-1.8**	**14**	**4.5**	**73**	**-10**	**77**	**25**
BAAQMD Significance Threshold	Consistency with Current Air Quality Plan control measures AND Projected VMT or vehicle trip increase is less than or equal to projected population increase							

Notes:
1. Emissions estimated using methods consistent with CalEEMod version 2013.2.2.

Abbreviations:
BAAQMD: Bay Area Air Quality Management District
CalEEMod: California Emissions Estimator Model
CAP: Criteria Air Pollutant
lb: pounds
NOx: nitrogen oxides
PM: particulate matter
ROG: reactive organic gases
VMT: vehicle miles traveled

References:
CalEEMod Version 2013.2.2 Available Online at: http://www.caleemod.com

Table AQ-7
Operational Mass Emissions - Town Center/Community Park
Vallco Town Center Specific Plan
Cupertino, California

Emissions Source	CAP Emissions[1] [ton/year]				CAP Emissions[1] [lb/day]			
	ROG	NO_x	PM_{10} Total	$PM_{2.5}$ Total	ROG	NO_x	PM_{10} Total	$PM_{2.5}$ Total
Proposed Project								
Architectural Coating	2.4	-	-	-	13	-	-	-
Consumer Products	16	-	-	-	89	-	-	-
Hearths	2.7E-03	2.3E-02	1.9E-03	1.8E-03	1.5E-02	1.3E-01	1.0E-02	1.0E-02
Landscaping	-	-	-	-	-	-	-	-
Energy Use	0.02	0.15	0.01	0.01	0.09	0.83	0.06	0.06
On-Road Fugitive Dust	-	-	26	6	-	-	145	36
On-Road Exhaust	19	17	4.6	1.9	103	91	25	11
Central Plant Boilers	0.94	3.4	1.3	1.3	5.2	19	7.2	7.2
Emergency Generators	0.04	0.73	0.025	0.025	0.23	4.0	0.13	0.13
Total - Proposed Project	**38**	**21**	**32**	**10**	**210**	**115**	**177**	**54**
Existing Land Use, at 82.83% Historical Occupancy								
Architectural Coating	0.63	-	-	-	3.4	-	-	-
Consumer Products	4.7	-	-	-	26	-	-	-
Landscaping	1.1E-03	1.1E-04	4.0E-05	4.0E-05	6.2E-03	6.0E-04	2.2E-04	2.2E-04
Energy Use	0.019	0.17	0.013	0.013	0.10	0.94	0.072	0.072
On-Road Fugitive Dust	-	-	17	4.1	-	-	92	23
On-Road Exhaust	21	23	3.0	1.4	118	124	17	7.5
Existing Boiler	0.02	0.06	0.02	0.02	0.09	0.31	0.12	0.12
Emergency Generators	0.01	0.11	0.008	0.008	0.05	0.63	0.04	0.04
Total - Existing Land Use	**27**	**23**	**20**	**5.5**	**147**	**126**	**109**	**30**
Difference (Project - Existing)	**11.6**	**-2.1**	**12**	**4.2**	**63**	**-12**	**68**	**23**
BAAQMD Significance Threshold	10	10	15	10	54	54	82	54

Notes:

1. Emissions estimated using methods consistent with CalEEMod version 2013.2.2.

Abbreviations:

BAAQMD: Bay Area Air Quality Management District
CalEEMod: California Emissions Estimator Model
CAP: Criteria Air Pollutant
lb: pounds
NOx: nitrogen oxides
PM: particulate matter
ROG: reactive organic gases

References:

CalEEMod Version 2013.2.2 Available Online at: http://www.caleemod.com

Table AQ-8
Modeling Parameters
Vallco Town Center Specific Plan
Cupertino, California

Period	Source	Source Type[1]	Source Dimension (m)	Number of Sources[2]	Release Height[3] (m)	Exit Temperature (K)	Exit Velocity (m/s)	Exit Diameter (m)	Initial Vertical Dimension[4] (m)	Initial Lateral Dimension (m)
Construction	Construction Equipment and Trucks On-Site	Volume	Project Area	TBD	5				1.4	TBD
	On-Road Trucks	Adjacent Volume	Variable	TBD	4.57				1.06	Variable
Operation	On-Road Fleet[5]	Adjacent Volume	Variable	TBD	0.6				0.14	Variable
	Back-Up Generators[6]	Point	-	TBD	3.66	739.8	45.3	0.18		

Notes:

1. Construction sources are modeled as volume sources across the project site. Volume sources have 20 meter spacing as the construction area is in excess
2. The number of sources covering the construction area and related roadways will be determined based on the geometry of the project and the truck routes. Roadways will be modeled out to 1,000 feet from the Project boundary.
3. Release height for on-site construction activities was estimated from the Localized Significance Threshold (LST) Methodology from the South Coast Air
4. Release parameters for on-road construction traffic are from the Air Resources Board (ARB) Risk Reduction Plan to Reduce Particulate Matter Emissions
5. Release parameters for the on-road fleet were selected based on communication with ARB. The initial lateral dimension for adjacent volume sources is calculated as the width of the roadway divided by 2.15 per USEPA AERMOD User's Guide Table 3-1. The initial vertical dimension for the adjacent volume
6. With no specific details on the back-up generators that will be deployed, release parameters used are the "median" values for diesel engines in the BAAQMD (STI 2011). In the absence of better data, the same parameters are used for propane and diesel engines.

Abbreviations:

K: Kelvin
m: meter
s: second

References:

ARB. 2000. Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engines and Vehicles. October.
Available online at: http://www.arb.ca.gov/diesel/documents/rrpapp.htm
Sonoma Technology, Inc. 2011. Memo to BAAQMD Re: Default Modeling Parameters for Stationary Sources. April 1.
USEPA. 2004. User's Guide for the AMS/EPA Regulatory Model - AERMOD. September.
Available online at: http://www.epa.gov/scram001/dispersion_prefrec.htm.
South Coast Air Quality Management District (SCAQMD). 2008. Localized Significance Threshold Methodology. July.
Available online at: http://www.aqmd.gov/home/regulations/ceqa/air-quality-analysis-handbook/localized-significance-thresholds

Table AQ-9
Exposure Parameters, 2015 OEHHA Methodology
Vallco Town Center Specific Plan
Cupertino, California

Period	Receptor Age Group	Exposure Parameters					
		Daily Breathing Rate (DBR)[1] (L/kg-day)	Exposure Duration (ED)[2] (years)	Fraction of Time at Home (FAH)[3] (unitless)	Exposure Frequency (EF)[4] (days/year)	Averaging Time (AT) (days)	Intake Factor, Inhalation (IF_{inh}) (m^3/kg-day)
Construction	3rd Trimester	361	0.25	1	350	25,550	0.0012
	Age 0-<2 Years	1,090	2	1	350	25,550	0.030
	Age 2-<9 Years	631	2.75	1	350	25,550	0.024
Operation	3rd Trimester	361	0.25	1	350	25,550	0.0012
	Age 0-<2 Years	1,090	2	1	350	25,550	0.030
	Age 2-<16 Years	572	14	1	350	25,550	0.11
	Age 16-30 Years	261	14	0.73	350	25,550	0.037

Notes:

1. Daily breathing rates reflect default breathing rates from OEHHA 2015 as follows: 95th percentile for 3rd trimester and age 0-<2 years; 80th percentile for ages 2-<9 years, 2-<16 years, and 16-30 years.
2. The total exposure duration for construction reflects the actual proposed construction schedule; the total exposure duration for operation reflects the default residential exposure duration from Cal/EPA 2015.
3. Fraction of time at home was conservatively assumed to be 1 for age groups younger than 16 years old (100%). The FAH of 0.73 for age group 16 and above reflects the default value from Cal/EPA 2015.
4. Exposure frequency reflects default exposure frequency for residents from Cal/EPA 2015.

Calculation:

Resident:
IF_{inh} = DBR * ED * FAH * EF * CF / AT
CF = 0.001 (m^3/L)

Abbreviations:

Cal/EPA: California Environmental Protection Agency
L: liter
kg: kilogram
m^3: cubic meter

Reference:

Cal/EPA. 2015. Air Toxics Hot Spots Program. Risk Assessment Guidelines. Guidance Manual for Preparation of Health Risk Assessments. Office of Environmental Health Hazard Assessment (OEHHA). February.
Available online at: http://oehha.ca.gov/air/hot_spots/hotspots2015.html.

Table AQ-10
Speciation Values
Vallco Town Center Specific Plan
Cupertino, California

Source	Emission Type	Fraction	Chemical[1]
Diesel Offroad Equipment (Construction and Generators)	**Exhaust PM**	1	Diesel PM
	Exhaust TOG	0.0019	1,3-Butadiene
		0.0735	Acetaldehyde
		0.02	Benzene
		0.0031	Ethylbenzene
		0.1471	Formaldehyde
		0.0016	n-Hexane
		0.0003	Methanol
		0.0148	Methyl Ethyl Ketone
		0.0009	Naphthalene
		0.026	Propylene
		0.0006	Styrene
		0.0147	Toluene
		0.0061	m-Xylene
		0.0034	o-Xylene
		0.001	p-Xylene
Propane Generators	**Exhaust PM**	0.07	Chlorine
		0.0005	Copper
		0.0005	Manganese
		0.0005	Nickel
	Exhaust TOG	0.0003	Acetaldehyde
		0.0011	Benzene
		0.0001	Ethylbenzene
		0.0081	Formaldehyde
		0.0002	n-Hexane
		0.0169	Propylene
		0.0004	Toluene
		0.0002	Isomers of Xylene
		0.0001	m-Xylene
		0.0001	o-Xylene
Diesel Roadway Traffic	**Exhaust PM**	1	Diesel PM
	Exhaust TOG	0.15942	Acetaldehyde
		0.01045	Benzene
		0.08505	Formaldehyde
		0.02860	Methyl Ethyl Ketone
		0.01518	Toluene
		0.00317	o-Xylene
		0.00889	m- & p-Xylenes

Table AQ-10
Speciation Values
Vallco Town Center Specific Plan
Cupertino, California

Source	Emission Type	Fraction	Chemical[1]
Gasoline Roadway Traffic	**Exhaust TOG**	0.0055	1,3-Butadiene
		0.0028	Acetaldehyde
		0.0013	Acrolein
		0.0247	Benzene
		0.0105	Ethylbenzene
		0.0158	Formaldehyde
		0.016	Hexane
		0.0012	Methanol
		0.0002	Methyl Ethyl Ketone
		0.0005	Naphthalene
		0.0306	Propylene
		0.0012	Styrene
		0.0576	Toluene
		0.048	Xylenes
	Evaporative TOG	0.0036	Benzene
		0.0012	Ethylbenzene
		0.0154	Hexane
		0.017	Toluene
		0.0058	Xylenes

Note:

1. Compounds presented in this table are only those air toxic contaminants with toxicity values from Cal/EPA (2015) evaluated in the health risk assessment. Speciation profiles presented in this table are from the following sources:
    - Diesel offroad exhaust, TOG: ARB 818 / EPA 3161
    - Propane offroad exhaust, PM: ARB 123
    - Propane offroad exhaust, TOG: ARB 719
    - Diesel onroad exhaust, TOG: EPA 4674
    - Gasoline onroad exhaust/evaporative, TOG: BAAQMD 5/2011 Guidance

Abbreviations:

ARB: Air Resources Board
BAAQMD: Bay Area Air Quality Management District
EPA: Environmental Protection Agency
PM: particulate matter
TOG: total organic gas

References:

ARB. Speciation Profiles Used in ARB Modeling. Available online at: http://www.arb.ca.gov/ei/speciate/speciate.htm#specprof
BAAQMD. 2011. Recommended Methods for Screening and Modeling Local Risks and Hazards. May.
Cal/EPA. 2015. OEHHA/ARB Consolidated Table of Approved Risk Assessment Health Values. May 13.
USEPA. SPECIATE 4.3. Available online at: http://cfpub.epa.gov/si/speciate/

Table AQ-11
Toxicity Values
Vallco Town Center Specific Plan
Cupertino, California

Chemical[1]	Cancer Potency Factor $(mg/kg\text{-}day)^{-1}$	Chronic REL ($\mu g/m^3$)	Acute REL ($\mu g/m^3$)
Diesel PM	1.1	5	-
Acetaldehyde	0.01	140	470
Acrolein	-	0.35	2.5
Benzene	0.1	3	27
1,3-Butadiene	0.6	2	660
Chlorine	-	0.2	210
Copper	-	-	100
Ethylbenzene	0.0087	2,000	-
Formaldehyde	0.021	9	55
n-Hexane	-	7,000	-
Manganese	-	0.09	-
Methanol	-	4,000	28,000
Methyl Ethyl Ketone	-	-	13,000
Naphthalene	0.12	9	-
Nickel	0.91	0.014	0.2
Propylene	-	3,000	-
Styrene	-	900	21,000
Toluene	-	300	37,000
Xylenes	-	700	22,000

Note:
1. Chemicals presented in this table reflect air toxic contaminants in the proposed fuel types that are expected from off-road equipment, on-road truck trips, automobile traffic, and propane generators.

Abbreviations:
-: not available or not applicable
$\mu g/m^3$: micrograms per cubic meter
ARB: Air Resources Board
Cal/EPA: California Environmental Protection Agency
$(mg/kg\text{-}day)^{-1}$: per milligram per kilogram-day
OEHHA: Office of Environmental Health Hazard Assessment
PM: particulate matter
REL: reference exposure level

Reference:
Cal/EPA. 2015. OEHHA/ARB Consolidated Table of Approved Risk Assessment Health Values. May 13.

Table AQ-12
Age Sensitivity Factors
Vallco Town Center Specific Plan
Cupertino, California

Receptor Age Group	Age Sensitivity Factor[1] (ASF)
3rd Trimester	10
Age 0-<2 Years	10
Age 2-<16 Years	3
Age 16-30 Years	1

Note:
[1.] Based on Cal/EPA 2015.

Abbreviation:
Cal/EPA: California Environmental Protection Agency

References:
Cal/EPA. 2015. Air Toxics Hot Spots Program. Risk Assessment Guidelines. Guidance Manual for Preparation of Health Risk Assessments. Office of Environmental Health Hazard Assessment (OEHHA). February.
Available online at: http://oehha.ca.gov/air/hot_spots/hotspots2015.html.

Table AQ-13
Project-Related Construction Health Risk Impacts at Sensitive Receptors, Without EDFs
Town Center/Community Park
Cupertino, California

Emission Source	Cancer Risk Impact[1] (in one million)	Chronic Non-Cancer Hazard Index[1]	Acute Non-Cancer Hazard Index[1]	Annual $PM_{2.5}$ Concentration[1] (ug/m^3)
Project Construction, Without EDFs	83	0.065	0.21	0.296
BAAQMD Significance Threshold	**10**	1	1	0.3

Notes:

1. The existing residential locations experiencing maximum project impacts with no EDFs are:

	UTMx	UTMy
Cancer	587135.52	4131721.81
Chronic HI, $PM_{2.5}$	587134.89	4131761.81
Acute HI	587057.1	4131620.57

Abbreviations:

BAAQMD: Bay Area Air Quality Management District
EDF: Environmental Design Feature
HI: health index
ug/m^3: micrograms per cubic meter
UTM: Universal Transverse Mercator coordinate system

Table AQ-14
Project-Related Construction Health Risk Impacts at Sensitive Receptors, With EDFs
Town Center/Community Park
Cupertino, California

Emission Source	Cancer Risk Impact[1] (in one million)	Chronic Non-Cancer Hazard Index[1]	Acute Non-Cancer Hazard Index[1]	Annual $PM_{2.5}$ Concentration[1] (ug/m^3)
Project Construction, With EDFs	7.5	0.0063	0.089	0.024
BAAQMD Significance Threshold	**10**	1	1	0.3

Notes:

1. The existing residential locations experiencing maximum project impacts with EDFs are:

	UTMx	UTMy
Cancer	587360.2	4131425.31
Chronic HI, $PM_{2.5}$	587361.46	4131345.32
Acute HI	587330.47	4132044.92

Abbreviations:

BAAQMD: Bay Area Air Quality Management District
EDF: Environmental Design Feature
HI: health index
ug/m^3: micrograms per cubic meter
UTM: Universal Transverse Mercator coordinate system

Table AQ-15
Project-Related Operational Health Risk Impacts to Existing Residential Areas
Vallco Town Center Specific Plan
Cupertino, California

Emission Source	Cancer Risk Impact (in one million)	Chronic Non-Cancer Hazard Index	Acute Non-Cancer Hazard Index	Annual $PM_{2.5}$ Concentration (ug/m^3)
Mobile	5.0	0.010	0.05	0.11
Emergency Generators	0.4	1.9E-04	0.04	6.6E-04
Project Operational Total	**5.3**	0.010	0.09	0.11
BAAQMD Significance Threshold	10	1	1	0.3

Notes:

1. Evaluated project operational activities include new traffic associated with the Vallco Specific Plan, and 14 planned emergency generators.

2. The existing residential locations experiencing maximum project impacts are:

	UTMx	UTMy
Cancer, Chronic HI, Annual $PM_{2.5}$	587360.2	4131425.31
Acute HI	587340.21	4131424.99

Abbreviations:

BAAQMD: Bay Area Air Quality Management District
HI: health index
ug/m^3: micrograms per cubic meter
UTM: Universal Transverse Mercator coordinate system

Table AQ-16
Project-Related Operational Health Risk Impacts to Proposed Residential Areas
Vallco Town Center Specific Plan
Cupertino, California

Emission Source	Cancer Risk Impact (in one million)	Chronic Non-Cancer Hazard Index	Acute Non-Cancer Hazard Index	Annual $PM_{2.5}$ Concentration (ug/m^3)
Mobile	6.7	0.002	0.03	0.16
Emergency Generators	1.3	0.03	0.35	1.8E-04
Project Operational Total	**8.0**	**0.03**	**0.38**	**0.16**
BAAQMD Significance Threshold	10	1	1	0.3

Notes:

1. Evaluated project operational activities include new traffic associated with the Vallco Specific Plan, and 14 planned emergency generators.

2. The proposed residential locations experiencing maximum project impacts are:

	UTMx	UTMy
Cancer	587290.06	4131614.86
Chronic HI, Acute HI	587278.68	4131278.98
$PM_{2.5}$	587090.19	4131195.58

Abbreviations:

BAAQMD: Bay Area Air Quality Management District
HI: health index
ug/m^3: micrograms per cubic meter
UTM: Universal Transverse Mercator coordinate system

Table AQ-17
Summary of Cumulative Health Risk Impacts to Existing Residential Areas
Town Center/Community Park
Vallco Town Center Specific Plan
Cupertino, California

Emission Source	Cancer Risk Impact (in one million)	Chronic Non-Cancer Hazard Index	Acute Non-Cancer Hazard Index	Annual $PM_{2.5}$ Concentration (ug/m^3)
Existing Stationary Sources				
76 Gas Station (BAAQMD Permit G9315)	1.2	0.002	0.002	n/a
Background Traffic	27	0.054	0.23	0.62
Subtotal	**28**	**0.06**	**0.23**	**0.62**
Project Construction	7.5	0.006	0.09	0.02
Project Traffic	5.0	0.010	0.05	0.11
Project Generators	0.4	1.9E-04	0.04	6.6E-04
Total Cumulative Impact	**41**	**0.07**	**0.40**	**0.76**
BAAQMD Significance Threshold	100	10	10	0.8

Notes:

[1.] Stationary source impacts were obtained from a data request to the BAAQMD. BAAQMD stated two dry cleaners located within 1,000 ft of the project no longer create risks to nearby residents, thus those sources are not included here. The only remaining source within 1,000 ft of the property is a gas station. The screening risk estimate provided by BAAQMD was scaled to a risk at the nearest offsite residential area (approximately 350 ft) with the BAAQMD's Gasoline Dispensing Facility Distance Multiplier Tool.

[2.] Project construction represents only construction impacts from the Town Center/Community Park.

[3.] The existing residential locations experiencing maximum project impacts are:

	UTMx	UTMy
Cancer, Chronic HI, Annual $PM_{2.5}$	587360.2	4131425.31
Acute HI	587340.21	4131424.99

Abbreviations:

BAAQMD: Bay Area Air Quality Management District
HI: health index
ug/m^3: micrograms per cubic meter
UTM: Universal Transverse Mercator coordinate system

Table AQ-18
Summary of Cumulative Health Risk Impacts to Proposed Residential Areas
Town Center/Community Park
Vallco Town Center Specific Plan
Cupertino, California

Emission Source	Cancer Risk Impact (in one million)	Chronic Non-Cancer Hazard Index	Acute Non-Cancer Hazard Index	Annual $PM_{2.5}$ Concentration (ug/m^3)
Existing Stationary Sources				
76 Gas Station (BAAQMD Permit G9315)	3.0	0.005	0.005	n/a
Background Traffic	19	0.028	0.17	0.35
Subtotal	**22**	**0.033**	**0.17**	**0.35**
Project Traffic	6.7	0.002	0.03	0.16
Project Generators	1.3	0.030	0.35	1.8E-04
Total Cumulative Impact	**30**	**0.06**	**0.55**	**0.51**
BAAQMD Significance Threshold	100	10	10	0.8

Notes:

[1.] Stationary source impacts were obtained from a data request to the BAAQMD. BAAQMD stated two dry cleaners located within 1,000 ft of the project no longer create risks to nearby residents, thus those sources are not included here. The only remaining operating source within 1,000 ft of the property is a gas station. The screening risk estimate provided by BAAQMD was scaled to a risk at the nearest proposed residential area (approximately 200 ft) with the BAAQMD's Gasoline Dispensing Facility Distance Multiplier Tool.

[2.] The proposed residential locations experiencing maximum project impacts are:

	UTMx	UTMy
Cancer	587290.06	4131614.86
Chronic HI, Acute HI,	587278.68	4131278.98
$PM_{2.5}$	587090.19	4131195.58

Abbreviations:

BAAQMD: Bay Area Air Quality Management District
HI: health index
ug/m^3: micrograms per cubic meter
UTM: Universal Transverse Mercator coordinate system

Table GHG-1
One-Time GHG Emissions
Town Center/Community Park
Cupertino, California

Emissions Type	GHG Emissions ($MT\ CO_2e$)
Construction Off-Road Emissions	3,483
Construction On-Road Emissions	19,331
One-Time Vegetation Change	-1,373
Total One-Time GHG Emissions	**21,441**

Abbreviations:

CO_2e: Carbon Dioxide Equivalent

GHG: greenhouse gas

MT: metric ton

Table GHG-2
One-Time GHG Emissions
Block 14
Cupertino, California

Emissions Type	GHG Emissions ($MT\ CO_2e$)
Construction Off-Road Emissions	383
Construction On-Road Emissions	218
Total One-Time GHG Emissions	**601**

Abbreviations:

CO_2e: Carbon Dioxide Equivalent

GHG: greenhouse gas

MT: metric ton

Table GHG-3
Operational GHG Emissions - Specific Plan Area
Vallco Town Center Specific Plan
Cupertino, California

Emissions Source	GHG Emissions[1]	Units
Specific Plan		
Hearths	27	$MT\ CO_2e/yr$
Landscaping	0.0036	
Energy Use	11,076	
Water Use	170	
Waste Disposed	1,643	
On-Road Exhaust	28,347	
Central Plant Boilers	18,699	
Emergency Generators	102	
Total - Planning Area	**60,065**	$MT\ CO_2e/yr$
Service Population - Proposed Project[2]	10,429	SP
Existing Land Use, at 82.83% Historical Occupancy		
Landscaping	0.023	MT CO2e/yr
Energy Use	2,822	
Water Use	230	
Waste Disposed	573	
On-Road Exhaust	21,517	
Existing Boiler	310	
Emergency Generators	4.0	
Total - Existing Land Use	**25,457**	$MT\ CO_2e/yr$
Service Population - Existing Land Use[2]	860	SP
Difference (Project - Existing)	34,608	$MT\ CO_2e/yr$
Emissions per Service Population - Net New[3]	3.6	$MT\ CO_2e/SP/yr$
BAAQMD Significance Threshold	**6.6**	

Notes:

1. Emissions estimated using methods consistent with CalEEMod version 2013.2.2.

2. Town Center/Community Park service population estimated from Keyser-Marston and Associates Fiscal and Economics Impact Assessment for the Town Center/Community Park (2016) and by assuming 2.85 people per renter-occupied unit in the City of Cupertino, consistent with US Census data. The City of Cupertino General Plan EIR assumes 0.3 employees per hotel room, used here to estimate the hotel service population. Existing land use and school service population estimated using employment density values from the Energy Information Administration.

3. The emissions per service population calculation is based on the Total Proposed Project GHG emissions value minus the Total Existing Land Use GHG emissions, divided by the Proposed Project service population minus the Existing Land Use service population.

Table GHG-3
Operational GHG Emissions - Specific Plan Area
Vallco Town Center Specific Plan
Cupertino, California

Abbreviations:

BAAQMD: Bay Area Air Quality Management District
CalEEMod: California Emissions Estimator Model
CO_2e: carbon dioxide equivalent
EIR: Environmental Impact Report
GHG: greenhouse gas
MT: metric ton
SP: service population
yr: year

References:

CalEEMod Version 2013.2.2 Available Online at: http://www.caleemod.com
Energy Information Administration. 2015. Commercial Buildings Energy Consumption Survey (CBECS). Table B1. Summary table: total and means of floorspace, number of workers, and hours of operation. March 4.
Available online at: http://www.eia.gov/consumption/commercial/data/2012/#summary
and http://www.eia.gov/consumption/commercial/data/2012/xls/b1.xlsx
Luk Associates. 2015. Town Center/Community Park – Water Demand Assessment. Table 3-2. Water Demand Summary using Potable Water and Recycled Water. October 27.

Table GHG-4
Operational GHG Emissions - Town Center/Community Park
Vallco Town Center Specific Plan
Cupertino, California

Emissions Source	GHG Emissions[1]	Units
Proposed Project		
Hearths	27	MT CO_2e/yr
Landscaping	0	
Energy Use	10,196	
Water Use	160	
Waste Disposed	1,596	
On-Road Exhaust	27,584	
Central Plant Boilers	18,699	
Emergency Generators	96	
Total - Proposed Project	**58,358**	MT CO_2e/yr
Service Population - Proposed Project[2]	10,286	SP
Existing Land Use, at 82.83% Historical Occupancy		
Landscaping	0.023	MT CO_2e/yr
Energy Use	2,822	
Water Use	230	
Waste Disposed	573	
On-Road Exhaust	21,517	
Existing Boiler	310	
Emergency Generators	4.0	
Total - Existing Land Use	**25,457**	MT CO_2e/yr
Service Population - Existing Land Use[2]	860	SP
Difference (Project - Existing)	32,901	MT CO_2e/yr
Emissions per Service Population - Net New,[3] with Central Plant	3.5	MT CO_2e/SP/yr
BAAQMD Significance Threshold	**4.6**	

Notes:

1. Emissions estimated using methods consistent with CalEEMod version 2013.2.2.

2. The Town Center/Community Park service population estimated from Keyser-Marston and Associates Fiscal and Economics Impact Assessment for the Town Center/Community Park (2016) and by assuming 2.85 people per renter-occupied unit in the City of Cupertino, consistent with US Census data. Existing land use service population estimated using employment density values from the Energy Information Administration.

3. The emissions per service population calculation is based on the Total Proposed Project GHG emissions value minus the Total Existing Land Use GHG emissions, divided by the Proposed Project service population minus the Existing Land Use service population.

Table GHG-4
Operational GHG Emissions - Town Center/Community Park
Vallco Town Center Specific Plan
Cupertino, California

Abbreviations:

BAAQMD: Bay Area Air Quality Management District
CalEEMod: California Emissions Estimator Model
CO_2e: carbon dioxide equivalent
EIR: Environmental Impact Report
GHG: greenhouse gas
MT: metric ton
SP: service population
yr: year

References:

CalEEMod Version 2013.2.2 Available Online at: http://www.caleemod.com

Energy Information Administration. 2015. Commercial Buildings Energy Consumption Survey (CBECS). Table B1. Summary table: total and means of floorspace, number of workers, and hours of operation. March 4.
Available online at: http://www.eia.gov/consumption/commercial/data/2012/#summary
and http://www.eia.gov/consumption/commercial/data/2012/xls/b1.xlsx

Luk Associates. 2015. Town Center/Community Park – Water Demand Assessment. Table 3-2. Water Demand Summary using Potable Water and Recycled Water. October 27.

Table EC-1
Construction Energy Resources Use
Vallco Town Center Specific Plan
Cupertino, California

Source		Town Center/Community Park	Block 14
Electricity			
Project Water Consumption[1]	kWh	12,235	634
Project On-Road Construction Trips[2]	kWh	50,271	447
Project Electricity Total	**kWh**	**62,506**	**1,082**
Diesel			
Project On-Road Construction Trips[2]	gallons	1,398,692	10,780
Project Off-Road Construction Equipment[3]	gallons	361,196	37,700
Project Diesel Total	**gallons**	**1,759,888**	**48,480**
Gasoline			
Project On-Road Construction Trips[2]	gallons	719,513	15,221
Project Gasoline Total	**gallons**	**719,513**	**15,221**

Notes:

1. Construction water use estimated based on acres disturbed per day per construction phase, construction days per phase, and estimated water use per acre (AWMA 1992).

2. On-road mobile source fuel use based on vehicle miles traveled (VMT) from CalEEMod® for all years of construction and fleet-average fuel consumption in gallons per mile from EMFAC2014 for CY 2017 through 2021 in Santa Clara County. Electricity demand based on VMT and calculated average electric vehicle fuel economy for 2015 models (in kWh per mile) from the DOE Fuel Economy Guide.

3. Off-road mobile source fuel usage based on a fuel usage rate of 0.05 gallons of diesel per horsepower (hp)-hour, consistent with diesel conversion factors given in USEPA AP-42 Table 3.4.1.

Abbreviations:

AWMA: Air & Waste Management Association
CalEEMod®: California Emissions Estimator Model
CY: calendar year
DOE: United States Department of Energy
EMFAC2014: California Air Resources Board EMission FACtor model.
hp: horsepower
kWh: kilowatt-hour
USEPA: United States Environmental Protection Agency
VMT: vehicle miles traveled

References:

AWMA. 1992. Air Pollution Engineering Manual.

DOE. 2016. Fuel Economy Guide, Model Year 2015. Electric Vehicles. Available online at: http://www.fueleconomy.gov/feg/printGuides.shtml. Accessed January 2016.

USEPA. 1996. AP 42. Compilation of Air Pollutant Emission Factors, Volume 1. Fifth Edition. Chapter 3.4, Large Stationary Diesel and All Stationary Dual-fuel Engines. Available online at: http://www.epa.gov/ttn/chief/ap42/ch03/final/c03s04.pdf. Accessed January 2016.

Table EC-2
Operational Energy Resources Use
Vallco Town Center Specific Plan
Cupertino, California

Source		Town Center/Community Park	Block 14	Specific Plan Area
Electricity				
Building[1]	kWh/year	74,760,871	2,189,536	76,950,408
Water[1]	kWh/year	493,041	28,101	521,142
Mobile[2]	kWh/year	797,633	21,990	819,624
Total Electricity	**kWh/year**	**76,051,546**	**2,239,627**	**78,291,173**
Natural Gas[1]				
Building	kBTU/year	3,182,731	10,923,043	14,105,773
Central Plant	kBTU/year	350,400,000	-	350,400,000
Total Natural Gas	**kBTU/year**	**353,582,731**	**10,923,043**	**364,505,773**
Diesel				
Backup Generators[3]	gallons/year	14,303	1,022	15,325
Mobile[2]	gallons/year	517,397	14,264	531,661
Total Diesel	**gallons/year**	**531,700**	**15,286**	**546,986**
Gasoline				
Mobile[2]	gallons/year	2,902,647	80,025	2,982,672

Notes

1. Electricity, natural gas, and water usage are based on Project-specific estimates and CalEEMod® defaults.
2. Mobile source fuel use calculated based on vehicle miles traveled (VMT) and the fleet-average fuel consumption (in gallons per mile) from EMFAC2014 for CY 2022. Electricity demand based on VMT and calculated average electric vehicle fuel economy for 2015 models (in kWh per mile) from the DOE Fuel Economy Guide.
3. Diesel use from backup generators was calculated from the provided horsepower, assuming 50 hours/year/generator (consistent with the Air Quality analysis) and a fuel usage rate of 0.05 gallons of diesel per horsepower (hp)-hour, consistent with diesel conversion factors given in USEPA AP-42 Table 3.4.1.

Abbreviations

CalEEMod®: California Emissions Estimator Model
CY: calendar year
DOE: United States Department of Energy
EMFAC2014: California Air Resources Board EMission FACtor model
hp: horsepower
kBTU: thousand British Thermal Unit
kWh: kilowatt-hour
USEPA: United States Environmental Protection Agency
VMT: vehicle miles traveled

References:

DOE. 2016. Fuel Economy Guide, Model Year 2015. Electric Vehicles. Available online at: http://www.fueleconomy.gov/feg/printGuides.shtml. Accessed January 2016.

USEPA. 1996. AP 42. Compilation of Air Pollutant Emission Factors, Volume 1. Fifth Edition. Chapter 3.4, Large Stationary Diesel and All Stationary Dual-fuel Engines. Available online at: http://www.epa.gov/ttn/chief/ap42/ch03/final/c03s04.pdf. Accessed January 2016.

Construction Emissions Supporting Tables

Table CON-1
Construction Phasing Schedule
Town Center/Community Park
Cupertino, California

Phase	Phase Name	Phase Start Date	Phase End Date	Number of Workdays per Week
Phase 1	Demolition	1/1/2017	2/5/2017	6
	Site Preparation	2/6/2017	2/26/2017	6
	Grading	2/27/2017	5/21/2017	6
	Building Construction	5/22/2017	10/15/2018	6
	Paving	10/16/2018	11/22/2018	6
	Architectural Coating	11/23/2018	12/30/2018	7
Phase 2	Demolition	5/1/2018	7/1/2018	6
	Site Preparation	7/2/2018	8/6/2018	6
	Grading	8/7/2018	1/20/2019	6
	Building Construction	1/21/2019	8/21/2021	6
	Paving	8/22/2021	10/26/2021	6
	Architectural Coating	10/27/2021	12/31/2021	7

Table CON-2
Hours of Operation, Construction
Town Center/Community Park
Cupertino, California

		Weekday		Saturday		Sunday	
Phase	**Phase Name**	**Hours per Weekday**	**Weekday Hours**	**Hours per Saturday**	**Saturday Hours**	**Hours per Sunday**	**Sunday Hours**
Phase 1	Demolition	10	7 AM to 5 PM	8	9 AM to 5 PM	None	None
	Site Preparation	10	7 AM to 5 PM	8	9 AM to 5 PM	None	None
	Grading	10	7 AM to 5 PM	8	9 AM to 5 PM	None	None
	Building Construction	10	7 AM to 5 PM	8	9 AM to 5 PM	None	None
	Paving	10	7 AM to 5 PM	8	9 AM to 5 PM	None	None
	Architectural Coating	10	7 AM to 5 PM	8	9 AM to 5 PM	4	7 AM to 11 AM
Phase 2	Demolition	10	7 AM to 5 PM	8	9 AM to 5 PM	None	None
	Site Preparation	10	7 AM to 5 PM	8	9 AM to 5 PM	None	None
	Grading	10	7 AM to 5 PM	8	9 AM to 5 PM	None	None
	Building Construction	10	7 AM to 5 PM	8	9 AM to 5 PM	None	None
	Paving	10	7 AM to 5 PM	8	9 AM to 5 PM	None	None
	Architectural Coating	15	6 AM to 9 PM	8	9 AM to 5 PM	6	7 AM to 1 PM

Table CON-3
Trip Generation Rates, Construction
Town Center/Community Park
Cupertino, California

Trip Type	Construction Average Daily Round-Trip Generation		
	Weekday	Saturday	Sunday
Phase 1			
Worker - before carpool rate applied[1]	253	253	13
Worker	231	231	12
Vendor	50	5	3
Hauling	120	0	0
Phase 2			
Worker	482	482	119
Vendor	50	5	3
Hauling	120	0	0

Notes:
1. Worker trip generation provided by the Project Sponsor in an email on November 17, 2015.
2. Vendor trip generation provided by the Project Sponsor on January 25, 2016.
3. Hauling truck trips include demolition of existing structures and 1.94 million cubic yards of offhaul.

Table CON-4
Worker Carpool Rate, Construction
Town Center/Community Park
Cupertino, California

Calculation of Carpool Rate for Worker Trips

Total Santa Clara County workers 16 years and over	1,055,334
Santa Clara County workers 16 years and over who get to work by car, truck, or van -- carpooled	115,326

Fraction of Santa Clara County workers in the Construction Industry	6.0%
Of all Santa Clara County workers who carpool, this fraction works in the Construction Industry	9.6%

Count of Santa Clara County workers in the Construction Industry	63,320
Count of Santa Clara County workers in the Construction Industry who carpool who work	11,071

Carpool rate in the Construction Industry	17.5%
Assumed workers per vehicle	2

References

US Census Bureau. 2013. American Community Survey, Table S0804, Means of Transportation to Work by Selected Characteristics for Workplace Geography. Available online at http://factfinder2.census.gov/faces/nav/jsf/pages/searchresults.xhtml?refresh=t and http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_14_1YR_S0804&prodType=table.

Table CON-5
Trip Lengths, Construction
Town Center/Community Park
Cupertino, California

Trip Type	Average Trip Length (miles)[1]
Worker	12.4
Vendor	7.3
Hauling	20

Notes:

1. Average trip lengths for workers, vendors and hauling are consistent with CalEEMod Appendix D.

Table CON-6
On-Road Vehicle Fleet Mix, Construction
Town Center/Community Park
Cupertino, California

Trip Type	Vehicle Classes, EMFAC2007 Categories
Worker	50% LDA, 25% LDT1, and 25% LDT2, consistent with CalEEMod
Vendor	T6 (MHDT) and T7 (HHDT), consistent with CalEEMod
Hauling	T7 (HHDT), consistent with CalEEMod

Notes:
1. Fleet mixes are all consistent with CalEEMod Appendix A.

Table CON-7
Phase 1 Off-Road Equipment List, Construction
Town Center/Community Park
Cupertino, California

Sub-Phase	Sub-Phase Name	Project Equipment at Site	Horsepower	Equipment Quantity	Usage Hours per Weekday	Usage Hours per Saturday	Usage Hours per Sunday	Equipment Start Date	Equipment End Date
1.1	Demolition	Concrete/Industrial Saws	81	1	10	8	0	1/1/2017	2/5/2017
1.1	Demolition	Excavators	162	3	10	8	0	1/1/2017	2/5/2017
1.1	Demolition	Rubber Tired Dozers	255	2	10	8	0	1/1/2017	2/5/2017
1.1	Demolition	Water Trucks	400	1	10	8	0	1/1/2017	2/5/2017
1.2	Site Preparation	Rubber Tired Dozers	255	3	10	8	0	2/6/2017	2/26/2017
1.2	Site Preparation	Tractors/Loaders/Backhoes	97	4	10	8	0	2/6/2017	2/26/2017
1.2	Site Preparation	Water Trucks	400	1	10	8	0	2/6/2017	2/26/2017
1.3	Grading	Excavators	162	3	10	8	0	2/27/2017	5/21/2017
1.3	Grading	Graders	174	1	10	8	0	2/27/2017	5/21/2017
1.3	Grading	Rubber Tired Dozers	255	1	10	8	0	2/27/2017	5/21/2017
1.3	Grading	Scrapers	361	2	10	8	0	2/27/2017	5/21/2017
1.3	Grading	Tractors/Loaders/Backhoes	97	3	10	8	0	2/27/2017	5/21/2017
1.3	Grading	Water Trucks	400	1	10	8	0	2/27/2017	5/21/2017
1.4	Building Construction	Cranes	226	1	10	8	0	5/22/2017	10/15/2018
1.4	Building Construction	Forklifts	89	3	10	8	0	5/22/2017	10/15/2018
1.4	Building Construction	Generator Sets	84	1	10	8	0	5/22/2017	10/15/2018
1.4	Building Construction	Tractors/Loaders/Backhoes	97	3	10	8	0	5/22/2017	10/15/2018
1.4	Building Construction	Welders	46	1	10	8	0	5/22/2017	10/15/2018
1.5	Paving	Pavers	125	2	10	8	0	10/16/2018	11/22/2018
1.5	Paving	Paving Equipment	130	2	10	8	0	10/16/2018	11/22/2018
1.5	Paving	Rollers	80	2	10	8	0	10/16/2018	11/22/2018
1.6	Architectural Coating	Air Compressors	78	1	10	8	4	11/23/2018	12/30/2018

Table CON-8
Phase 2 Off-Road Equipment List, Construction
Town Center/Community Park
Cupertino, California

Sub-Phase	Sub-Phase Name	Project Equipment at Site	Horsepower	Equipment Quantity	Usage Hours per Weekday	Usage Hours per Saturday	Usage Hours per Sunday	Equipment Start Date	Equipment End Date
2.1	Demolition	Concrete/Industrial Saws	81	1	10	8	0	5/1/2018	7/1/2018
2.1	Demolition	Excavators	162	3	10	8	0	5/1/2018	7/1/2018
2.1	Demolition	Rubber Tired Dozers	255	2	10	8	0	5/1/2018	7/1/2018
2.1	Demolition	Water Trucks	400	1	10	8	0	5/1/2018	7/1/2018
2.2	Site Preparation	Rubber Tired Dozers	255	3	10	8	0	7/2/2018	8/6/2018
2.2	Site Preparation	Tractors/Loaders/Backhoes	97	4	10	8	0	7/2/2018	8/6/2018
2.2	Site Preparation	Water Trucks	400	1	10	8	0	7/2/2018	8/6/2018
2.3	Grading	Excavators	162	3	10	8	0	8/7/2018	1/20/2019
2.3	Grading	Graders	174	1	10	8	0	8/7/2018	1/20/2019
2.3	Grading	Rubber Tired Dozers	255	1	10	8	0	8/7/2018	1/20/2019
2.3	Grading	Scrapers	361	2	10	8	0	8/7/2018	1/20/2019
2.3	Grading	Tractors/Loaders/Backhoes	97	3	10	8	0	8/7/2018	1/20/2019
2.3	Grading	Water Trucks	400	1	10	8	0	8/7/2018	1/20/2019
2.4	Building Construction	Cranes	226	1	10	8	0	1/21/2019	8/21/2021
2.4	Building Construction	Forklifts	89	3	10	8	0	1/21/2019	8/21/2021
2.4	Building Construction	Generator Sets	84	1	10	8	0	1/21/2019	8/21/2021
2.4	Building Construction	Tractors/Loaders/Backhoes	97	3	10	8	0	1/21/2019	8/21/2021
2.4	Building Construction	Welders	46	1	10	8	0	1/21/2019	8/21/2021
2.5	Paving	Pavers	125	2	10	8	0	8/22/2021	10/26/2021
2.5	Paving	Paving Equipment	130	2	10	8	0	8/22/2021	10/26/2021
2.5	Paving	Rollers	80	2	10	8	0	8/22/2021	10/26/2021
2.6	Architectural Coating	Air Compressors	78	1	10	8	4	10/27/2021	12/31/2021

Table CON-9
Architectural Coating Emissions, Construction Phase 1
Town Center/Community Park
Cupertino, California

Venue	Floor Area (square feet)	Building Surface Area[1] (square feet)	Application Rate	Indoor Paint VOC EF[2] (g/L)	Outdoor Paint VOC EF[2] (g/L)	Architectural Coating VOC emissions[3] (lb/year)
Office	1,881,600	3,763,200	100%	100	150	19,626
Retail	381,467	762,934	100%	100	150	3,979
Residential	0	0	100%	100	150	0
Parking Below Grade	1,503,527	90,212	100%	100	150	470
Parking Above Grade	576,628	34,598	100%	100	150	180

Notes:
1. Consistent with CalEEMod, residential building surface area is assumed to be 2.7 times the floor area, and non-residential 2 times the floor area. Also consistent with CalEEMod, the parking painted area is assumed to be 6% of the total surface area.

2. Based on BAAQMD paint VOC regulations, 100 g/L for flat paints, generally used indoors, and 150 g/L for all other architectural coatings. Building area is assumed to be 75% indoors and 25% outdoors, consistent with CalEEMod.
3. Uses CalEEMod assumption that 1 gallon of paint covers 180 square feet.

Table CON-10
Architectural Coating Emissions, Construction Phase 2
Town Center/Community Park
Cupertino, California

Venue	Floor Area (square feet)	Building Surface Area[1] (square feet)	Application Rate	Indoor Paint VOC EF[2] (g/L)	Outdoor Paint VOC EF[2] (g/L)	Architectural Coating VOC emissions[3] (lb/year)
Office	215,370	430,740	100%	100	150	2,246
Retail	309,385	618,770	100%	100	150	3,227
Residential	961,622	2,596,379	100%	100	150	13,541
Parking Below Grade	1,025,579	61,535	100%	100	150	321
Parking Above Grade	427,596	25,656	100%	100	150	134

Notes:

1. Consistent with CalEEMod, residential building surface area is assumed to be 2.7 times the floor area, and non-residential 2 times the floor area. Also consistent with CalEEMod, the parking painted area is assumed to be 6% of the total surface area.

2. Based on BAAQMD paint VOC regulations, 100 g/L for flat paints, generally used indoors, and 150 g/L for all other architectural coatings. Building area is assumed to be 75% indoors and 25% outdoors, consistent with CalEEMod.
3. Uses CalEEMod assumption that 1 gallon of paint covers 180 square feet.

Table CON-11
Asphalt Paving Off-Gassing Emissions, Construction
Town Center/Community Park
Cupertino, California

Asphalt Paving ROG Emissions - Phase 1

Venue	Floor Area (square feet)	Asphalt-Paved Area[1] (acre)	Asphalt Paving Off-Gassing Emission Factor[2] (lb/acre)	Asphalt Paving Off-Gassing Emissions (lb/year)
Parking Below Grade	1,503,527	0	2.62	0
Parking Above Grade	576,628	13.2	2.62	35

Asphalt Paving ROG Emissions - Phase 2

Venue	Floor Area (square feet)	Asphalt-Paved Area[1] (acre)	Asphalt Paving Off-Gassing Emission Factor[2] (lb/acre)	Asphalt Paving Off-Gassing Emissions (lb/year)
Parking Below Grade	1,025,579	0	2.62	0
Parking Above Grade	427,596	9.8	2.62	26

Notes:

1. Below-grade parking is assumed to have no asphalt paving. Above-grade parking square footage is based on information provided by the Project Sponsor.
2. Emission factor is from South Coast Air Quality Management District study as reported in the CalEEMod User's Guide, Appendix A.

Table CON-12
GHG Emissions Sequestration from Vegetation
Town Center/Community Park
Cupertino, California

Number of Net New Trees[1]	Units	Broad Species Class	Annual CO_2 accumulation per tree ($MT\ CO_2$/tree/year)[2]	Project GHG Sequestration ($MT\ CO_2e$)
1,282	Trees	Miscellaneous	-0.0354	-908
Number of Net New Acres[1]	**Units**	**Vegetation Land Use Subtype**	**Annual CO_2 accumulation per acre ($MT\ CO_2$/acre/year)[2]**	**Project GHG Sequestration ($MT\ CO_2e$)**
5.26	Acres	Grassland	-4.31	-453
0.14	Acres	Grassland	-4.31	-12
			Total, Trees and Acres Covered	-1,373

Notes:
1. Number of net new trees from Project Description.
2. From CalEEMod User's Guide Appendix A.
3. All vegetation types are assumed to have a growing period of 20 years.

Table CON-13
2017 to 2021 Weighted Mobile Emission Factors
Town Center/Community Park
Cupertino, California

Calendar Year	Units	Total						Gas						Diesel					
		Pollutant						Pollutant						Pollutant					
		ROG	TOG	NOx	PM_{10}	$PM_{2.5}$	CO_2	ROG	TOG	NOx	PM_{10}	$PM_{2.5}$	CO_2	ROG	TOG	NOx	PM_{10}	$PM_{2.5}$	CO_2
Worker Emission Factors																			
2017	[g/mile]	0.03	0.04	0.13	0.047	0.020	335	0.03	0.04	0.13	0.046	0.019	333	1.7E-04	1.9E-04	0.0011	3.3E-04	1.9E-04	1.41
2017	[g/trip]	1.13	1.15	0.21	0.0028	0.0026	76	1.13	1.15	0.21	0.0028	0.0026	76	0	0	0	0	0	0
2018	[g/mile]	0.02	0.03	0.11	0.047	0.020	326	0.02	0.03	0.11	0.046	0.019	325	1.5E-04	1.7E-04	0.0009	3.1E-04	1.8E-04	1.37
2018	[g/trip]	1.02	1.04	0.18	0.0027	0.0024	74	1.02	1.04	0.18	0.0027	0.0024	74	0	0	0	0	0	0
2019	[g/mile]	0.02	0.03	0.10	0.047	0.020	317	0.02	0.03	0.10	0.046	0.019	316	1.4E-04	1.6E-04	0.0008	3.0E-04	1.7E-04	1.33
2019	[g/trip]	0.93	0.95	0.16	0.0026	0.0024	73	0.93	0.95	0.16	0.0026	0.0024	73	0	0	0	0	0	0
2020	[g/mile]	0.02	0.02	0.09	0.047	0.020	308	0.02	0.02	0.09	0.046	0.019	307	1.3E-04	1.5E-04	7.0E-04	3.0E-04	1.6E-04	1.30
2020	[g/trip]	0.85	0.87	0.14	0.0025	0.0023	71	0.85	0.87	0.14	0.0025	0.0023	71	0	0	0	0	0	0
2021	[g/mile]	0.02	0.02	0.08	0.047	0.019	299	0.02	0.02	0.08	0.046	0.019	298	1.2E-04	1.3E-04	6.0E-04	2.9E-04	1.5E-04	1.26
2021	[g/trip]	0.79	0.80	0.12	0.0025	0.0023	69	0.79	0.80	0.12	0.0025	0.0023	69	0	0	0	0	0	0
Vendor Emission Factors																			
2017	[g/mile]	0.24	0.30	4.9	0.20	0.12	1,476	0.017	0.025	0.095	9.8E-03	4.1E-03	93.7	2.2E-01	2.7E-01	4.7993	1.9E-01	1.2E-01	1,382
2017	[g/trip]	0.16	0.17	0.20	2.2E-04	2.1E-04	10.4	0.156	0.166	0.198	2.2E-04	2.1E-04	10.4	0	0	0	0	0	0
2018	[g/mile]	0.20	0.26	4.4	0.18	0.11	1,464	0.014	0.020	0.080	9.8E-03	4.1E-03	92.9	1.9E-01	2.4E-01	4.3240	1.7E-01	1.0E-01	1,371
2018	[g/trip]	0.14	0.15	0.18	1.8E-04	1.6E-04	10.1	0.137	0.146	0.183	1.8E-04	1.6E-04	10.1	0	0	0	0	0	0
2019	[g/mile]	0.18	0.23	4.0	0.17	0.10	1,451	0.011	0.017	0.068	9.8E-03	4.1E-03	92.2	1.7E-01	2.2E-01	3.9485	1.6E-01	9.3E-02	1,359
2019	[g/trip]	0.12	0.13	0.17	1.5E-04	1.4E-04	9.9	0.122	0.130	0.168	1.5E-04	1.4E-04	9.9	0	0	0	0	0	0
2020	[g/mile]	0.14	0.18	3.4	0.15	0.08	1,438	0.009	0.014	0.059	9.8E-03	4.1E-03	91.6	1.3E-01	1.7E-01	3.3E+00	1.4E-01	7.4E-02	1,346
2020	[g/trip]	0.11	0.12	0.15	1.3E-04	1.2E-04	9.8	0.110	0.118	0.155	1.3E-04	1.2E-04	9.8	0	0	0	0	0	0
2021	[g/mile]	0.10	0.14	2.8	0.13	0.059	1,425	0.008	0.011	0.051	9.8E-03	4.1E-03	91.0	9.3E-02	1.3E-01	2.8E+00	1.2E-01	5.5E-02	1,334
2021	[g/trip]	0.10	0.11	0.14	1.2E-04	1.1E-04	9.7	0.100	0.107	0.142	1.2E-04	1.1E-04	9.7	0	0	0	0	0	0
Hauling Emission Factors																			
2017	[g/mile]	0.20	0.27	5.8	0.14	0.08	1,728	0.009	0.012	0.046	9.5E-04	3.7E-04	20.7	1.9E-01	2.6E-01	5.7276	1.4E-01	7.5E-02	1,708
2017	[g/trip]	0.041	0.044	0.055	5.6E-05	5.3E-05	2.0	0.041	0.044	0.055	5.6E-05	5.3E-05	2.0	0	0	0	0	0	0
2018	[g/mile]	0.17	0.24	5.2	0.12	0.06	1,707	0.007	0.011	0.043	9.5E-04	3.7E-04	20.4	1.6E-01	2.3E-01	5.1504	1.2E-01	6.1E-02	1,687
2018	[g/trip]	0.033	0.036	0.053	3.7E-05	3.4E-05	1.82	0.033	0.036	0.053	3.7E-05	3.4E-05	1.8	0	0	0	0	0	0
2019	[g/mile]	0.16	0.23	4.9	0.12	0.06	1,687	0.006	0.009	0.040	9.5E-04	3.7E-04	20.1	1.5E-01	2.2E-01	4.8335	1.2E-01	5.9E-02	1,667
2019	[g/trip]	0.026	0.028	0.050	2.1E-05	1.9E-05	1.67	0.026	0.028	0.050	2.1E-05	1.9E-05	1.7	0	0	0	0	0	0
2020	[g/mile]	0.15	0.22	4.5	0.12	0.05	1,665	0.005	0.008	0.038	9.5E-04	3.7E-04	19.9	1.4E-01	2.1E-01	4.4E+00	1.2E-01	5.4E-02	1,646
2020	[g/trip]	0.023	0.024	0.048	1.6E-05	1.5E-05	1.62	0.023	0.024	0.048	1.6E-05	1.5E-05	1.6	0	0	0	0	0	0
2021	[g/mile]	0.14	0.21	4.0	0.11	0.05	1,644	0.005	0.007	0.036	9.5E-04	3.7E-04	19.7	1.3E-01	2.0E-01	4.0E+00	1.1E-01	5.2E-02	1,624
2021	[g/trip]	0.020	0.022	0.045	1.4E-05	1.3E-05	1.59	0.020	0.022	0.045	1.4E-05	1.3E-05	1.6	0	0	0	0	0	0

Notes:

1. Emission factors taken from EMFAC 2014. Any g/trip emission factors were calculated by converting the g/vehicle/day emission factor in EMFAC using the following equation:
   g/trip = (g/vehicle/day) * (vehicle population/vehicle trip count)

Table CON-14
Construction Traffic Fleet Mix
Town Center/Community Park
Cupertino, California

EMFAC Fleet Scenarios 2017					
Vehicle Type	Total Vehicles	Percentage of Fleet Mix	% by Fuel Type		
			Gas	DSL	ELEC
Worker					
LDA	768,115	50%	49.2%	0.41%	0.34%
LDT1	59,698	25%	24.95%	0.030%	0.023%
LDT2	248,743	25%	24.96%	0.035%	0.000%
Vendor					
T6	11,063	50%	6.5%	43.5%	0.0%
T7	6,630	50%	0.6%	49.4%	0.0%
Hauling					
T7	6,630	100%	1.1%	98.9%	0.0%

Operational Emissions Supporting Tables

Table OP-1
Land Use Summary
Town Center/Community Park
Cupertino, California

Land Use[1]	Size	Units
Existing Conditions		
Retail	1,200,000	sf
Project Conditions		
Office	2,000,000	sf
Retail	640,000	sf
Apartments	760	Units
Senior Adult Housing	40	Units
Health/Fitness Club	40,000	sf
Banquet Hall (Pav 4)	15,000	sf
High School Innovation Center	100	Students
Civic Meeting Space (Pav 6)	4,000	sf
Transit Center	5,000	sf
Office Amenity (Pav 5 - Office Event Center)	20,000	sf
Office Amenity (Pav 7 - Caf/Fitness)	20,000	sf
Office Amenity (Skybridges, Lobbies)	135,000	sf
Loading, Facilities + Security Areas	75,000	sf
Testing + Workshop Area	175,000	sf
Central Plant	45,000	sf
Parking Below Grade	2,529,106	sf
Parking Above Grade	1,004,224	sf
Park	30	acres
Specific Plan		
Hotel	191	rooms

Notes:

1. Land uses taken from draft Traffic Impact Analysis.

Table OP-2
Trip Generation, Existing and Project
Town Center/Community Park
Cupertino, California

Trip Generation	Size	Units	Provided in TIA		Estimated by Ramboll Environ[1]
			Weekday	Saturday	Sunday
Existing Conditions					
Historical Use: 82.83%					
Retail	1,200,000	sf	30,216	39,264	19,750
Project Conditions					
Office	2,000,000	sf	24,700	4,920	2,100
Retail	640,000	sf	22,698	29,754	14,218
Apartments	760	Units	4,730	5,710	4,778
Senior Adult Housing	40	Units	138	104	114
Banquet Hall (Pav 4)	15,000	sf		150	150
High School Innovation Center	100	Students	171	61	25
Civic Meeting Space	4,000	sf	50	10	10
Office Amenity (Pav 5 - Office Event Center)	20,000	sf	248	49	21
Office Amenity (Pav 7 - Caf/Fitness)	20,000	sf	248	49	21
Office Amenity (Skybridges, Lobbies)	135,000	sf	1,668	332	142
Loading, Facilities + Security Areas	75,000	sf	928	185	79
Testing + Workshop Area	175,000	sf	1,206	312	119
Park	10	acres	200	228	228
Town Center/Community Park Total Project Trips			**56,985**	**41,864**	**22,005**
Hotel	191	rooms	1,562	1,564	1,136
Total Gross Project Trips			**58,547**	**43,428**	**23,141**
MXD Non-Office Trip Reduction, Daily Average			**21%**	**17%**	**0%**
MXD Office Trip Reduction, Daily Average			**21%**	**17%**	**0%**
Net External Project Trips			**46,378**	**36,077**	**23,141**

Notes:

1. Sunday trip rates estimated using methods consistent with the draft TIA, specifically using the ITE Trip Generation Manual, 9th Ed. Weekend trip generation rates for land uses using the Silicon Valley single-tenant survey data are based on the ratio of average weekend to weekday trips in the ITE Trip Generation Manual.

Cases:

1. If the ITE average rate is used, fill in with the Sunday rates from the ITE.
2. If the ITE fitted rate is used, fill in the Sunday rates using the fit equation from the ITE.
3. If the SV average rate is used, scale Sunday based on the ITE average rates.

Table OP-3
Trip Lengths
Town Center/Community Park
Cupertino, California

TIA Land Use[1]	CalEEMod Trip Types[2]	Average Primary Trip Length (miles)	Average Overall Trip Length (miles)
Office	General Office Building	8.0	6.6
Retail	Regional Shopping Center	7.7	4.8
Apartments	Apartments Mid Rise	6.9	6.1
Senior Adult Housing	Apartments Mid Rise	6.9	6.1
Health/Fitness Club	Health Club	7.7	4.7
Banquet Hall (Pav 4)	Government (Civic Center)	9.0	5
High School Innovation Center	High School	9.0	7.2
Civic Meeting Space	Government (Civic Center)	9.0	5.3
Transit Center	General Office Building	8.0	7
Office Amenity (Pav 5 - Office Event Center)	General Office Building	8.0	6.6
Office Amenity (Pav 7 - Caf/Fitness)	General Office Building	8.0	6.6
Office Amenity (Skybridges, Lobbies)	General Office Building	8.0	6.6
Loading, Facilities + Security Areas	General Office Building	8.0	6.6
Testing + Workshop Area	General Office Building	8.0	6.6
Park	City Park	8.0	5.9
Hotel	Hotel	7.7	5.2

Notes:

1. Land uses taken from draft TIA.

2. Ramboll Environ selected a CalEEMod land use type to match the TIA landuses. Trip length and trip type data was then gathered from CalEEMod for each land use.

Table OP-4
Architectural Coating Emissions, Project Operational
Town Center/Community Park
Cupertino, California

Venue	Floor Area (square feet)	Building Surface Area[1] (square feet)	Application Rate[2]	Indoor Paint VOC EF[3] (g/L)	Outdoor Paint VOC EF[3] (g/L)	Architectural Coating VOC emissions[4] (lb/year)
Office	2,000,000	4,000,000	10%	100	150	2,086
Retail	640,000	1,280,000	10%	100	150	668
Residential	961,622	2,596,379	10%	100	150	1,354
Health/Fitness Club	40,000	80,000	10%	100	150	42
Banquet Hall (Pav 4)	15,000	30,000	10%	100	150	16
High School Innovation	10,000	20,000	10%	100	150	10
Civic Meeting Space (Pav 6)	4,000	8,000	10%	100	150	4
Transit Center	5,000	10,000	10%	100	150	5
Office Amenity (Pav 5 - Office Event Center)	20,000	40,000	10%	100	150	21
Office Amenity (Pav 7 - Caf/Fitness)	20,000	40,000	10%	100	150	21
Office Amenity (Skybridges, Lobbies)	135,000	270,000	10%	100	150	141
Loading, Facilities + Security Areas	75,000	150,000	10%	100	150	78
Testing + Workshop Area	175,000	350,000	10%	100	150	183
Central Plant	45,000	90,000	10%	100	150	47
Parking Below Grade	2,529,106	151,746	10%	100	150	79
Parking Above Grade	1,004,224	60,253	10%	100	150	31
Hotel[5]	277,332	554,664	10%	100	150	289

Notes:

1. Consistent with CalEEMod, residential building surface area is assumed to be 2.7 times the floor area, and non-residential 2 times the floor area. Also consistent with CalEEMod, the parking painted area is assumed to be 6% of the total surface area.

2. Consistent with CalEEMod, 10% of all surfaces are assumed to be coated each year.

3. Based on BAAQMD paint VOC regulations, 100 g/L for flat paints, generally used indoors, and 150 g/L for all other architectural coatings. Building area is assumed to be 75% indoors and 25% outdoors, consistent with CalEEMod.

4. Uses CalEEMod assumption that 1 gallon of paint covers 180 square feet.

5. Hotel square footage is based on an assumption of 500 square feet per room.

Table OP-5
Architectural Coating Emissions, Baseline Operational
Town Center/Community Park
Cupertino, California

Venue	Floor Area (square feet)	Building Surface Area[1] (square feet)	Application Rate[2]	Indoor Paint VOC EF[3] (g/L)	Outdoor Paint VOC EF[3] (g/L)	Architectural Coating VOC emissions[4] (lb/year)
Retail	1,200,000	2,400,000	10%	100	150	1,252

Notes:

1. Consistent with CalEEMod, non-residential building surface area is assumed to be 2 times the floor area.

2. Consistent with CalEEMod, 10% of all surfaces are assumed to be coated each year.

3. Based on BAAQMD paint VOC regulations, 100 g/L for flat paints, generally used indoors, and 150 g/L for all other architectural coatings. Building area is assumed to be 75% indoors and 25% outdoors, consistent with CalEEMod.

4. Uses CalEEMod assumption that 1 gallon of paint covers 180 square feet.

Table OP-6
Consumer Product Emissions, Operation
Town Center/Community Park
Cupertino, California

Consumer Product ROG Emissions - Baseline Operational

Venue	Floor Area (square feet)	Consumer Products VOC EF[1] (lb/sq ft/day)	Days per Year	Consumer Products VOC emissions (lb/year)
Retail	1,200,000	2.14E-05	365	9,373

Consumer Product ROG Emissions - Project Operational

Venue	Floor Area (square feet)	Consumer Products VOC EF[1] (lb/sq ft/day)	Days per Year	Consumer Products VOC emissions (lb/year)
Office	2,000,000	2.14E-05	365	15,622
Retail	640,000	2.14E-05	365	4,999
Residential	961,622	2.14E-05	365	7,511
Health/Fitness Club	40,000	2.14E-05	365	312
Banquet Hall (Pav 4)	15,000	2.14E-05	365	117
High School Innovation Center	10,000	2.14E-05	365	78
Civic Meeting Space (Pav 6)	4,000	2.14E-05	365	31
Transit Center	5,000	2.14E-05	365	39
Office Amenity (Pav 5 - Office Event Center)	20,000	2.14E-05	365	156
Office Amenity (Pav 7 - Caf/Fitness)	20,000	2.14E-05	365	156
Office Amenity (Skybridges, Lobbies)	135,000	2.14E-05	365	1,054
Loading, Facilities + Security Areas	75,000	2.14E-05	365	586
Testing + Workshop Area	175,000	2.14E-05	365	1,367
Central Plant	45,000	2.14E-05	365	351
Hotel[2]	277,332	2.14E-05	365	2,166

Notes:

1. From CalEEMod User's Guide, Appendix A.
2. Hotel square footage is based on an assumption of 500 square feet per room.

Table OP-7
Hearth Emissions, Project Operational
Town Center/Community Park
Cupertino, California

Wood Stoves
The BAAQMD does not allow wood stoves in new building construction after November 1, 2016 (Rule 6-3-306).

Fireplace Population Inputs in CalEEMod

	Wood Hearth %	Natural Gas %	Propane %	Wood Mass Fireplace (lb/year)
CalEEMod Default[1]	14	55.0	0	92
Adjusted so no wood stoves[2]	0	69.0	0	0

Notes:

1. From Table 5.1 of CalEEMod User's Guide Appendix D.

2. Adjusted because per BAAQMD Rule 6-3-306 after November 1, 2016, no new building construction can include wood-burning devices. Wood hearths are assumed to be natural gas hearths.

Fireplace Operation Inputs in CalEEMod[1]

Hours/day Fireplace	Day/year Fireplace	MMBTU/hr-fireplace
3.5	4.3	0.06

Notes:

1. From Table 5.1 of CalEEMod User's Guide Appendix D.

Table D5.2 Hearth Emission Factors from CalEEMod User's Guide Appendix D, filtered for relevant hearth types

	Emission Factor by Pollutant[2] (lb/MMBTU)								
Hearth Type	**TOG**	**ROG**	**CO**	**NOX**	**PM10**	**PM2_5**	**CO2_NBIO**	**CH4**	**N2O**
Natural Gas[2]	1.08E-02	1.08E-02	3.92E-02	9.22E-02	7.45E-03	7.37E-03	117.6470588	0.002255	0.002157
Propane	1.09E-02	1.09E-02	8.20E-02	1.42E-01	7.65E-03	7.65E-03	136.6120219	0.002186	0.009836
No Fireplace	0	0	0	0	0	0	0	0	0

Notes:

1. From Table 5.2 of CalEEMod User's Guide Appendix D.

2. Natural gas emission factors for CO, SO2, and NOx have been corrected based on AP-42 Chapter 1.4 for residential furnaces.

Project Data

Project Dwelling Units	Count of Wood Hearths	Count of Natural Gas Hearths	Count of Propane Hearths
800	0	552	0

Project Emissions

	Project Emissions by Hearth Type (lb/year)								
Hearth Type	**TOG**	**ROG**	**CO**	**NOX**	**PM10**	**PM2_5**	**CO2_NBIO**	**CH4**	**N2O**
Natural Gas	5.36	5.36	19.48	45.78	3.70	3.66	58447.06	1.12	1.07
Propane	0	0	0	0	0	0	0	0	0
No Fireplace	0	0	0	0	0	0	0	0	0

CO_2e emissions: 26.7

References:

California Emissions Estimator Model (CalEEMod). Available online at http://www.caleemod.com/
Intergovernmental Panel on Climate Change (IPCC). 1995. Second Assessment Report.
Available at http://www.ipcc.ch/ipccreports/sar/wg_I/ipcc_sar_wg_I_full_report.pdf

Table OP-8
Energy Use Emission Factors for Criteria Air Pollutants[1]
Town Center/Community Park
Cupertino, California

Land Use Type	ROG (lb/MMBTU)	NOx (lb/MMBTU)	PM_{10} (lb/MMBTU)	$PM_{2.5}$ (lb/MMBTU)
Residential	1.08E-02	9.22E-02	7.45E-03	7.45E-03
Nonresidential	1.08E-02	9.80E-02	7.45E-03	7.45E-03

Notes:
1. Emission factors from Table 8.2 of Appendix D of the CalEEMod User's Guide.

References:
California Emissions Estimator Model (CalEEMod). Available online at http://www.caleemod.com/

Table OP-9
Energy Use Emission Factors for Greenhouse Gases
Town Center/Community Park
Cupertino, California

Greenhouse Gas

Greenhouse Gas	CO_2	CH_4	N_2O	CO_2e	Units
Global Warming Potential[1]	1	21	310	-	-
2015 Electricity Use Emission Factor[2]	391	0.029	0.00617	393.5	lb/MWh
	1.8E-01	1.3E-05	2.8E-06	0.18	MT/MWh
2022 Electricity Use Emission Factor[2]	290	0.029	0.00617	293	lb/MWh
	1.3E-01	1.3E-05	2.8E-06	0.13	MT/MWh
Natural Gas Use Emission Factor[3]	117.6471	0.0023	0.0022	118	lb/MMBTU
	5.3E-03	1.0E-07	9.8E-08	0.0054	MT/therm

Note:

1. Global Warming Potentials from IPCC 1995 consistent with CalEEMod version 2013.2.2.
2. Electricity Use CO_2 emission factor from PG&E 2013. The 2020 PG&E emission factor is used for operating year 2022. CH_4 and N_2O emission factors from CalEEMod.
3. Natural Gas Use emission factors from Table 8.2 of CalEEMod User's Guide Appendix D.

References:

California Emissions Estimator Model (CalEEMod). Available online at http://www.caleemod.com/
Intergovernmental Panel on Climate Change (IPCC). 1995. Second Assessment Report.
Available at http://www.ipcc.ch/ipccreports/sar/wg_I/ipcc_sar_wg_I_full_report.pdf
Pacific Gas and Electric Company (PG&E). 2013. Greenhouse Gas Emission Factors: Guidance for PG&E Customers.
Available online at
http://www.pge.com/includes/docs/pdfs/shared/environment/calculator/pge_ghg_emission_factor_info_sheet.pdf

Table OP-10
Energy Use Rates for Basline and Project Operations
Town Center/Community Park
Cupertino, California

Historical (pre-Title 24) Energy Use Rates[1]

Venue	CalEEMod Venue Subtype	Title-24 Electricity (KWhr/size/yr)	Non Title-24 Electricity (KWhr/size/yr)	Lighting Energy Intensity (KWhr/size/yr)	Title-24 Natural Gas (KBTU/size/yr)	Non-Title-24 Natural Gas (KBTU/size/yr)
Retail	Regional Shopping Center	3.6	2.7	6.0	2.9	0

Notes:
1. From Table 8.1 of CalEEMod User's Guide Appendix D.

2008 Title 24 Energy Use Rates[2]

Venue	CalEEMod Venue Subtype	Size Metric	Title-24 Electricity (KWhr/size/yr)	Non Title-24 Electricity (KWhr/size/yr)	Lighting Energy Intensity (KWhr/size/yr)	Title-24 Natural Gas (KBTU/size/yr)	Non-Title-24 Natural Gas (KBTU/size/yr)
Office	General Office Building	SF	7.5	7.8	4.4	0	0.060
Retail	Regional Shopping Center	SF	3.4	2.7	5.6	0	0
Apartments	Apartments Mid Rise	DU	227	2,559	741	0	1,736
Senior Adult Housing	Apartments Mid Rise	DU	227	2,559	741	0	1,736
Health/Fitness Club	Health Club	SF	1.8	3.7	3.5	0	6.7
Banquet Hall (Pav 4)	Government (Civic Center)	SF	7.5	7.8	4.4	17.2	0.060
High School Innovation Center	High School	SF	1.9	1.3	2.8	0	0.93
Civic Meeting Space (Pav 6)	Government (Civic Center)	SF	7.5	7.8	4.4	0	0.060
Transit Center	General Office Building	SF	7.5	7.8	4.4	0	0.060
Office Amenity (Pav 5 - Office Event Center)	General Office Building	SF	7.5	7.8	4.4	0	0.060
Office Amenity (Pav 7 - Caf/Fitness)	General Office Building	SF	7.5	7.8	4.4	0	0.060
Office Amenity (Skybridges, Lobbies)	General Office Building	SF	7.5	7.8	4.4	0	0.060
Loading, Facilities + Security Areas	General Office Building	SF	7.5	7.8	4.4	0	0.060
Testing + Workshop Area	Research & Development	SF	1.8	3.7	3.5	0	6.7
Parking Below Grade	Enclosed Parking with Elevator	SF	3.9	0.19	2.6	0	0
Parking Above Grade	Enclosed Parking with Elevator	SF	3.9	0.19	2.6	0	0
Park	Park	SF	0	0	0.88	0	0
Hotel	Hotel	SF	2.5	3.2	2.7	42	4.8

Notes:
2. From Table 8.1 of CalEEMod User's Guide Appendix D. Title 24-regulated natural gas use (space and water heating and cooling) set to zero since Central Plant will provide these services to the Town Center/Community Park.

2013 Title 24 Adjustment Factors[3]

Type	Electricity	Natural Gas
Multi-Family	23.3%	3.8%
Nonresidential	21.8%	16.8%

Notes:

3. From CEC 2013.

2013 Title 24 Energy Use Rates[4]

Venue	CalEEMod Venue Subtype	Size Metric	Title-24 Electricity (KWhr/size/yr)	Non Title-24 Electricity (KWhr/size/yr)	Lighting Energy Intensity (KWhr/size/yr)	Title-24 Natural Gas (KBTU/size/yr)	Non-Title-24 Natural Gas (KBTU/size/yr)
Office	General Office Building	SF	5.8	7.8	4.4	0	0.06
Retail	Regional Shopping Center	SF	2.6	2.7	5.6	0	0
Apartments	Apartments Mid Rise	DU	174	2,559	741	0	1,736
Senior Adult Housing	Apartments Mid Rise	DU	174	2,559	741	0	1,736
Health/Fitness Club	Health Club	SF	1.4	3.7	3.5	0	6.7
Banquet Hall (Pav 4)	Regional Shopping Center	SF	5.8	7.8	4.4	14.27712	0.1
High School Innovation Center	High School	SF	1.5	1.3	2.8	0	0.9
Civic Meeting Space (Pav 6)	Civic Meeting Space	SF	5.8	7.8	4.4	0	0.1
Transit Center	General Office Building	SF	5.8	7.8	4.4	0	0.06
Office Amenity (Pav 5 - Office Event Center)	General Office Building	SF	5.8	7.8	4.4	0	0.06
Office Amenity (Pav 7 - Caf/Fitness)	General Office Building	SF	5.8	7.8	4.4	0	0.06
Office Amenity (Skybridges, Lobbies)	General Office Building	SF	5.8	7.8	4.4	0	0.06
Loading, Facilities + Security Areas	General Office Building	SF	5.8	7.8	4.4	0	0.06
Testing + Workshop Area	Research & Development	SF	1.4	3.7	3.5	0	6.7
Parking Below Grade	Enclosed Parking with Elevator	SF	3.1	0.2	2.6	0	0.0
Parking Above Grade	Enclosed Parking with Elevator	SF	3.1	0.2	2.6	0	0.0
Park	Park	SF	0	0	0.9	0	0
Hotel	Hotel	SF	1.96	3.2	2.7	34.64	4.8

Notes:

4. Title 24 energy uses adjusted to reflect 2013 Title 24 building energy efficiency standards. Title 24-regulated natural gas use (space and water heating and cooling) set to zero since Central Plant will provide these services to the Town Center/Community Park.

References:

California Energy Commission. 2013. Impact Analysis. California's 2013 Building Energy Efficiency Standards.
Available online at http://www.energy.ca.gov/2013publications/CEC-400-2013-008/CEC-400-2013-008.pdf?_sm_au_=iVVRz3FV2dMBFjr2
California Emissions Estimator Model (CalEEMod). Available online at http://www.caleemod.com/

Table OP-11
Energy Usage for Baseline and Project Operations
Town Center/Community Park
Cupertino, California

Energy Usage - Baseline Operational

Venue	CalEEMod Venue Subtype	Size	Electricity Use Rate[1] (kWh/ sq ft-yr)	Annual Electricity Use (MWh/yr)	Natural Gas Use Rate[2] (kBTU/sq ft-yr)	Annual Natural Gas Use (therm/yr)
Retail	Baseline Retail	1200000 SF	12	14,700	2.9	35,040

Energy Usage - Project Operational

Venue	CalEEMod Venue Subtype	Size	Electricity Use Rate[1] (kWh/ unit-yr)	Annual Electricity Use (MWh/yr)	Natural Gas Use Rate[2] (kBTU/unit-yr)	Annual Natural Gas Use (therm/yr)
Office	General Office Building	2,000,000 SF	18	36,167	0.06	1,200
Retail	Regional Shopping Center	640,000 SF	11	7,011	0	0
Apartments	Apartments Mid Rise	760 DU	3,474	2,640	1735.98	13,193
Senior Adult Housing	Apartments Mid Rise	40 DU	3,474	139	1735.98	694
Health/Fitness Club	Health Club	40,000 SF	8.6	345	6.67	2,668
Banquet Hall (Pav 4)	Government (Civic Center)	15,000 SF	18	271	14	2,151
High School Innovation Center	High School	10,000 SF	5.6	56	0.93	93
Civic Meeting Space (Pav 6)	Government (Civic Center)	4,000 SF	18	72	0.06	2
Transit Center	General Office Building	5,000 SF	18	90	0.06	3
Office Amenity (Pav 5 - Office Event Center)	General Office Building	20,000 SF	18	362	0.06	12
Office Amenity (Pav 7 - Caf/Fitness)	General Office Building	20,000 SF	18	362	0.06	12
Office Amenity (Skybridges, Lobbies)	General Office Building	135,000 SF	18	2,441	0.06	81
Loading, Facilities + Security Areas	General Office Building	75,000 SF	18	1,356	0.06	45
Testing + Workshop Area	Research & Development	175,000 SF	8.6	1,511	6.67	11,673
Parking Below Grade	Enclosed Parking with Elevator	2,529,106 SF	5.9	14,882	0	0
Parking Above Grade	Enclosed Parking with Elevator	1,004,224 SF	5.9	5,909	0	0
Park	Park	1,306,800 SF	0.88	1145	0	0
Landscaping	Landscaping	-	-		-	-
	Project Subtotal	**-**	**-**	**74,761**	**-**	**31,827**
Hotel	Hotel	277,332 SF	7.9	2,190	39	109,230
	Specific Plan Total	**-**	**-**	**76,950**	**-**	**141,058**

Notes:

1. Electricity Use Rate is the sum of Title 24 and non-Title 24 electricity uses plus Lighting electricity use.

2. Natural Gas Use Rate is the non-Title 24 natural gas uses. Title 24-regulated natural gas use (space and water heating and cooling) set to zero since Central Plant will provide these services to the Town Center/Community Park.

Table OP-12
Energy Use Emissions, Project Operational
Town Center/Community Park
Cupertino, California

Venue	CalEEMod Venue Subtype	ROG (tons/year)	NOx (tons/year)	PM_{10} (tons/year)	$PM_{2.5}$ (tons/year)	CO_2e (MT CO_2e/yr)
Office	General Office Building	6.47E-04	5.88E-03	4.47E-04	4.47E-04	4,805
Retail	Regional Shopping Center	0	0	0	0	930
Apartments	Apartments Mid Rise	7.11E-03	6.08E-02	4.92E-03	4.92E-03	421
Senior Adult Housing	Apartments Mid Rise	3.74E-04	3.20E-03	2.59E-04	2.59E-04	22
Health/Fitness Club	Health Club	1.44E-03	1.31E-02	9.94E-04	9.94E-04	60
Banquet Hall (Pav 4)	Government (Civic Center)	1.2.E-03	1.1.E-02	8.0.E-04	8.0.E-04	48
High School Innovation Center	High School	5.01E-05	4.56E-04	3.46E-05	3.46E-05	8
Civic Meeting Space (Pav 6)	Government (Civic Center)	1.29E-06	1.18E-05	8.94E-07	8.94E-07	10
Transit Center	General Office Building	1.62E-06	1.47E-05	1.12E-06	1.12E-06	12
Office Amenity (Pav 5 - Office Event Cente	General Office Building	6.47E-06	5.88E-05	4.47E-06	4.47E-06	48
Office Amenity (Pav 7 - Caf/Fitness)	General Office Building	6.47E-06	5.88E-05	4.47E-06	4.47E-06	48
Office Amenity (Skybridges, Lobbies)	General Office Building	4.37E-05	3.97E-04	3.02E-05	3.02E-05	324
Loading, Facilities + Security Areas	General Office Building	2.43E-05	2.21E-04	1.68E-05	1.68E-05	180
Testing + Workshop Area	Research & Development	6.29E-03	5.72E-02	4.35E-03	4.35E-03	263
Parking Below Grade	Enclosed Parking with Elevator	0	0	0	0	1,975
Parking Above Grade	Enclosed Parking with Elevator	0	0	0	0	784
Park	Park	0	0	0	0	152
Landscaping[1]	Landscaping	-	-	-	-	
Electric Vehicle Charging[2]	-	-	-	-	-	106
	Project Subtotal	**0.02**	**0.2**	**0.01**	**0.01**	**10,196**
Hotel	Hotel	0.059	0.54	0.041	0.041	877
Electric Vehicle Charging[2]	-	-	-	-	-	3
	Specific Plan Total	**0.08**	**0.7**	**0.05**	**0.05**	**11,076**

Notes:

1. Landscaping equipment is 100% electric.

2. Electricity demand based on VMT and calculated average electric vehicle fuel economy for 2015 models (in kWh per mile) from the DOE Fuel Economy Guide.

References:

DOE. 2016. Fuel Economy Guide, Model Year 2015. Electric Vehicles. Available online at: http://www.fueleconomy.gov/feg/printGuides.shtml. Accessed January 2016.

Table OP-13
Energy Use Emissions, Baseline Operational
Town Center/Community Park
Cupertino, California

Land Use Type	ROG (tons/year)	NOx (tons/year)	PM_{10} (tons/year)	$PM_{2.5}$ (tons/year)	CO_2e (MT CO_2e/yr)
Regional Shopping Center	0.019	0.17	0.013	0.013	2,812
Electric Vehicle Charging[1]	-	-	-	-	10
Baseline Total	0.019	0.17	0.013	0.013	2,822

Notes:

1. Electricity demand based on VMT and calculated average electric vehicle fuel economy for 2015 models (in kWh per mile) from the DOE Fuel Economy Guide.

References:

DOE. 2016. Fuel Economy Guide, Model Year 2015. Electric Vehicles. Available online at: http://www.fueleconomy.gov/feg/printGuides.shtml. Accessed January 2016.

Table OP-14
Fugitive Road Dust Emissions, Project and Baseline Operation
Town Center/Community Park
Cupertino, California

Road Dust Equation[1]

E = k*(sL)^0.91 * (W)^1.02 * (1-P/4N)

Parameter	**Value**
E = annual average emission factor in the same units as k	[calculated]
k = particle size multiplier for particle size range and units of interest	
PM_{10} (lb/VMT)	0.0022
$PM_{2.5}$ (lb/VMT)	0.00054
sL = road surface silt loading (grams per square meter) (g/m^2)	0.1
W = average weight (tons) of all the vehicles traveling the road	2.4
P = number of "wet" days with at least 0.01 in of precipitation during averaging period	58
N number of days in the averaging period	365

Total 2015 VMT	52,767,257
Total Project 2022 VMT	83,216,687
Total Specific Plan 2022 VMT	85,510,941

Pollutant	**Fugitive PM_{10}**	**Fugitive $PM_{2.5}$**	**Units**
Emission Factor [lb/VMT]	6.35E-04	1.56E-04	lb/VMT
2015 Baseline Emissions	17	4.1	tons/year
Project Emissions	26	6.5	tons/year
Specific Plan Emissions	27	6.7	tons/year

Notes:

1. Road dust equation and parameters are based on CalEEMod defaults for Santa Clara County.

References:

USEPA. 1996. AP 42. Compilation of Air Pollutant Emission Factors, Volume 1. Fifth Edition. Chapter 13.2.1, Paved Roads. Available online at: http://www3.epa.gov/ttn/chief/ap42/ch13/final/c13s0201.pdf. . Accessed January 2016.

Abbreviations:

lb: pounds
PM: particulate matter
USEPA: United States Environmental Protection Agency
VMT: vehicle miles traveled

Table OP-15
Emergency Generator Emissions, Project Operations
Town Center/Community Park
Cupertino, California

Number of generators: 14
Number of diesel-fired generators: 7
Number of propane-fired generators: 7

Assumed Engine Parameters

Horsepower per generator	400
Non-Emergency Hours/Year per generator[1]	50

Notes:
1. Operation for routine maintenance and testing is conservatively assumed to be 50 hours per year, the maximum allowable.

Emission Factors

Pollutant	**ROG**	**TOG**	**NO_X**	**PM_{10}**	**$PM_{2.5}$**	**CO_2e**
Diesel-Fired Emission Factor[1] (g/bhp-hr)	0.26	0.26	4.6	0.15	0.15	522
LPG-Fired Emission Factor[2] (g/bhp-hr)	0.011	0.013	0.16	0.01	0.01	161

Notes:
1. Diesel engine emission factors for NOx, PM_{10}, and $PM_{2.5}$ based on ARB Tier 2 standards for 400-hp engines. Emission factors for ROG and TOG were converted from NMHC values provided in the Tier standards using EPA hydrocarbon conversion factors. Emission factor for CO_2 from AP-42 (USEPA 1995).
2. LPG-fired engine emission factors for ROG, NOx, PM_{10}, and $PM_{2.5}$ based on AP-42 Chapter 1.5 (USEPA 2008). The AP-42 factors are for external combustion but are used here to approximate emissions from internal combustion engines.

Annual Emissions

Source	**ROG**	**TOG**	**NO_X**	**PM_{10}**	**$PM_{2.5}$**	**CO_2e**
	tons/year (CO_2e in MT/year)					
Diesel Emergency Generators[3,4]	0.04	0.04	0.7	0.02	0.02	73
LPG Emergency Generators[3,4]	0.002	0.002	0.025	0.001	0.001	23
Total Emergency Generators	**0.041**	**0.042**	**0.729**	**0.025**	**0.025**	**96**

Table OP-15
Emergency Generator Emissions, Project Operations
Town Center/Community Park
Cupertino, California

Notes:

[1.] Emissions for emergency generators are calculated assuming each engine is 400 hp and operates for 50 hours/year of non-emergency testing. Below is the calculation methodology:

E = EF * HP * Hr

Where: E = generator engine emissions

EF = compression-ignition engine emission factor

HP = generator horsepower

Hr = generator hours

Note that this analysis conservatively assumes operation at 100% capacity (load factor = 1) during emissions tests.

Abbreviations:

ARB: [California] Air Resources Board
LPG: Liquefied Petroleum Gas
NOx: nitrogen oxides
PM: particulate matter
ROG: reactive organic gases
USEPA: United States Environmental Protection Agency

References:

USEPA. 1996. AP 42, Volume I, Fifth Edition (1996). §3.3 Gasoline And Diesel Industrial Engines.
Available online at: http://www.epa.gov/ttn/chief/ap42/ch03/final/c03s03.pdf
USEPA. 2008. AP 42, Volume I, Fifth Edition (1996). §1.5 Liquefied Petroleum Gas Combustion.
Available online at: http://www3.epa.gov/ttn/chief/ap42/ch01/final/c01s05.pdf
USEPA. 2010. Conversion Factors for Hydrocarbon Emission Components, NR-002d. EPA-420-R-10-015. July.
Available online at: http://www.epa.gov/otaq/models/nonrdmdl/nonrdmdl2010/420r10015.pdf

Table OP-16
Emergency Generator Emissions, Baseline Operations
Town Center/Community Park
Cupertino, California

Existing Engine Parameters[1]

Location	Plant #	Fuel	HP	Model Year	Hours of Operation
Macy's	16354	Diesel	130	1974	30
JC Penney	16390	Diesel	150	1978	20
Sears	16806	Natural Gas	56	1970	50

Notes:
1. From Public Records Requests to the BAAQMD. Sears engine assumed operation for routine maintenance and testing is 50 hours per year.

Emission Factors

Pollutant	ROG	TOG	NO_X	PM_{10}	$PM_{2.5}$	CO_2e
Emission Factor, Diesel engine[2] (g/bhp-hr)	1.12	1.14	14.1	1.00	1.00	522
Emission Factor, Natural Gas engine[3] (g/bhp-hr)	0.03	0.41	2.6	0.02	0.02	127

Notes:
2. Emission factors are from USEPA AP 42, Volume I, Fifth Edition (1996). §3.3 Gasoline And Diesel Industrial Engines. Available online at: http://www.epa.gov/ttn/chief/ap42/ch03/final/c03s03.pdf
3. Emission factors are from USEPA AP 42, Volume I, Fifth Edition (2000). §3.2: Natural Gas-fired Reciprocating Engines. Available online at: http://www3.epa.gov/ttn/chief/ap42/ch03/final/c03s02.pdf

Source	ROG	TOG	NO_X	PM_{10}	$PM_{2.5}$	CO_2e
	tons/year (CO_2e in MT/year)					
Macy's	4.8E-03	4.9E-03	6.0E-02	4.3E-03	4.3E-03	2.0
JC Penney	3.7E-03	3.8E-03	4.6E-02	3.3E-03	3.3E-03	1.6
Sears	1.1E-04	1.3E-03	7.9E-03	6.9E-05	6.9E-05	0.36
Total	**0.009**	**0.010**	**0.11**	**0.008**	**0.008**	**4.0**

Table OP-16
Emergency Generator Emissions, Baseline Operations
Town Center/Community Park
Cupertino, California

Notes:

Emissions for EGs were calculated based on emission factors from AP-42. Emission factors for ROG were converted from NMHC values using EPA hydrocarbon conversion factors. Below is the calculation methodology:

E = EF * HP * Hr

Where: E = generator engine emissions

EF = compression-ignition (diesel) engine emission factor

HP = generator horsepower

Hr = generator hours

Note that this analysis conservatively assume the EG would operate at 100% capacity (load factor = 1) during emissions tests.

Abbreviations:

ARB: [California] Air Resources Board
NOx: nitrogen oxides
PM: particulate matter
ROG: reactive organic gases
USEPA: United States Environmental Protection Agency

References:

CalEEMod Version 2013.2.2 Available Online at: http://www.caleemod.com

USEPA. 2010. Conversion Factors for Hydrocarbon Emission Components, NR-002d. EPA-420-R-10-015. July. Available online at: http://www.epa.gov/otaq/models/nonrdmdl/nonrdmdl2010/420r10015.pdf

Table OP-17
Central Plant Boiler Emissions, Project Operations
Town Center/Community Park
Cupertino, California

Number of boilers: 20

Assumed Boiler Parameters

MMBTU/hour	6
Hours/Year per boiler	2,920

Emission Factors

Pollutant	ROG	TOG	NO_X	PM_{10}	$PM_{2.5}$	CO_2e
Emission Factor (lb/MMBTU)	0.0054	0.011	0.020	0.0075	0.0075	118

Notes:
1. Emission factor for NOx is the Bay Area Air Quality Management District (BAAQMD) Rule 9-7-307. All other emission factors from AP-42 (USEPA 1998), with ROG assumed equivalent to the AP-42 factor for VOC. $PM_{2.5}$ is conservatively assumed equal to PM.

Annual Emissions

Source	ROG	TOG	NO_X	PM_{10}	$PM_{2.5}$	CO_2e
	tons/year (CO_2e in MT/year)					
Boilers[1,2]	0.9	1.9	3.4	1.3	1.3	18,699

Notes:
1. Twenty natural gas-fired boilers of 6 MMBTU/hour each are assumed to operate on site, each boiler for four months of the year (2,920 hours/year).

Abbreviations:
BAAQMD: Bay Area Air Quality Management District
lb: pound
MMBTU: Million British thermal units
MT: metric ton
NOx: nitrogen oxides
PM: particulate matter
ROG: reactive organic gases
TOG: total organic gases
USEPA: United States Environmental Protection Agency

References:
USEPA. 1998. AP 42, Volume I, Fifth Edition. §1.4 Natural Gas Combustion. July.
Available online at: http://www.epa.gov/ttn/chief/ap42/ch01/final/c01s04.pdf. Accessed January 2016.

Table OP-18
Central Plant Boiler Emissions, Baseline Operations
Town Center/Community Park
Cupertino, California

Number of boilers: 1

Assumed Boiler Parameters

MMBTU/hour	1.99
Hours/Year per boiler	2,920

Emission Factors

Pollutant	ROG	TOG	NO_X	PM_{10}	$PM_{2.5}$	CO_2e
Emission Factor (lb/MMBTU)	0.0054	0.011	0.020	0.0075	0.0075	118

Notes:

[1.] Emission factor for NOx is the Bay Area Air Quality Management District (BAAQMD) Rule 9-7-307. All other emission factors from AP-42 (USEPA 1998), with ROG assumed equivalent to the AP-42 factor for VOC. $PM_{2.5}$ is conservatively assumed equal to PM.

Annual Emissions

Source	ROG	TOG	NO_X	PM_{10}	$PM_{2.5}$	CO_2e
	tons/year (CO_2e in MT/year)					
Boiler[1,2]	0.02	0.03	0.06	0.02	0.02	310

Notes:

[1.] One existing boiler of 1.99 MMBTU/hour operates on site, for approximately four months of the year (2,920 hours/year).

Abbreviations:

BAAQMD: Bay Area Air Quality Management District
lb: pound
MMBTU: Million British thermal units
MT: metric ton
NOx: nitrogen oxides
PM: particulate matter
ROG: reactive organic gases
TOG: total organic gases
USEPA: United States Environmental Protection Agency

References:

USEPA. 1998. AP 42, Volume I, Fifth Edition. §1.4 Natural Gas Combustion. July.
Available online at: http://www.epa.gov/ttn/chief/ap42/ch01/final/c01s04.pdf. Accessed January 2016.

Table OP-19
Water Usage and Electricity Intensity for Baseline and Project Operations
Town Center/Community Park
Cupertino, California

Water Usage Rates from CalEEMod[1]

Venue	CalEEMod Venue Subtype	Size Metric	Indoor Water, gal/size/year	Outdoor Water, gal/size/year
Retail	Regional Shopping Center	1000sqft	74,073	45,399
Hotel	Hotel	room	25,367	2,819

Notes:
1. Water Use Rates from Table 9.1 of Appendix D of the CalEEMod User's Guide.

Water Usage - Baseline Operational

Venue	CalEEMod Venue Subtype	Area (1000 sq ft)	Indoor Water, million gal/year	Outdoor Water, million gal/year
Retail	Baseline Retail	1,200	89	54

Water Usage - Project Operational

Venue	CalEEMod Venue Subtype	Size	Indoor Water, million gal/year	Outdoor Water, million gal/year
	Project Subtotal	-	**77**	**22**
Hotel	Hotel	191 KSF	5	1
	Specific Plan Total	-	**81**	**23**

Notes:
1. Project water usage from Table 3-2 of the Luk Associates 2015 Water Demand Assessment Project Report. October 27.

Water Electricity Intensity

County	Electricity to Supply Water (kWh/million gal)	Electricity to Treat Water (kWh/million gal)	Electricity to Distribute Water (kWh/million gal)
Santa Clara	2,117	111	1,272

Notes:
1. Water Electricity Intensity from Table 9.2 of Appendix D of the CalEEMod User's Guide.

Table OP-20
Wastewater Treatment Types and Electricity Intensity, Baseline and Project Operations
Town Center/Community Park
Cupertino, California

Wastewater Electricity Intensity

County	Electricity to Treat Wastewater
Santa Clara	1,911

Water Electricity Intensity from Table 9.2 of Appendix D of the CalEEMod User's Guide.

Wastewater Treatment Types

County	Septic Tank	Aerobic	Anaerobic, Facultative Lagoons	Anaerobic, Combustion of Gas	Anaerobic, Cogeneration of Gas
Santa Clara	10.33%	87.46%	2.21%	100%	0%

Water Treatment Types from Table 9.3 of Appendix D of the CalEEMod User's Guide.

Wastewater Treatment Direct Emission Factors

Wastewater Treatment Type	CO_2 Biogenic, ton/gal	CO_2 Non-Biogenic, ton/gal	CH_4, ton/gal	N_2O, ton/gal
Septic	0	0	2.50E-07	8.48E-10
Aerobic	3.90E-07	0	1.34E-09	8.48E-10
Anaerobic Facultative	3.90E-07	0	4.02E-07	8.48E-10
Digester Burn	0	0	0	0
Digester Cogen	0	0	0	0

Wastewater Treatment Direct Emission Factors from Table 9.4 of Appendix D of the CalEEMod User's Guide.

Table OP-21
Water Use GHG Emissions, Baseline and Project Operations
Town Center/Community Park
Cupertino, California

Water Usage GHG Emissions - Baseline Operational

Venue	CalEEMod Venue Subtype	Electricity Indirect Emissions (MT CO_2e/year)	Septic Tank Direct Emissions (MT CO_2e/year)	Aerobic Direct Emissions (MT CO_2e/year)	Facultative Lagoon Direct Emissions (MT CO_2e/year)
Retail	Baseline Retail	120	45.98	48	16

Water Usage GHG Emissions - Project Operational

Venue	CalEEMod Venue Subtype	Electricity Indirect Emissions (MT CO_2e/year)	Septic Tank Direct Emissions (MT CO_2e/year)	Aerobic Direct Emissions (MT CO_2e/year)	Facultative Lagoon Direct Emissions (MT CO_2e/year)
	Project Total	**65**	**40**	**41**	**14**
Hotel	Hotel	4	3	3	1
	Specific Plan Total	**69**	**42**	**44**	**15**

Table OP-22
Solid Waste Generation for Baseline and Project Operations
Town Center/Community Park
Cupertino, California

Solid Waste Generation Rates[1]

Venue	CalEEMod Venue Subtype	Size Metric	Solid Waste Generation Rate, ton/size/year
Office	General Office Building	1000sqft	0.93
Retail	Regional Shopping Center	1000sqft	1.05
Apartments	Apartments Mid Rise	DU	0.46
Senior Adult Housing	Apartments Mid Rise	DU	0.46
Health/Fitness Club	Health Club	1000sqft	5.70
Banquet Hall (Pav 4)	Government (Civic Center)	1000sqft	5.70
High School Innovation Center	High School	Student	0.18
Civic Meeting Space (Pav 6)	Government (Civic Center)	1000sqft	5.70
Transit Center	General Office Building	1000sqft	0.93
Office Amenity (Pav 5 - Office Event Center	General Office Building	1000sqft	0.93
Office Amenity (Pav 7 - Caf/Fitness)	General Office Building	1000sqft	0.93
Office Amenity (Skybridges, Lobbies)	General Office Building	1000sqft	0.93
Loading, Facilities + Security Areas	General Office Building	1000sqft	0.93
Testing + Workshop Area	Research & Development	1000sqft	0.08
Parking Below Grade	Enclosed Parking with Elevator	1000sqft	0
Parking Above Grade	Enclosed Parking with Elevator	1000sqft	0
Park	Park	Acre	0.09
Hotel	Hotel	Room	0.55

Notes:

1. Solid Waste Generation Rates from Table 10.1 of Appendix D of the CalEEMod User's Guide.

Solid Waste Generation - Baseline Operational

Venue	CalEEMod Venue Subtype	Area (1000 sq ft)	Solid Waste Generation Rate, ton/year
Retail	Baseline Retail	1,200	1,260

Solid Waste Generation - Project Operational

Venue	Land Use Type	Area (DU or 1000 sq ft or acre)	Solid Waste Generation Rate, ton/year
Office	General Office Building	2,000 KSF	1,860
Retail	Regional Shopping Center	640 KSF	672
Apartments	Apartments Mid Rise	760 DU	350
Senior Adult Housing	Apartments Mid Rise	40 DU	18
Health/Fitness Club	Health Club	40 KSF	228
Banquet Hall (Pav 4)	Government (Civic Center)	15 KSF	86
High School Innovation Center	High School	100 Students	18
Civic Meeting Space (Pav 6)	Government (Civic Center)	4 KSF	23
Transit Center	General Office Building	5 KSF	5
Office Amenity (Pav 5 - Office Event Center	General Office Building	20 KSF	19
Office Amenity (Pav 7 - Caf/Fitness)	General Office Building	20 KSF	19
Office Amenity (Skybridges, Lobbies)	General Office Building	135 KSF	126
Loading, Facilities + Security Areas	General Office Building	75 KSF	70
Testing + Workshop Area	Research & Development	175 KSF	13
Parking Below Grade	Enclosed Parking with Elevator	2,529 KSF	0
Parking Above Grade	Enclosed Parking with Elevator	1,004 KSF	0
Park	Park	30 Acres	3
	Project Total	-	**3,508**
Hotel	Hotel	191 KSF	105
	Specific Plan Total	**-**	**3,612**

Table OP-23
Solid Waste GHG Emissions Baseline and Project Operations
Town Center/Community Park
Cupertino, California

Solid Waste Landfill Gas Treatment Types

County	Landfill, No Gas Capture	Landfill, Capture Gas Flare	Landfill Gas Capture Efficiency	Landfill Gas Control Efficiency
Santa Clara	6%	94%	75%	98%

Solid Waste Landfill Gas Treatment Types from Appendices A and D, Table 10.1, to CalEEMod User's Guide

Solid Waste Landfill Gas Emission Factors

Description	CO_2 Emissions (ton/ton waste)	CH_4 Emissions (ton/ton waste)
No LFG Collection	1.43E-01	4.26E-02
LFG Collect and Combust	2.29E-01	1.14E-02

Solid Waste Landfill Gas Emission Factors from Table 10.2 of CalEEMod User's Guide Appendix D.

Solid Waste GHG Emissions - Baseline Operational

Venue	CalEEMod Venue Subtype	CO_2 (MT/year)	CH_4 (MT/year)	CO_2e (MT/year)
Retail	Baseline Retail	255.77	15.12	573

Solid Waste GHG Emissions - Project Operational

Venue	CalEEMod Venue Subtype	CO_2 (MT/year)	CH_4 (MT/year)	CO_2e (MT/year)
Office	General Office Building	378	22	846
Retail	Regional Shopping Center	136	8.1	306
Apartments	Apartments Mid Rise	71	4.2	159
Senior Adult Housing	Apartments Mid Rise	3.7	0.22	8.4
Health/Fitness Club	Health Club	46	2.7	104
Banquet Hall (Pav 4)	Government (Civic Center)	17.4	1.03	39
High School Innovation Center	High School	3.7	0.22	8.3
Civic Meeting Space (Pav 6)	Government (Civic Center)	4.6	0.27	10
Transit Center	General Office Building	0.9	0.06	2.1
Office Amenity (Pav 5 - Office Event (	General Office Building	3.8	0.22	8.5
Office Amenity (Pav 7 - Caf/Fitness)	General Office Building	3.8	0.22	8.5
Office Amenity (Skybridges, Lobbies)	General Office Building	25	1.5	57
Loading, Facilities + Security Areas	General Office Building	14	0.84	32
Testing + Workshop Area	Research & Development	2.7	0.16	6.0
Parking Below Grade	Enclosed Parking with Elevator	0	0	0
Parking Above Grade	Enclosed Parking with Elevator	0	0	0
Park	Park	0.55	0.032	1.23
	Project Total	**712**	**42**	**1,596**
Hotel	Hotel	21	1	48
	Specific Plan Total	**733**	**43**	**1,643**

Table OP-24
Mobile Exhaust Emissions, Existing and Project
Town Center/Community Park
Cupertino, California

	Trip Type	Emissions, Total						Emissions, GAS Vehicles Only					Emissions, DSL Vehicles Only				
		ROG	TOG	NOx	PM_{10}	$PM_{2.5}$	CO_2	ROG	TOG	NOx	PM_{10}	$PM_{2.5}$	ROG	TOG	NOx	PM_{10}	$PM_{2.5}$
		[tons/yr]						[tons/yr]					[tons/yr]				
Baseline Operational	Weekday	15	17	16	2.2	1.0	15,473	15	16	11	1.9	0.8	0.30	0.35	5.66	0.25	0.16
	Saturday	4.0	4.4	4.2	0.6	0.26	4,021	3.9	4.3	2.8	0.5	0.21	0.08	0.09	1.47	0.07	0.042
	Sunday	2.0	2.2	2.1	0.3	0.13	2,023	2.0	2.2	1.4	0.3	0.11	0.04	0.05	0.74	0.03	0.021
	Total	**21**	**23**	**23**	**3**	**1**	**21,517**	**21**	**23**	**15**	**2.7**	**1.1**	**0.41**	**0.48**	**7.87**	**0.35**	**0.23**

	Trip Type	Emissions, Total						Emissions, GAS Vehicles Only					Emissions, DSL Vehicles Only				
		ROG	TOG	NOx	PM_{10}	$PM_{2.5}$	CO_2	ROG	TOG	NOx	PM_{10}	$PM_{2.5}$	ROG	TOG	NOx	PM_{10}	$PM_{2.5}$
		[tons/yr]						[tons/yr]					[tons/yr]				
Project Operational	Weekday	15	17	14	3.8	1.6	22,729	15	17	9	3.4	1.4	0.25	0.30	4.56	0.32	0.15
	Saturday	2.3	2.5	1.9	0.5	0.22	3,168	2.2	2.5	1.3	0.47	0.20	0.034	0.042	0.633	0.044	0.021
	Sunday	1.2	1.3	1.0	0.3	0.12	1,686	1.2	1.3	0.7	0.25	0.11	0.018	0.022	0.337	0.023	0.011
	Total	**19**	**21**	**17**	**5**	**2**	**27,584**	**19**	**21**	**11**	**4.1**	**1.7**	**0.30**	**0.37**	**5.53**	**0.38**	**0.19**

	Trip Type	Emissions, Total						Emissions, GAS Vehicles Only					Emissions, DSL Vehicles Only				
		ROG	TOG	NOx	PM_{10}	$PM_{2.5}$	CO_2	ROG	TOG	NOx	PM_{10}	$PM_{2.5}$	ROG	TOG	NOx	PM_{10}	$PM_{2.5}$
		[tons/yr]						[tons/yr]					[tons/yr]				
Specific Plan Operational	Weekday	16	17	14	3.8	1.6	23,289	15	17	9	3.5	1.5	0.25	0.31	4.67	0.32	0.16
	Saturday	2.4	2.6	2.0	0.5	0.23	3,286	2.3	2.6	1.3	0.49	0.20	0.035	0.044	0.657	0.046	0.022
	Sunday	1.3	1.4	1.1	0.3	0.12	1,772	1.2	1.4	0.7	0.26	0.11	0.019	0.024	0.354	0.025	0.012
	Total	**19**	**21**	**17**	**5**	**2**	**28,347**	**1**	**1**	**1**	**0.3**	**0.1**	**0.02**	**0.02**	**0.35**	**0.02**	**0.01**

Notes:
1. CO2e emissions do not include indirect electricity-related emissions from electric vehicle charging.

Table OP-25
Onroad Fleet Mix
Town Center/Community Park
Cupertino, California

Fleet Mix, 2015					
Vehicle Type	Total Vehicles	Percentage of Fleet Mix	% by Fuel Type		
			Gas	DSL	ELEC
LDA	744,946	57%	56.7%	0.40%	0.22%
LDT1	62,861	5%	4.82%	0.006%	0.005%
LDT2	246,509	19%	18.94%	0.022%	0%
LHD1	25,857	2%	1.30%	0.69%	0%
LHD2	5,686	0.44%	0.18%	0.26%	0%
MCY	31,882	2%	2.45%	0%	0%
MDV	157,472	12%	12.00%	0.11%	0%
MH	5,122	0.39%	0.33%	0.07%	0%
OBUS	1,255	0.10%	0.05%	0.04%	0%
SBUS	650	0.05%	0.01%	0.04%	0%
T6	10,770	0.83%	0.11%	0.72%	0%
T7	6,551	0.50%	0.01%	0.50%	0%
UBUS	550	0.04%	0.01%	0.04%	0%

Fleet Mix, 2022					
Vehicle Type	Total Vehicles	Percentage of Fleet Mix	% by Fuel Type		
			Gas	DSL	ELEC
LDA	840,750	60%	57.1%	0.6%	2.1%
LDT1	55,294	4%	3.9%	0.0%	0.0%
LDT2	256,324	18%	18.2%	0.0%	0.0%
LHD1	22,136	2%	0.9%	0.7%	0.0%
LHD2	6,351	0%	0.1%	0.3%	0.0%
MCY	35,455	3%	2.5%	0.0%	0.0%
MDV	161,807	12%	11.3%	0.2%	0.0%
MH	4,282	0%	0.2%	0.1%	0.0%
OBUS	1,586	0%	0.1%	0.1%	0.0%
SBUS	746	0%	0.0%	0.0%	0.0%
T6	11,972	1%	0.1%	0.7%	0.0%
T7	7,226	1%	0.0%	0.5%	0.0%
UBUS	558	0%	0.0%	0.0%	0.0%

Notes:
[1.] Fleet mixes calculated based on EMFAC2014 projections for Santa Clara County.

Abbreviations:
EMFAC2014: California Air Resources Board EMission FACtor model.

Table OP-26
Mobile Emission Factors
Town Center/Community Park
Cupertino, California

Year	Fuel	ROG	ROG	TOG	TOG	NOX	NOX	CO2	CO2	PM10	PM10	PM2.5	PM2.5
		[g/mile]	[g/trip]	[g/mile]	[g/trip]	[g/mile]	[g/trip]	[g/mile]	[g/trip]	[g/mile]	[g/trip]	[g/mile]	[g/trip]
2015	Total	0.1056	1.2707	0.1325	1.3018	0.3253	0.3124	391.1558	79.4895	0.0517	0.0028	0.0229	0.0025
2022		0.0723	0.7598	0.0924	0.7747	0.1575	0.1339	319.8063	66.2646	0.0493	0.0023	0.0208	0.0021
2015	Diesel	0.0070	0.0001	0.0083	0.0001	0.1348	0.0020	27.9627	0.1247	0.0060	0.0000	0.0039	0.0000
2022		0.0032	0.0001	0.0040	0.0001	0.0599	0.0018	27.9944	0.1290	0.0042	0.0000	0.0020	0.0000
2015	Gas	0.0985	1.2706	0.1242	1.3017	0.1904	0.3105	363.1932	79.3648	0.0456	0.0027	0.0190	0.0025
2022		0.0691	0.7596	0.0884	0.7745	0.0976	0.1322	291.8118	66.1357	0.0442	0.0023	0.0184	0.0021
2015	Electricity	0	1.85E-05	0	1.85E-05	0	0	0	0	1.00E-04	0	3.97E-05	0
2022		0	1.74E-04	0	1.74E-04	0	0	0	0	9.39E-04	0	3.72E-04	0

Notes:

1. Emission factors taken from EMFAC 2014. Any g/trip emission factors were calculated by converting the g/vehicle/day emission factor in EMFAC using the following equation:

   g/trip = (g/vehicle/day) * (vehicle population/vehicle trip count)

Table OP-27
Operational Mobile Emissions
Town Center/Community Park
Cupertino, California

Project

Trip Type	Days Per Year[2]	Daily One-way Vehicle Trips[1]	Weighted Trip Length	Miles/ Day	Emissions, Total						Emissions, GAS Vehicles Only					Emissions, DSL Vehicles Only				
					ROG	TOG	NOx	PM_{10}	$PM_{2.5}$	CO_2	ROG	TOG	NOx	PM_{10}	$PM_{2.5}$	ROG	TOG	NOx	PM_{10}	$PM_{2.5}$
		Total	[mile/trip][2]		[tons/yr except CO_2, which is in MT/yr]						[tons/yr]					[tons/yr]				
Weekday	261	45,141	5.83	263,177	15.3	17.0	13.7	3.8	1.6	22729	15.1	16.7	9.1	3.4	1.42	0.2	0.3	4.6	0.3	0.2
Saturday	52	34,778	5.25	182,743	2.3	2.5	1.9	0.5	0.2	3168	2.24	2.48	1.29	0.47	0.20	0.0	0.0	0.6	0.0	0.02
Sunday	52	18,280	5.32	97,311	1.2	1.3	1.0	0.3	0.1	1686	1.18	1.31	0.68	0.25	0.11	0.02	0.02	0.3	0.02	0.01
				Total Emissions	19	21	17	4.6	1.9	27,584	19	21	11	4.1	1.7	0.30	0.37	5.53	0.38	0.19

Specific Plan

Trip Type	Days Per Year[2]	Daily One-way Vehicle Trips[1]	Weighted Trip Length	Miles/Day	Emissions, Total						Emissions, GAS Vehicles Only					Emissions, DSL Vehicles Only				
					ROG	TOG	NOx	PM_{10}	$PM_{2.5}$	CO_2	ROG	TOG	NOx	PM_{10}	$PM_{2.5}$	ROG	TOG	NOx	PM_{10}	$PM_{2.5}$
		Total	[mile/trip][2]		[tons/yr except CO_2, which is in MT/yr]						[tons/yr]					[tons/yr]				
Weekday	261	46,378	5.81	269,635	16	17	14	4	2	23289	15.48	17.17	9.32	3.45	1.45	0.3	0.3	4.7	0.3	0.2
Saturday	52	36,077	5.25	189,524	2.4	2.6	2.0	0.5	0.2	3286	2.33	2.57	1.34	0.49	0.20	0.0	0.0	0.7	0.0	0.02
Sunday	52	19,224	5.32	102,237	1.3	1.4	1.1	0.3	0.1	1772	1.25	1.37	0.72	0.26	0.11	0.02	0.02	0.35	0.02	0.01
				Total Emissions	19	21	17	4.7	2.0	28,347	19	21	11	4.2	1.8	0.31	0.38	5.68	0.39	0.19

Notes:

1. Daily one-way vehicle trips represents the sum of all daily trips generated by the existing land use. See Table OP-2 (Trip Generation, Existing and Project) for more details.

2. Trip length weighted by trip length for each land use and relative contribution to trip generation

Table OP-28
Baseline Mobile Emissions
Town Center/Community Park
Cupertino, California

Trip Type	Days Per Year	Daily One-way Vehicle Trips[1]	Weighted Trip Length [mile/trip][2]	Miles/ Day	Emissions, Total						Emissions, GAS Vehicles Only					Emissions, DSL Vehicles Only				
		Total			ROG	TOG	NOx	PM_{10}	$PM_{2.5}$	CO_2	ROG	TOG	NOx	PM_{10}	$PM_{2.5}$	ROG	TOG	NOx	PM_{10}	$PM_{2.5}$
					[tons/yr except CO_2, which is in MT/yr]						[tons/yr]					[tons/yr]				
Weekday	261	30,216	4.8	145,544	15.45	16.85	16.32	2.19	0.98	15,473	15.16	16.50	10.66	1.93	0.82	0.30	0.35	5.66	0.25	0.16
Saturday	52	39,264	4.8	189,126	4.02	4.38	4.24	0.57	0.26	4,021	3.94	4.29	2.77	0.50	0.21	0.08	0.09	1.47	0.07	0.04
Sunday	52	19,750	4.8	95,131	2.02	2.20	2.13	0.29	0.13	2,023	1.98	2.16	1.39	0.25	0.11	0.04	0.05	0.74	0.03	0.02
Total Emissions					21	23	23	3.0	1.4	21,517	21	23	15	2.7	1.1	0.41	0.48	7.87	0.35	0.23

Notes:

1. Daily one-way vehicle trips represents the sum of all daily trips generated by the existing land use. See Table OP-2 (Trip Generation, Existing and Project) for more details.
2. Weighted trip length calculated based on CalEEMod trip types and trip length for Baseline land use (Retail)

Energy Conservation Supporting Tables

Table A1. Electricity Usage for Construction Water Usage
Town Center/Community Park

Phase ID	Year	Construction Phase	Project Equipment	Off-Road Equipment Type[1]	Number of Units	Total Hours	Acres Disturbed/8-hour Day/Unit[2]	Total Acres Disturbed	Total Gallons of Water[3]	Total kWh[4]
1	2017	Site Preparation	Rubber Tired Dozers	Rubber Tired Loaders	3	522	0.0	0.0	0	0
			Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	4	696	0.5	43.5	131,370	460
1	2017	Grading	Graders	Graders	1	696	0.5	43.5	131,370	460
			Rubber Tired Dozers	Rubber Tired Loaders	1	696	0.0	0.0	0	0
			Scrapers	Scrapers	2	1,392	1.0	174.0	525,480	1,839
			Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	3	2,088	0.5	130.5	394,110	1,379
									Phase 1, 2017 Subtotal	**4,138**
2	2018	Site Preparation	Rubber Tired Dozers	Rubber Tired Loaders	3	900	0.0	0.0	0	0
			Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	4	1,200	0.5	75.0	226,500	793
2	2018	Grading	Graders	Graders	1	1,218	0.5	76.1	229,898	805
			Rubber Tired Dozers	Rubber Tired Loaders	1	1,218	0.0	0.0	0	0
			Scrapers	Scrapers	2	2,436	1.0	304.5	919,590	3,219
			Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	3	3,654	0.5	228.4	689,693	2,414
									Phase 2, 2018 Subtotal	**7,230**
2	2019	Grading	Graders	Graders	1	164	0.5	10.3	30,955	108
			Rubber Tired Dozers	Rubber Tired Loaders	1	164	0.0	0.0	0	0
			Scrapers	Scrapers	2	328	1.0	41.0	123,820	433
			Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	3	492	0.5	30.8	92,865	325
									Phase 2, 2019 Subtotal	**867**
									Phase 2, 2018 & 2019 Subtotal	**8,097**
									Phases 1 & 2 Total	**12,235**

Notes

1. Construction off-road equipment use, hours per day, and days per phase from project specific construction equipment list. Only the equipment types here are assumed to have associated water control.
2. Acres disturbed per 8 hour workday calculated from CalEEMod® Appendix D Table 3.7.
3. Gallons of water usage for dust control is calculated based on a minimum control efficiency of 66% (three times daily) with an application rate of 3,020 gallons/acre/day (AWMA 1992) and average of 26 construction days per month.
4. Calculated based on the CalEEMod® default Santa Clara County energy intensity of 0.0035 kWh per gallon for supply, distribution, and treatment of water.

Abbreviation

CalEEMod®: California Emissions Estimator Model
kWh: kilowatt-hour

Reference

Air & Waste Management Association. 1992. Air Pollution Engineering Manual.

Table A2. Fuel and Electricity Usage from Construction On-road Mobile Sources
Town Center/Community Park

Diesel and Gasoline Usage									
Phase	Year	Trip Type[1]	Vehicle Type[1]	Fuel	% of Fleet[1]	Total Round Trips	One-way Trip Length (mile)	Fuel Efficiency[2] (mpg)	Fuel Usage (gal)
1	2017	Worker	LDA	Gas	49.25%	72,896	12.4	27.3	32,556
	2017	Worker	LDA	Diesel	0.41%	72,896	12.4	35.4	210
	2017	Worker	LDT1	Gas	24.95%	72,896	12.4	23.2	19,451
	2017	Worker	LDT1	Diesel	0.03%	72,896	12.4	26.9	20
	2017	Worker	LDT2	Gas	24.96%	72,896	12.4	20.2	22,298
	2017	Worker	LDT2	Diesel	0.04%	72,896	12.4	27.8	23
	2017	Vendor	MHDT	Gas	6.49%	13,453	7.3	6.2	2,047
	2017	Vendor	MHDT	Diesel	43.51%	13,453	7.3	8.2	10,413
	2017	Vendor	HHDT	Gas	0.57%	13,453	7.3	4.5	252
	2017	Vendor	HHDT	Diesel	49.43%	13,453	7.3	5.5	17,499
	2017	Hauling	HHDT	Gas	1.15%	31,355	20	4.5	3,218
	2017	Hauling	HHDT	Diesel	98.85%	31,355	20	5.5	223,482
Phase 1, 2017 Subtotal								**Gasoline**	**79,821**
								Diesel	**251,647**
1	2018	Worker	LDA	Gas	49.08%	72,696	12.4	28.1	31,453
	2018	Worker	LDA	Diesel	0.44%	72,696	12.4	36.4	217
	2018	Worker	LDT1	Gas	24.95%	72,696	12.4	23.8	18,927
	2018	Worker	LDT1	Diesel	0.03%	72,696	12.4	27.5	19
	2018	Worker	LDT2	Gas	24.96%	72,696	12.4	20.8	21,641
	2018	Worker	LDT2	Diesel	0.04%	72,696	12.4	28.4	25
	2018	Vendor	MHDT	Gas	6.44%	13,416	7.3	6.3	2,003
	2018	Vendor	MHDT	Diesel	43.56%	13,416	7.3	8.2	10,378
	2018	Vendor	HHDT	Gas	0.56%	13,416	7.3	4.5	242
	2018	Vendor	HHDT	Diesel	49.44%	13,416	7.3	5.6	17,258
	2018	Hauling	HHDT	Gas	1.12%	31,269	20	4.5	3,088
	2018	Hauling	HHDT	Diesel	98.88%	31,269	20	5.6	220,402
Phase 1, 2018 Subtotal								**Gasoline**	**77,355**
								Diesel	**248,298**
Phase 1, 2017 & 2018 Subtotal								**Gasoline**	**157,176**
								Diesel	**499,944**
2	2018	Worker	LDA	Gas	49.08%	104,955	12.4	28.1	45,410
	2018	Worker	LDA	Diesel	0.44%	104,955	12.4	36.4	313
	2018	Worker	LDT1	Gas	24.95%	104,955	12.4	23.8	27,326
	2018	Worker	LDT1	Diesel	0.03%	104,955	12.4	27.5	27
	2018	Worker	LDT2	Gas	24.96%	104,955	12.4	20.8	31,245
	2018	Worker	LDT2	Diesel	0.04%	104,955	12.4	28.4	35
	2018	Vendor	MHDT	Gas	6.44%	8,993	7.3	6.3	1,343
	2018	Vendor	MHDT	Diesel	43.56%	8,993	7.3	8.2	6,956
	2018	Vendor	HHDT	Gas	0.56%	8,993	7.3	4.5	162
	2018	Vendor	HHDT	Diesel	49.44%	8,993	7.3	5.6	11,569
	2018	Hauling	HHDT	Gas	1.12%	20,960	20	4.5	2,070
	2018	Hauling	HHDT	Diesel	98.88%	20,960	20	5.6	147,742
Phase 2, 2018 Subtotal								**Gasoline**	**107,556**
								Diesel	**166,643**

Table A2. Fuel and Electricity Usage from Construction On-road Mobile Sources
Town Center/Community Park

Diesel and Gasoline Usage									
Phase	Year	Trip Type[1]	Vehicle Type[1]	Fuel	% of Fleet[1]	Total Round Trips	One-way Trip Length	Fuel Efficiency[2]	Fuel Usage
							(mile)	(mpg)	(gal)
2	2019	Worker	LDA	Gas	48.83%	157,002	12.4	29.0	65,634
	2019	Worker	LDA	Diesel	0.46%	157,002	12.4	37.5	481
	2019	Worker	LDT1	Gas	24.95%	157,002	12.4	24.4	39,854
	2019	Worker	LDT1	Diesel	0.03%	157,002	12.4	28.1	38
	2019	Worker	LDT2	Gas	24.96%	157,002	12.4	21.4	45,440
	2019	Worker	LDT2	Diesel	0.04%	157,002	12.4	28.9	56
	2019	Vendor	MHDT	Gas	6.42%	13,453	7.3	6.4	1,983
	2019	Vendor	MHDT	Diesel	43.58%	13,453	7.3	8.2	10,376
	2019	Vendor	HHDT	Gas	0.55%	13,453	7.3	4.6	232
2	2019	Vendor	HHDT	Diesel	49.45%	13,453	7.3	5.7	17,112
	2019	Hauling	HHDT	Gas	1.09%	31,355	20	4.6	2,967
	2019	Hauling	HHDT	Diesel	98.91%	31,355	20	5.7	218,538
Phase 2, 2019 Subtotal								**Gasoline**	**156,111**
								Diesel	**246,602**
2	2020	Worker	LDA	Gas	48.52%	157,432	12.4	29.8	63,503
	2020	Worker	LDA	Diesel	0.49%	157,432	12.4	38.6	492
	2020	Worker	LDT1	Gas	24.95%	157,432	12.4	25.0	38,913
	2020	Worker	LDT1	Diesel	0.03%	157,432	12.4	28.8	36
	2020	Worker	LDT2	Gas	24.96%	157,432	12.4	22.0	44,258
	2020	Worker	LDT2	Diesel	0.04%	157,432	12.4	29.5	59
	2020	Vendor	MHDT	Gas	6.52%	13,490	7.3	6.4	2,003
	2020	Vendor	MHDT	Diesel	43.48%	13,490	7.3	8.3	10,337
	2020	Vendor	HHDT	Gas	0.55%	13,490	7.3	4.7	230
	2020	Vendor	HHDT	Diesel	49.45%	13,490	7.3	5.7	16,948
	2020	Hauling	HHDT	Gas	1.10%	31,441	20	4.7	2,942
	2020	Hauling	HHDT	Diesel	98.90%	31,441	20	5.7	216,447
Phase 2, 2020 Subtotal								**Gasoline**	**151,850**
								Diesel	**244,320**
2	2021	Worker	LDA	Gas	48.15%	157,432	12.4	30.7	61,148
	2021	Worker	LDA	Diesel	0.51%	157,432	12.4	39.7	498
	2021	Worker	LDT1	Gas	24.96%	157,432	12.4	25.8	37,737
	2021	Worker	LDT1	Diesel	0.03%	157,432	12.4	29.6	34
	2021	Worker	LDT2	Gas	24.95%	157,432	12.4	22.8	42,800
	2021	Worker	LDT2	Diesel	0.05%	157,432	12.4	30.3	60
	2021	Vendor	MHDT	Gas	6.60%	13,490	7.3	6.5	2,013
	2021	Vendor	MHDT	Diesel	43.40%	13,490	7.3	8.3	10,280
2	2021	Vendor	HHDT	Gas	0.55%	13,490	7.3	4.7	227
	2021	Vendor	HHDT	Diesel	49.45%	13,490	7.3	5.8	16,724
	2021	Hauling	HHDT	Gas	1.09%	31,441	20	4.7	2,896
	2021	Hauling	HHDT	Diesel	98.91%	31,441	20	5.8	213,586
Phase 2, 2021 Subtotal								**Gasoline**	**146,820**
								Diesel	**241,183**
Phase 2, 2018-2021 Subtotal								**Gasoline**	**562,337**
								Diesel	**898,748**
Phases 1 & 2 Total								**Gasoline**	**719,513**
								Diesel	**1,398,692**

Table A2. Fuel and Electricity Usage from Construction On-road Mobile Sources
Town Center/Community Park

Electricity Usage									
Phase	Year	Trip Type[1]	Vehicle Type[1]	Fuel	% of Fleet[1]	Total Round Trips	One-way Trip Length	Vehicle Efficiency[3]	Electricity Usage
							(mile)	(kWh/mile)	(kWh)
1	2017	Worker	LDA	Electric	0.34%	72,896	12.4	0.33	2,080
	2017	Worker	LDT1	Electric	0.02%	72,896	12.4	0.33	139
								Phase 1, 2017 Subtotal	**2,219**
1	2018	Worker	LDA	Electric	0.48%	72,696	12.4	0.33	2,924
	2018	Worker	LDT1	Electric	0.02%	72,696	12.4	0.33	133
								Phase 1, 2018 Subtotal	**3,057**
								Phase 1, 2017-2018 Subtotal	**5,276**
2	2018	Worker	LDA	Electric	0.48%	104,955	12.4	0.33	4,222
	2018	Worker	LDT1	Electric	0.02%	104,955	12.4	0.33	192
								Phase 2, 2018 Subtotal	**4,414**
2	2019	Worker	LDA	Electric	0.71%	157,002	12.4	0.33	9,191
	2019	Worker	LDT1	Electric	0.02%	157,002	12.4	0.33	270
								Phase 2, 2019 Subtotal	**9,461**
2	2020	Worker	LDA	Electric	1.00%	157,432	12.4	0.33	13,017
	2020	Worker	LDT1	Electric	0.02%	157,432	12.4	0.33	251
								Phase 2, 2020 Subtotal	**13,268**
2	2021	Worker	LDA	Electric	1.35%	157,432	12.4	0.33	17,612
	2021	Worker	LDT1	Electric	0.02%	157,432	12.4	0.33	241
								Phase 2, 2021 Subtotal	**17,853**
								Phase 2, 2018-2021 Subtotal	**44,996**
								Phase 1 & 2 Total	**50,271**

Notes

1. CalEEMod® default vehicle mix of light-duty auto (LDA), light-duty truck type 1 (LDT1), and light-duty truck type 2 (LDT2) for worker trips, mix of medium heavy-duty vehicles (T6) and heavy heavy-duty trucks (T7) for vendor trips, and all heavy heavy-duty trucks (T7) for hauling trips.
2. Based on EMFAC2014 output. See Table A5.
3. Average electric vehicle fuel economy for 2015 models (in kWh per mile) from the 2015 DOE Fuel Economy Guide.

Abbreviations

CalEEMod®: California Emissions Estimator Model
DOE: United States Department of Energy
EMFAC2014: On-Road Vehicle EMission FACtors Model
gal: gallon
kWh: kilowatt-hour
LDA: light-duty auto
LDT1: light-duty truck, type 1
LDT2: light-duty truck, type 2
mpg: miles per gallon
MHDT: medium heavy-duty vehicles
HHDT: heavy heavy-duty trucks

Sources:

DOE. 2016. Fuel Economy Guide, Model Year 2015. Electric Vehicles. Available online at: http://www.fueleconomy.gov/feg/printGuides.shtml. Accessed January 2016.

Table A3. Fuel Usage of Off-road Construction Diesel Equipment
Town Center/Community Park

Phase	Phase Name	Project Equipment	OFFROAD Equipment	Fuel Type	Hp	LF	Quantity	Total Hours	Calendar Year	Constr. Year	Hp-Hour[1]	Fuel Usage[2] (gal)	Fuel Usage Subtotals (gal)
1	Demolition	Concrete/Industrial Saws	Other Construction Equipment	Diesel	81	0.4154	1	290	2017	1	9,758	498.5	
1	Demolition	Excavators	Excavators	Diesel	162	0.3819	3	870	2017	1	53,825	2,749.6	
1	Demolition	Rubber Tired Dozers	Rubber Tired Loaders	Diesel	255	0.3618	2	580	2017	1	53,510	2,733.5	
1	Demolition	Water Trucks	Off-Highway Trucks	Diesel	400	0.3819	1	290	2017	1	44,300	2,263.0	
1	Site Preparation	Rubber Tired Dozers	Rubber Tired Loaders	Diesel	255	0.3618	3	522	2017	1	48,159	2,460.2	
1	Site Preparation	Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	Diesel	97	0.3685	4	696	2017	1	24,878	1,270.9	
1	Site Preparation	Water Trucks	Off-Highway Trucks	Diesel	400	0.3819	1	174	2017	1	26,580	1,357.8	
1	Grading	Excavators	Excavators	Diesel	162	0.3819	3	2,088	2017	1	129,180	6,599.0	
1	Grading	Graders	Graders	Diesel	174	0.4087	1	696	2017	1	49,495	2,528.4	
1	Grading	Rubber Tired Dozers	Rubber Tired Loaders	Diesel	255	0.3618	1	696	2017	1	64,212	3,280.2	
1	Grading	Scrapers	Scrapers	Diesel	361	0.4824	2	1,392	2017	1	242,412	12,383.3	
1	Grading	Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	Diesel	97	0.3685	3	2,088	2017	1	74,635	3,812.6	
1	Grading	Water Trucks	Off-Highway Trucks	Diesel	400	0.3819	1	696	2017	1	106,321	5,431.3	
1	Building Construction	Cranes	Cranes	Diesel	226	0.2881	1	2,184	2017	1	142,202	7,264.2	
1	Building Construction	Forklifts	Rough Terrain Forklifts	Diesel	89	0.4020	3	6,552	2017	1	234,417	11,974.9	
1	Building Construction	Generator Sets	Other Construction Equipment	Diesel	84	0.4154	1	2,184	2017	1	76,208	3,893.0	
1	Building Construction	Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	Diesel	97	0.3685	3	6,552	2017	1	234,198	11,963.7	
1	Building Construction	Welders	Other Construction Equipment	Diesel	46	0.4154	1	2,184	2017	1	41,733	2,131.9	
												Phase 1, 2017 Subtotal	**84,596**
1	Building Construction	Cranes	Cranes	Diesel	226	0.2881	1	2,316	2018	2	150,796	7,703	
1	Building Construction	Forklifts	Rough Terrain Forklifts	Diesel	89	0.4020	3	6,948	2018	2	248,586	12,699	
1	Building Construction	Generator Sets	Other Construction Equipment	Diesel	84	0.4154	1	2,316	2018	2	80,814	4,128	
1	Building Construction	Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	Diesel	97	0.3685	3	6,948	2018	2	248,353	12,687	
1	Building Construction	Welders	Other Construction Equipment	Diesel	46	0.4154	1	2,316	2018	2	44,255	2,261	
1	Paving	Pavers	Pavers	Diesel	125	0.4154	2	640	2018	2	33,232	1,698	
1	Paving	Paving Equipment	Paving Equipment	Diesel	130	0.3551	2	640	2018	2	29,544	1,509	
1	Paving	Rollers	Rollers	Diesel	80	0.3752	2	640	2018	2	19,210	981	
1	Architectural Coating	Air Compressors	Other Construction Equipment	Diesel	78	0.4154	1	332	2018	2	10,757	550	
												Phase 1, 2018 Subtotal	**44,215**
												Phase 1 Total	**128,811**

Table A3. Fuel Usage of Off-road Construction Diesel Equipment
Town Center/Community Park

Phase	Phase Name	Project Equipment	OFFROAD Equipment	Fuel Type	Hp	LF	Quantity	Total Hours	Calendar Year	Constr. Year	Hp-Hour[1]	Fuel Usage[2] (gal)	Fuel Usage Subtotals (gal)
2	Demolition	Concrete/Industrial Saws	Other Construction Equipment	Diesel	81	0.4154	1	512	2018	2	17,227	880.0	
2	Demolition	Excavators	Excavators	Diesel	162	0.3819	3	1,536	2018	2	95,029	4,854.4	
2	Demolition	Rubber Tired Dozers	Rubber Tired Loaders	Diesel	255	0.3618	2	1,024	2018	2	94,473	4,826.0	
2	Demolition	Water Trucks	Off-Highway Trucks	Diesel	400	0.3819	1	512	2018	2	78,213	3,995.4	
2	Site Preparation	Rubber Tired Dozers	Rubber Tired Loaders	Diesel	255	0.3618	3	900	2018	2	83,033	4,241.6	
2	Site Preparation	Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	Diesel	97	0.3685	4	1,200	2018	2	42,893	2,191.2	
2	Site Preparation	Water Trucks	Off-Highway Trucks	Diesel	400	0.3819	1	300	2018	2	45,828	2,341.1	
2	Grading	Excavators	Excavators	Diesel	162	0.3819	3	3,654	2018	2	226,065	11,548.2	
2	Grading	Graders	Graders	Diesel	174	0.4087	1	1,218	2018	2	86,617	4,424.7	
2	Grading	Rubber Tired Dozers	Rubber Tired Loaders	Diesel	255	0.3618	1	1,218	2018	2	112,371	5,740.4	
2	Grading	Scrapers	Scrapers	Diesel	361	0.4824	2	2,436	2018	2	424,221	21,670.8	
2	Grading	Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	Diesel	97	0.3685	3	3,654	2018	2	130,610	6,672.1	
2	Grading	Water Trucks	Off-Highway Trucks	Diesel	400	0.3819	1	1,218	2018	2	186,062	9,504.7	
												Phase 2, 2018 Subtotal	**82,891**
2	Grading	Excavators	Excavators	Diesel	162	0.3819	3	492	2019	3	30,439	1,555	
2	Grading	Graders	Graders	Diesel	174	0.4087	1	164	2019	3	11,663	596	
2	Grading	Rubber Tired Dozers	Rubber Tired Loaders	Diesel	255	0.3618	1	164	2019	3	15,130	773	
2	Grading	Scrapers	Scrapers	Diesel	361	0.4824	2	328	2019	3	57,120	2,918	
2	Grading	Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	Diesel	97	0.3685	3	492	2019	3	17,586	898	
2	Grading	Water Trucks	Off-Highway Trucks	Diesel	400	0.3819	1	164	2019	3	25,053	1,280	
2	Building Construction	Cranes	Cranes	Diesel	226	0.2881	1	2,862	2019	3	186,347	9,519	
2	Building Construction	Forklifts	Rough Terrain Forklifts	Diesel	89	0.4020	3	8,586	2019	3	307,190	15,692	
2	Building Construction	Generator Sets	Other Construction Equipment	Diesel	84	0.4154	1	2,862	2019	3	99,865	5,101	
2	Building Construction	Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	Diesel	97	0.3685	3	8,586	2019	3	306,902	15,678	
2	Building Construction	Welders	Other Construction Equipment	Diesel	46	0.4154	1	2,862	2019	3	54,688	2,794	
												Phase 2, 2019 Subtotal	**56,804**
2	Building Construction	Cranes	Cranes	Diesel	226	0.2881	1	3,036	2020	4	197,676	10,098	
2	Building Construction	Forklifts	Rough Terrain Forklifts	Diesel	89	0.4020	3	9,108	2020	4	325,866	16,646	
2	Building Construction	Generator Sets	Other Construction Equipment	Diesel	84	0.4154	1	3,036	2020	4	105,937	5,412	
2	Building Construction	Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	Diesel	97	0.3685	3	9,108	2020	4	325,561	16,631	
2	Building Construction	Welders	Other Construction Equipment	Diesel	46	0.4154	1	3,036	2020	4	58,013	2,964	
												Phase 2, 2020 Subtotal	**51,750**

Table A3. Fuel Usage of Off-road Construction Diesel Equipment
Town Center/Community Park

Phase	Phase Name	Project Equipment	OFFROAD Equipment	Fuel Type	Hp	LF	Quantity	Total Hours	Calendar Year	Constr. Year	Hp-Hour[1]	Fuel Usage[2] (gal)	Fuel Usage Subtotals (gal)
2	Building Construction	Cranes	Cranes	Diesel	226	0.2881	1	1,932	2021	5	125,794	6,426	
2	Building Construction	Forklifts	Rough Terrain Forklifts	Diesel	89	0.4020	3	5,796	2021	5	207,369	10,593	
2	Building Construction	Generator Sets	Other Construction Equipment	Diesel	84	0.4154	1	1,932	2021	5	67,414	3,444	
2	Building Construction	Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	Diesel	97	0.3685	3	5,796	2021	5	207,175	10,583	
2	Building Construction	Welders	Other Construction Equipment	Diesel	46	0.4154	1	1,932	2021	5	36,917	1,886	
2	Paving	Pavers	Pavers	Diesel	125	0.4154	2	1,084	2021	5	56,287	2,875	
2	Paving	Paving Equipment	Paving Equipment	Diesel	130	0.3551	2	1,084	2021	5	50,041	2,556	
2	Paving	Rollers	Rollers	Diesel	80	0.3752	2	1,084	2021	5	32,537	1,662	
2	Architectural Coating	Air Compressors	Other Construction Equipment	Diesel	78	0.4154	1	552	2021	5	17,885	914	
												Phase 2, 2021 Subtotal	**40,940**
												Phase 2 Total	**232,385**

Notes

1. HP-Hour is the basis for the fuel calculation. HP-Hour is calculated using the following formula:
   HP-Hour = Total Hours x LF x HP
2. Off-road mobile source fuel usage is calculated using a fuel usage rate of 0.05 gallons of diesel per horsepower (HP)-hour, based on SCAQMD CEQA Air Quality Handbook, Table A9-3E.

Abbreviations

CEQA: California Environmental Quality Act
Gal: gallon
HP: horsepower
LF: load factor
SCAQMD: South Coast Air Quality Management District

Sources

SCAQMD CEQA Air Quality Handbook, Table A9-3E.

Table A4. Electricity Usage for Construction Water Usage
Block 14

Year	Construction Phase	Project Equipment	Number of Units	Total Hours	Acres Disturbed/8-hour Day/Unit[2]	Total Acres Disturbed	Total Gallons of Water[3]	Total kWh[4]
2017	Site Preparation	Tractors/Loaders/Backhoes	4	320	0.5	20.0	60,400	211
	Grading	Graders	1	160	0.5	10.0	30,200	106
		Tractors/Loaders/Backhoes	3	480	0.5	30.0	90,600	317
							Block 14 Total	**634**

Notes
1. Construction off-road equipment use, hours per day, and days per phase from project specific construction equipment list. Only the equipment types here are assumed to have associated water control.
2. Acres disturbed per 8 hour workday calculated from CalEEMod® Appendix D Table 3.7.
3. Gallons of water usage for dust control is calculated based on a minimum control efficiency of 66% (three times daily) with an application rate of 3,020 gallons/acre/day (AWMA 1992) and average of 26 construction days per month.
4. Calculated based on the CalEEMod® default Santa Clara County energy intensity of 0.0035 kWh per gallon for supply, distribution, and treatment of water.

Table A5. Fuel and Electricity Usage from Construction On-road Mobile Sources
Block 14

Diesel and Gasoline Usage								
Year	Trip Type[1]	Vehicle Type[1]	Fuel	% of Fleet[1]	Total One Way Trips	One-way Trip Length (mile)	Fuel Efficiency[2] (mpg)	Fuel Usage (gal)
2017	Worker	LDA	Gas	49.25%	25,140	12.4	27.3	5,614
	Worker	LDA	Diesel	0.41%	25,140	12.4	35.4	36
	Worker	LDT1	Gas	24.95%	25,140	12.4	23.2	3,354
	Worker	LDT1	Diesel	0.03%	25,140	12.4	26.9	3
	Worker	LDT2	Gas	24.96%	25,140	12.4	20.2	3,845
	Worker	LDT2	Diesel	0.04%	25,140	12.4	27.8	4
	Vendor	MHDT	Gas	6.49%	9,450	7.3	6.2	719
	Vendor	MHDT	Diesel	43.51%	9,450	7.3	8.2	3,657
	Vendor	HHDT	Gas	0.57%	9,450	7.3	4.5	89
	Vendor	HHDT	Diesel	49.43%	9,450	7.3	5.5	6,146
	Hauling	HHDT	Gas	1.15%	0	20	4.5	0
	Hauling	HHDT	Diesel	98.85%	0	20	5.5	0
						Block 14 2017 Fuel Usage	**Gasoline**	**13,620**
							Diesel	**9,847**
2018	Worker	LDA	Gas	49.08%	3,080	12.4	28.1	666
	Worker	LDA	Diesel	0.44%	3,080	12.4	36.4	5
	Worker	LDT1	Gas	24.95%	3,080	12.4	23.8	401
	Worker	LDT1	Diesel	0.03%	3,080	12.4	27.5	0
	Worker	LDT2	Gas	24.96%	3,080	12.4	20.8	458
	Worker	LDT2	Diesel	0.04%	3,080	12.4	28.4	1
	Vendor	MHDT	Gas	6.44%	900	7.3	6.3	67
	Vendor	MHDT	Diesel	43.56%	900	7.3	8.2	348
	Vendor	HHDT	Gas	0.56%	900	7.3	4.5	8
	Vendor	HHDT	Diesel	49.44%	900	7.3	5.6	579
	Hauling	HHDT	Gas	1.12%	0	20	4.5	0
	Hauling	HHDT	Diesel	98.88%	0	20	5.6	0
						Block 14 2018 Fuel Usage	**Gasoline**	**1,601**
							Diesel	**932**
						Block 14 Total 2017 and 2018 Fuel Usage	**Gasoline**	**15,221**
							Diesel	**10,780**

Electricity Usage								
Year	Trip Type[1]	Vehicle Type[1]	Fuel	% of Fleet[1]	Total One Way Trips	One-way Trip Length (mile)	Vehicle Efficiency[3] (kWh/mile)	Electricity Usage (kWh)
2017	Worker	LDA	Electric	0.34%	25,140	12.4	0.33	359
	Worker	LDT1	Electric	0.02%	25,140	12.4	0.33	24
							Block 14 2017 Electricity Usage	**383**
2018	Worker	LDA	Electric	0.48%	3,080	12.4	0.33	62
	Worker	LDT1	Electric	0.02%	3,080	12.4	0.33	3
							Block 14 2018 Electricity Usage	**65**
							Block 14 Total 2017 and 2018 Fuel Usage	**447**

Notes

1. CalEEMod® default vehicle mix of light-duty auto (LDA), light-duty truck type 1 (LDT1), and light-duty truck type 2 (LDT2) for worker trips, mix of medium heavy-duty vehicles (T6) and heavy heavy-duty trucks (T7) for vendor trips, and all heavy heavy-duty trucks (T7) for hauling trips.
2. Based on EMFAC2014 output. See Table A5.
3. Average electric vehicle fuel economy for 2015 models (in kWh per mile) from the 2015 DOE Fuel Economy Guide.

Table A6. Fuel Usage of Off-road Construction Diesel Equipment
Block 14

Year	Phase Name	Project Equipment	Fuel Type	Hp	LF	Quantity	Total Hours	Hp-Hour[1]	Fuel Usage[2] (gal)
2017	Demolition	Concrete/Industrial Saws	Diesel	81	0.73	1	160	9,461	483
	Demolition	Excavators	Diesel	162	0.38	3	480	29,549	1,509
	Demolition	Rubber Tired Dozers	Diesel	255	0.4	2	320	32,640	1,667
	Site Preparation	Rubber Tired Dozers	Diesel	255	0.4	3	240	24,480	1,251
	Site Preparation	Tractors/Loaders/Backhoes	Diesel	97	0.37	4	320	11,485	587
	Grading	Excavators	Diesel	162	0.38	1	160	9,850	503
	Grading	Graders	Diesel	174	0.41	1	160	11,414	583
	Grading	Rubber Tired Dozers	Diesel	255	0.4	1	160	16,320	834
	Grading	Tractors/Loaders/Backhoes	Diesel	97	0.37	3	480	17,227	880
	Building Construction	Cranes	Diesel	226	0.29	1	1,470	96,344	4,922
	Building Construction	Forklifts	Diesel	89	0.2	3	5,040	89,712	4,583
	Building Construction	Generator Sets	Diesel	84	0.74	1	1,680	104,429	5,335
	Building Construction	Tractors/Loaders/Backhoes	Diesel	97	0.37	3	4,410	158,275	8,085
	Building Construction	Welders	Diesel	46	0.45	1	1,680	34,776	1,776
2018	Building Construction	Cranes	Diesel	226	0.29	1	140	9,176	469
	Building Construction	Forklifts	Diesel	89	0.2	3	480	8,544	436
	Building Construction	Generator Sets	Diesel	84	0.74	1	160	9,946	508
	Building Construction	Tractors/Loaders/Backhoes	Diesel	97	0.37	3	420	15,074	770
	Building Construction	Welders	Diesel	46	0.45	1	160	3,312	169
	Paving	Pavers	Diesel	125	0.42	2	320	16,800	858
	Paving	Paving Equipment	Diesel	130	0.36	2	320	14,976	765
	Paving	Rollers	Diesel	80	0.38	2	320	9,728	497
	Architectural Coating	Air Compressors	Diesel	78	0.48	1	120	4,493	230
								Block 14 2017 Diesel Usage	32,998
								Block 14 2018 Diesel Usage	4,702
								Block 14 2017 and 2018 Diesel Usage	37,700

Notes

1. HP-Hour is the basis for the fuel calculation. HP-Hour is calculated using the following formula:
   HP-Hour = Total Hours x LF x HP
2. Off-road mobile source fuel usage is calculated using a fuel usage rate of 0.05 gallons of diesel per horsepower (HP)-hour, based on SCAQMD CEQA Air Quality Handbook, Table A9-3E.

Abbreviations

CalEEMod®: California Emissions Estimator Model
CEQA: California Environmental Quality Act
DOE: United States Department of Energy
EMFAC2014: On-Road Vehicle EMission FACtors Model
gal: gallon
HHDT: heavy heavy-duty trucks
HP: horsepower
kWh: kilowatt-hour
LDA: light-duty auto
LDT1: light-duty truck, type 1
LDT2: light-duty truck, type 2
LF: load factor
MHDT: medium heavy-duty vehicles
mpg: miles per gallon
SCAQMD: South Coast Air Quality Management District

Sources

SCAQMD CEQA Air Quality Handbook, Table A9-3E.
Air & Waste Management Association. 1992. Air Pollution Engineering Manual.
DOE. 2016. Fuel Economy Guide, Model Year 2015. Electric Vehicles. Available online at: http://www.fueleconomy.gov/feg/printGuides.shtml. Accessed January 2016.

Table A7. Vehicle Fuel Efficiency Calculation based on EMFAC2014 output

Calendar Year	Vehicle Class	Fuel	Population (vehicles)	VMT (miles/day)	Fuel Consumption (1000 gal/day)	Miles/Gallon
2017	HHDT	GAS	76	8,787	1.97	4.47
2017	HHDT	DSL	6,554	874,351	157.61	5.55
2017	LDA	GAS	756,531	26,738,861	977.79	27.35
2017	LDA	DSL	6,303	247,448	6.99	35.38
2017	LDA	ELEC	5,280	258,895	0.00	0.00
2017	LDT1	GAS	59,571	1,903,671	82.10	23.19
2017	LDT1	DSL	71	1,582	0.06	26.90
2017	LDT1	ELEC	55	1,572	0.00	0.00
2017	LDT2	GAS	248,391	8,715,141	430.58	20.24
2017	LDT2	DSL	353	14,588	0.52	27.85
2017	LHDT1	GAS	15,248	468,050	49.07	9.54
2017	LHDT1	DSL	9,324	340,379	19.99	17.03
2017	LHDT2	GAS	2,227	79,984	9.30	8.60
2017	LHDT2	DSL	3,631	146,930	9.65	15.22
2017	MCY	GAS	32,898	250,024	6.66	37.57
2017	MDV	GAS	156,844	5,102,591	329.50	15.49
2017	MDV	DSL	1,909	78,848	3.71	21.24
2017	MH	GAS	3,943	32,176	4.96	6.49
2017	MH	DSL	899	8,095	0.85	9.53
2017	MHDT	GAS	1,436	68,749	11.04	6.23
2017	MHDT	DSL	9,626	492,502	60.01	8.21
2017	OBUS	GAS	729	41,595	6.47	6.43
2017	OBUS	DSL	608	48,971	6.93	7.07
2017	SBUS	GAS	193	9,141	0.81	11.35
2017	SBUS	DSL	494	18,877	2.64	7.16
2017	UBUS	GAS	120	16,874	3.42	4.93
2017	UBUS	DSL	425	59,655	14.25	4.19
2018	HHDT	GAS	75	8,918	1.96	4.55
2018	HHDT	DSL	6,573	894,393	159.40	5.61
2018	LDA	GAS	766,111	27,052,393	961.67	28.13
2018	LDA	DSL	6,838	264,848	7.27	36.43
2018	LDA	ELEC	7,565	373,128	0.00	0.00
2018	LDT1	GAS	58,193	1,862,506	78.37	23.76
2018	LDT1	DSL	67	1,498	0.05	27.46
2018	LDT1	ELEC	51	1,460	0.00	0.00
2018	LDT2	GAS	249,197	8,711,168	418.92	20.79
2018	LDT2	DSL	385	15,463	0.54	28.39
2018	LHDT1	GAS	14,542	436,762	45.66	9.56
2018	LHDT1	DSL	9,478	342,661	19.89	17.22
2018	LHDT2	GAS	2,189	78,645	9.07	8.67
2018	LHDT2	DSL	3,755	150,966	9.78	15.44
2018	MCY	GAS	33,428	251,045	6.68	37.59

Table A7. Vehicle Fuel Efficiency Calculation based on EMFAC2014 output

Calendar Year	Vehicle Class	Fuel	Population (vehicles)	VMT (miles/day)	Fuel Consumption (1000 gal/day)	Miles/Gallon
2018	MDV	GAS	157,143	5,070,643	320.44	15.82
2018	MDV	DSL	2,143	86,025	3.96	21.74
2018	MH	GAS	3,795	31,016	4.74	6.54
2018	MH	DSL	900	8,018	0.84	9.57
2018	MHDT	GAS	1,447	70,433	11.18	6.30
2018	MHDT	DSL	9,781	495,416	60.26	8.22
2018	OBUS	GAS	757	42,648	6.58	6.48
2018	OBUS	DSL	624	50,474	7.11	7.10
2018	SBUS	GAS	203	9,489	0.83	11.42
2018	SBUS	DSL	493	18,912	2.63	7.18
2018	UBUS	GAS	134	18,554	3.73	4.98
2018	UBUS	DSL	410	56,887	13.47	4.22
2019	HHDT	GAS	74	9,133	1.98	4.62
2019	HHDT	DSL	6,700	919,175	161.93	5.68
2019	LDA	GAS	774,933	27,288,052	942.00	28.97
2019	LDA	DSL	7,362	280,745	7.48	37.52
2019	LDA	ELEC	11,193	554,153	0.00	0.00
2019	LDT1	GAS	57,048	1,827,918	74.99	24.38
2019	LDT1	DSL	63	1,425	0.05	28.08
2019	LDT1	ELEC	47	1,351	0.00	0.00
2019	LDT2	GAS	249,925	8,708,829	407.22	21.39
2019	LDT2	DSL	418	16,304	0.56	28.94
2019	LHDT1	GAS	13,902	409,647	42.69	9.60
2019	LHDT1	DSL	9,630	344,825	19.80	17.41
2019	LHDT2	GAS	2,156	77,507	8.87	8.74
2019	LHDT2	DSL	3,880	154,802	9.89	15.65
2019	MCY	GAS	33,936	252,109	6.70	37.61
2019	MDV	GAS	157,453	5,043,975	311.59	16.19
2019	MDV	DSL	2,371	92,640	4.17	22.23
2019	MH	GAS	3,671	30,040	4.57	6.58
2019	MH	DSL	901	7,942	0.83	9.60
2019	MHDT	GAS	1,467	72,331	11.37	6.36
2019	MHDT	DSL	9,954	500,920	60.73	8.25
2019	OBUS	GAS	780	43,429	6.66	6.52
2019	OBUS	DSL	657	52,254	7.33	7.13
2019	SBUS	GAS	214	9,874	0.86	11.48
2019	SBUS	DSL	495	18,947	2.63	7.20
2019	UBUS	GAS	147	20,168	4.02	5.01
2019	UBUS	DSL	399	54,787	12.86	4.26
2020	HHDT	GAS	75	9,389	2.01	4.68
2020	HHDT	DSL	6,802	941,580	163.85	5.75
2020	LDA	GAS	784,209	27,452,520	920.32	29.83

Table A7. Vehicle Fuel Efficiency Calculation based on EMFAC2014 output

Calendar Year	Vehicle Class	Fuel	Population (vehicles)	VMT (miles/day)	Fuel Consumption (1000 gal/day)	Miles/Gallon
2020	LDA	DSL	7,867	294,898	7.64	38.60
2020	LDA	ELEC	16,102	788,012	0.00	0.00
2020	LDT1	GAS	56,183	1,799,902	71.89	25.04
2020	LDT1	DSL	60	1,365	0.05	28.77
2020	LDT1	ELEC	43	1,245	0.00	0.00
2020	LDT2	GAS	251,334	8,718,503	396.02	22.02
2020	LDT2	DSL	447	17,001	0.58	29.54
2020	LHDT1	GAS	13,273	384,510	39.94	9.63
2020	LHDT1	DSL	9,778	346,679	19.71	17.59
2020	LHDT2	GAS	2,131	76,608	8.70	8.80
2020	LHDT2	DSL	4,006	158,381	10.00	15.84
2020	MCY	GAS	34,428	253,032	6.73	37.62
2020	MDV	GAS	157,885	5,021,086	302.81	16.58
2020	MDV	DSL	2,591	98,649	4.34	22.73
2020	MH	GAS	3,561	29,173	4.41	6.62
2020	MH	DSL	900	7,862	0.82	9.64
2020	MHDT	GAS	1,493	74,243	11.57	6.42
2020	MHDT	DSL	9,949	504,549	60.91	8.28
2020	OBUS	GAS	805	44,318	6.75	6.56
2020	OBUS	DSL	688	53,948	7.53	7.17
2020	SBUS	GAS	224	10,249	0.89	11.52
2020	SBUS	DSL	497	18,981	2.63	7.22
2020	UBUS	GAS	160	21,708	4.31	5.04
2020	UBUS	DSL	386	52,431	12.20	4.30
2021	HHDT	GAS	77	9,679	2.04	4.74
2021	HHDT	DSL	6,992	973,511	167.16	5.82
2021	LDA	GAS	793,418	27,557,998	896.45	30.74
2021	LDA	DSL	8,349	307,395	7.73	39.75
2021	LDA	ELEC	22,212	1,065,041	0.00	0.00
2021	LDT1	GAS	55,605	1,779,026	68.90	25.82
2021	LDT1	DSL	57	1,317	0.04	29.57
2021	LDT1	ELEC	41	1,176	0.00	0.00
2021	LDT2	GAS	253,305	8,739,292	383.93	22.76
2021	LDT2	DSL	475	17,655	0.58	30.29
2021	LHDT1	GAS	12,660	361,612	37.42	9.66
2021	LHDT1	DSL	9,921	348,378	19.62	17.75
2021	LHDT2	GAS	2,111	75,873	8.56	8.87
2021	LHDT2	DSL	4,131	161,656	10.10	16.01
2021	MCY	GAS	34,947	253,873	6.75	37.63
2021	MDV	GAS	158,291	5,000,619	293.09	17.06
2021	MDV	DSL	2,802	104,057	4.45	23.36
2021	MH	GAS	3,472	28,454	4.27	6.66

Table A7. Vehicle Fuel Efficiency Calculation based on EMFAC2014 output

Calendar Year	Vehicle Class	Fuel	Population (vehicles)	VMT (miles/day)	Fuel Consumption (1000 gal/day)	Miles/Gallon
2021	MH	DSL	899	7,783	0.80	9.67
2021	MHDT	GAS	1,522	76,132	11.78	6.46
2021	MHDT	DSL	10,000	516,216	62.09	8.31
2021	OBUS	GAS	831	45,141	6.84	6.60
2021	OBUS	DSL	706	55,514	7.69	7.22
2021	SBUS	GAS	235	10,620	0.92	11.57
2021	SBUS	DSL	499	19,015	2.63	7.24
2021	UBUS	GAS	173	23,181	4.57	5.07
2021	UBUS	DSL	378	50,782	11.72	4.33

Notes

1. CalEEMod® default vehicle mix of light-duty auto (LDA), light-duty truck type 1 (LDT1), and light-duty truck type 2 (LDT2) for worker trips, mix of medium heavy-duty vehicles (T6) and heavy heavy-duty trucks (T7) for vendor trips, and all heavy heavy-duty trucks (T7) for hauling trips.
2. EMFAC2014 annual output for Santa Clara County aggregated vehicle model years and speeds.

Abbreviations

CalEEMod®: California Emissions Estimator Model
EMFAC2014: On-Road Vehicle EMission FACtors Model
LDA: light-duty auto
LDT1: light-duty truck, type 1
LDT2: light-duty truck, type 2
T6: medium heavy-duty vehicles
T7: heavy heavy-duty trucks
VMT: vehicle miles traveled

Table AQ-XX
Vehicle Miles Traveled (VMT) and Population Growth
Town Center/Community Park
Cupertino, California

Scenario	VMT	Population	VMT per Capita
82.83% Baseline	52,767,257	860	61,370
2022 Specific Plan	85,510,941	10,429	8,199
% Change	62%	1113%	-87%

Abbreviations:
VMT: vehicle miles traveled

Appendix BIO

Assessment of 895 Trees at Town Center Community Park Project

Assessment of 895 Trees
at
Town Center / Community Park
North Wolfe Road
Cupertino, California

Site Visits:

Walter Levison (WLCA)

Spring & Fall, 2015, 2/11/2016

Report:

Walter Levison

10/5/2015, Revised 2/11/2016

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1.0 Summary

The following matrix summarizes existing conditions at the site, and includes detailed information on tree disposition related to the current proposed development entitled Town Center / Community Park (Project). The information was too complex to be presented in standard bulleted format:

Line Number	Description	Details	Species	Condition Ratings	Municipal Protection Status?	Total Count
1	Total trees at site	866 of 875 original survey trees remaining at project site, plus 20 median trees remaining of original 20 surveyed along N. Wolfe	Various	Ranging from "dead" to "good"	None, except for six (6) trees as noted below on line 2.	886
2	Protected trees on site (City of Cupertino ordinance)	#260, 261, 262, 414, 415, 416	California sycamores	Fair to Good (see Excel tree data charts for more details)	Yes	6
3	Transplants initially proposed by team (WLCA suggests considering retaining the trees in-situ, or removing the trees.	2 protected trees in medians (sycamores #260 and #416)	California sycamore (protected specimens)	Good and Fair respectively	Yes	2

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Line Number	Description	Details	Species		Condition Ratings	Municipal Protection Status?	Total Count
4	Removals proposed by team (Tag numbers noted in the updated WLCA Excel tree data charts attached to this report)	Direct conflicts with proposed demolition and new construction	Aleppo pine (*Pinus halepensis*)	1	(Various condition ratings)	No	361
			Canary Island pine (*Pinus canariana*)	1			
			carrotwood or carob (*Cupaniopsis* or *Ceratonia*)	4			
			coast redwood (*Sequoia sempervirens*)	77			
			dollar gum *(Eucalyptus polyanthemos)*	3			
			evergreen pear (*Pyrus kawakamii*)	15			
			fern pine (*Podocarpus gracilior*)	15			
			Ficus species	7			
			flowering cherry cultivar (*Prunus serrulata* Cult.)	1			
			flowering pear cultivar (*Pyrus calleryana* Cult.)	8			
			giant sequoia (*Metasequoia glyptostroboides*)	1			
			holly oak (*Quercus ilex*)	3			
			Italian stone pine (*Pinus pinea*)	18			
			Monterey pine (*Pinus radiata*)	10			
			oak species (*Quercus sp.*)	2			
			pine species (*Pinus sp.*)	1			
			red oak (*Quercus rubra*)	1			
			shamel ash (*Fraxinus uhdei*)	163			

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Line Number	Description	Details	Species	Condition Ratings	Municipal Protection Status?	Total Count
			southern magnolia (*Magnolia grandiflora*): 17 species not identified (out of leaf, etc.): 4 strawberry tree (*Arbutus* Cult.): 2 tulip tree (*Liriodendron tulipifera*): 7			
5	Removals proposed by WLCA due to very poor overall condition ratings (in addition to those noted in line 4 above)	----------	(Tag Numbers) #51, 227, 281, 434, 435, 438, 185, 495, 496, 497, 521, 522, 523,536, 555, 564, 567, 592, 597, 598, 603, 604, 605, 606, 607, 610, 628, 629, 631, 634, 635, 636, 637, 639, 646, 653, 654, 659, 660, 670, 671, 675, 677, 683, 684, 685, 689, 691, 699, 700, 702, 704, 705, 706, 707, 709, 711, 714, 716, 717, 718, 719, 720, 721, 722, 724, 726, 728, 731, 732, 735, 736, 758, 763, 764, 768, 810, 812, 813, 814, 815, 821, 827, 834, 836, 843, 853, 873, 1119		No	89
6	West perimeter road trees in vicinity of trenching. Various tag numbers **(#571 to #871, etc.)** Tree disposition: Unknown until building set of plans is available for review.	Proposed utility trenching per street plan sheet P-0506 Expect potential negative impacts to trees if utilities not installed using pit to pit directional bore technology	Coast redwoods, shamel ash, etc.	Various	No	300+

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Line Number	Description	Details	Species	Condition Ratings	Municipal Protection Status?	Total Count
7	East side of east perimeter road. Various tag numbers **(#518 to #570, etc.)** Tree disposition: Unknown until building set of plans is available for review.	Proposed utility trenching per street plan sheet P-0506 Expect potential negative impacts to trees if utilities not installed using pit to pit directional bore technology	Shamel ash, Chinese elm, etc.	Various	No	50+
8	Potential root loss to trees along east side of alternate lot west. Various tag numbers **(#953 to #1,049, etc.)**	Proposed utility trenching per street plan sheet P-0506 Proposed new water line route (if the utility is not installed using pit to pit directional bore technology)	Coast redwood	Various	No	100+

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Line Number	Description	Details	Species	Condition Ratings	Municipal Protection Status?	Total Count
9	Potential root loss to trees along N. Wolfe Rd. Tree tags **#1106, 1107, 1108**	Proposed utility trenching per street plan sheet P-0506 Proposed new storm drain line trench along N. Wolfe Rd. (if the utility is not installed using pit to pit directional bore technology)	Southern magnolia	"Fair"	No	3
10	Potential root loss to trees along east side of N. Wolfe Rd. Tree tag numbers **#430, 431, 432, 433, 434 435, 437, 438, 439**	Proposed utility trenching per street plan sheet P-0506 Proposed communication line trench running north-south between freeway 280 and Block 12 development (if the utility is not installed using pit to pit directional bore technology)	Giant sequoia, coast redwood, shamel ash (Note that author WLCA suggests considering some trees in this grouping for removal, such as #434, 435, and 438, per line 5 of this matrix).	Ranges from 'very poor' to 'good'.	No	9

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Line Number	Description	Details	Species	Condition Ratings	Municipal Protection Status?	Total Count
11	Conceptual Landscape plan and Irrigation plan impacts to existing trees (as applicable)	Only limited impact assessment was performed by WLCA, due to the conceptual nature of the current designs shown on proposed plan sheets available as of the date of writing.	WLCA reviewed tree species proposed for use by the landscape architect Olin Studio, and offered alternatives to some species or cultivars deemed inappropriate. WLCA also offered limited analysis of potential landscape and irrigation trenching impacts to existing trees. See section 5.0 of this report below.			

2.0 Assignment & Background

Walter Levison, Consulting Arborist (WLCA) was initially retained to tag and assess 895 trees throughout the existing site that extends from perimeter road west to perimeter road east, and from freeway 280 to Stevens Creek Boulevard, Cupertino, California, including median trees along North Wolfe adjacent to the project site. The east boundary of the survey area was a property owned by Apple Inc. The west boundary of the survey area was a developed single family residential area. Tags in this area are tagged #1 through #875 (round-shaped tags), with median trees tagged as #1,106 through #1,125 (racetrack-shaped tags) along N. Wolfe Road.

WLCA's initial work product consisted of an Excel tree data set in PDF format, along with digitally marked up tree location maps. The initial proposed development set of plans had not yet been developed at that time, and was not available for review.

A secondary tree study was also completed by WLCA, which involved tagging, assessing, and locating on a topo sheet all trees located north of the project site in a triangular lot known as 'alternate lot west', situated between the northwest corner of the project site and freeway 280. Trees in this area were tagged as trees #876 through #1,105, with round- shaped tags to #1,000, and racetrack-shaped tags for trees numbering greater than 1,000. N. Wolfe Road median trees #1,106 through #1,125 were added at this time, using the racetrack-shaped tags as noted above.

WLCA was later retained in September 2015 to prepare a formal written arborist report that was to include the following items:

a) Review the set of proposed plan sheets as available in September 2015. If possible, note conflicts where initial proposed utilities and construction may impact trees being retained, and discuss adjustments to the plans as applicable.
b) Update the existing Excel tree data spreadsheet to note an "X" in removal column indicating tree to be removed.
c) Discussion of trees to be retained and trees to be removed, including species overviews, condition ratings, etc.
d) Note trees protected per Cupertino City Tree Ordinance being retained and removed.
e) Note trees suggested by WLCA to be removed due to very poor condition.

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f) Note possible adjustments to the scope of construction to optimize tree survival and/or preserve important trees on the site as applicable (see also item 'a' above).
g) Note irrigation and soil moisture deficit concerns and options.
h) Note tree part failure risk concerns.
i) Archive digital images of some important or otherwise noteworthy tree specimens and include those images in the report.
j) Attach the updated Excel tree data charts and a master tree location basemap to the report.
k) Prepare recommendations for transplanting on-site for significant sized trees that are expected to be removed as a result of site plan work, with new install locations to be noted by Consultant on the proposed site plan drawings. Specifications for holding trees in boxes, etc. (i.e. "box holding" recommendations for irrigation, maintenance, etc.).
l) Recommendations for tree protection and maintenance based on arboriculture BMPs, with phased protection and maintenance conforming to the current proposed demolition and construction phases 1, 2, and 3.

All of the above items are included in this written report. Most of the information has been presented in matrix form, for ease of reference. The updated WLCA tree data sheets (Excel format) are attached to this report. The landscape architect's single PDF landscape plan sheet P0601 "existing tree conditions", based off WLCA's original Spring 2015 rough-plot tree location maps, is attached to this report for reference of existing tree locations.

3.0 Observations & Discussion

Existing trees at the project site (not including alternate lot west which currently has 229 trees as of 2/11/2016):

3.1 **Predominant Tree Species at Property**

Tree Species	Number of individuals	Percent of total tree population of 895 surveyed in Spring 2015
Shamel ash (*Fraxinus uhdei*)	399	45%
Coast redwood (*Sequoia sempervirens*)	319	36%
Pine species (mainly *Pinus radiata* and *Pinus pinea*)	65 (approx.)	7%

As seen above, the tree population percentages of coast redwood and shamel ash along the project property perimeter are far too high for a stable urban forest situation. In an ideal world, we would stratify the population out using a large number of tree genera and species to guard against pest and disease outbreaks (and abiotic issues such as drought conditions) that could potentially wipe out a large percentage of the tree population.

The existing monoculture type planting was from an earlier era when the project site was originally built out and planted using mainly coast redwood and shamel ash. These trees are very heavy water users, and have been suffering for years during the continuing California drought conditions with subnormal rainfall. Supplemental very heavy irrigation on a regular basis throughout the year is crucial to keeping coast redwood and shamel ash alive and vigorous.

However, the ash and redwood specimens at the site have not been receiving this level of irrigation, and are spiraling into decline and in many cases death.

At this time, the property owner is not proposing any significant alterations to the perimeter tree populations on the property, and the screening benefit of the perimeter trees will remain as long as individual trees are alive and thriving. Note also that many of these trees are not actually on the project property and are actually within a public utility right of way (personal communication, project property owner 10/23/2015).

3.2 **Tree Condition Study**

Overall Tree Condition Ratings for Two Main Species in Population
(Not including alternative lot west)

Tree Species	Number of individuals	Dead	Very Poor	Poor	Fair	Good	Excellent
Coast redwood	319	15	52	74	110	66	2
Percent of redwood population	(100%)	5%	16%	**23%**	**34%**	21%	<1%
Tree Species	Number of individuals	Dead	Very Poor	Poor	Fair	Good	Excellent
Shamel ash	399	2	65	161	156	15	0
Percent of Shamel ash population	(100%)	<1%	16%	**40%**	**39%**	4%	0%

Interestingly, the above study shows somewhat of a bell curve form, where most of the tree individuals rated out with overall condition ratings in the middle portion of the rating range (range is from dead (0%) to excellent (90% to 100%). If droughty conditions continue in California with subnormal natural rainfall this winter, many of these trees could continue spiraling into decline and end up with all ratings in the dead, very poor, and poor portion of the rating range, unless very heavy irrigation were to be commenced at this time and continued regularly through the entire winter.

3.3 **Drought Effects on Project Site Trees**

Given the current low soil moisture conditions that have been present in the San Francisco Bay Area for multiple years now, and continued subnormal natural rainfall conditions, the moisture available to the coast redwood and shamel ash tree root zones at the project site is very minimal. This has resulted in chronic loss of live twig density and live foliar density in the trees, which is expressed visually as desiccated, dead patches of canopy seen in the trees, especially in the outermost, uppermost sections of the tree canopies of individual specimens along the east and west sides of the west perimeter road (see images below in this report).

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It is not clear whether tree vigor (new live twig and foliar growth) will be or can be boosted through either very heavy, sustained supplemental irrigation of the trees' root zones, or through natural rainfall finally occurring after the (existing) prolonged period of subnormal soil moisture. Generally, trees that decline to an overall condition rating of poor (i.e. less than 50%) will not increase in vigor until very heavy irrigation is applied over an extended period of 6, 12, or even 18 months[1] to the trees' entire root zone areas. Even after this type of serious irrigation regime commences and is continued for the extended period, the trees may still not respond favorably, and will continue to decline.

High quality irrigation water with low ionic content needs to be available for supplemental irrigation of coast redwoods. See section 3.5 below for more information.

3.4 **Soil Moisture Deficit / Moisture Requirements**

Shamel Ash and Coast Redwood Moisture Requirements

In order to keep coast redwood and shamel ash specimens from declining in live twig density, live twig extension, and live foliar density over time, a very heavy irrigation regime will need to be set in place as an over-grade no-dig type system placed over the ground throughout the open soil root zones of individual trees and groupings of these trees being retained at the project site.

Although the actual volume of supplemental water to be applied per week per coast redwood specimen varies with soil conditions, weather, solar exposure, and other issues, the following is a set of rough guidelines for water application based on the author's experience. Note that use of a heavy mulch of coarse chipper truck type wood chips lain over the ground surface in a 4 to 6 inch thick layer can significantly reduce evaporation, and thereby help reduce supplemental irrigation needs:

[1] Levison, Walter. Professional consulting experience with irrigation of coast redwoods on construction sites on South Bay and Peninsula, Bay Area locations, between 1999 and 2015.

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Supplemental Irrigation	Per Week	Per Month, Year-Round (See "Winter Tier")	
1. Tier 1 "Optimal" for an individual coast redwood	Suggest 1x/week irrigation event	20 gallons per each 1 inch of trunk diameter	Based on a standard set forth by another consulting arborist
2. Tier 2 Moderate level (OK for trees with grafted root systems, etc.)	Suggest 1x/week irrigation event	10 gallons per each 1 inch of trunk diameter	
3. Tier 3 During water use restriction periods	Suggest 1x/week irrigation event	5 gallons per each 1 inch of trunk diameter	
4. Tier 4 During Winter Storms (regular heavy rain events)		Temporary shutoff of irrigation system OK between December and March, depending on intensity of and frequency of rain events.	
5. Optional: Fog, Spray, or Mist Systems	(3x to 7x/week)		

WLCA generally recommends that irrigation events occur once weekly (1x/week) throughout the entire "open soil sections of the root zones" of the trees, which may be as large as 25 feet radius or more in some cases. The trees' root zone areas need to be allowed to "dry down" as water percolates through the uppermost few feet of the soil profile, and is then used by the trees (transpired) or evaporates into the atmosphere (evaporation from open soil). As noted above in this section, use of mulch is beneficial if a layer 4 inches thick can be placed over the open soil root zone areas of the trees, between approximately 1 foot out and 25 feet out from the trunks of the trees.

Optionally, we could install some type of fogging system to augment moisture uptake by the trees by adding fog water to some lower canopy or mid canopy locations. Redwoods in their natural range along the Northern California coast and Oregon coast forests derive a significant percentage of their water moisture through direct acquisition of fog water through their needles[2]. Thus, use of a fogging system could potentially be of great benefit to the trees, if such as system could be affixed to locations near canopies at varying elevations above grade. Below is an image

[2] Burgess SSO, Dawson TE (2004). *The Contribution of Fog to the Water Relations of Sequoia sempervirens (D. Don): Foliar Uptake and Prevention of Dehydration.* Plant Cell Environs. 27:1023-1034.

of an actual installed aerial misting system in use on local peninsula Bay Area project redwood specimen. These systems would require a substantial initial investment in piping, mistheads, and labor to install, but have been beneficial in terms of increasing tree survival during hot or windy periods, according to other arborists and nurserymen I spoke with in 2015.

3.5 **Ion Content in Recycled Water / Standards**

Many municipalities such as San Jose and Palo Alto are using recycled water as a regular component of their City parks irrigation regime. However, this does come with known drawbacks. Coast redwoods are known to be sensitive to ion concentrations in soil water per the text referenced below[3]. The text notes that coast redwood has low tolerance of boron ion in recycled water. Ion sensitivity of coast redwood as related to other ions such as sodium, chloride, or ammonium was not specifically noted in the text. However, per the author's conversations with numerous city arborists and consulting arborists in the Bay Area, coast redwood appears to have low tolerance of specific ionic content in water in addition to boron ion.

The following table derived from information in the below-referenced text provides some guidelines for total ion content of various ions in recycled water at levels that could be deemed "safe" for trees with low tolerance (high ion sensitivity), although this is only a guideline, and was published more than 10 years ago:

[3] Costello, Perry, Matheny, Henry, and Geisel (2003). *Abiotic Disorders of Landscape Plants: A Diagnostic Guide*. UC ANR Publication 3420. ANR Communications Services. Oakland, California.

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Irrigation Water Ion	Type of Measurement	Content Range Considered "Safe"	Unsafe for Tree Species with Low Tolerance to Stated Ions
TDS Total Dissolved Solids	Mg/l	<450	450 to 2,000
Salinity	Mmhos/cm	<0.7	0.7 to 3.0
Boron	Mg/l	<0.5	0.5 to 1.0
Chloride (surface bubbler irrigation)	Mg/l	<140	140 to 300
Chloride (sprinkler irrigation)	Mg/l	<100	>100
Sodium (surface bubbler irrigation)	SAR	<3	3 to 9
Sodium (sprinkler irrigation)	Mg/l	<70	>70

Salinity tolerance of various tree species proposed in project tree palette by the landscape architect is noted in the reference shown in this report as citation #3. WLCA is in communication with the landscape architect staff to discuss salinity tolerance issues.

EXISTING REDWOODS

The new project does not propose to use recycled water for irrigation of the existing redwoods being retained as perimeter screening (personal communication 10/23/2015, property owner). Therefore, the ionic content of irrigation water appears (at the time of writing) to be an issue with new proposed tree plantings only.

USE OF RECYCLED WATER BLEND AND FLUSHING SEQUENCES

To reduce ion content in irrigation water to acceptable levels per the above matrix guidelines, recycled water with high ion content can be blended with standard municipal drinking water prior to running it through irrigation systems for surface application to trees. Per the property owner, this blending will be performed seasonally during non water-restriction periods in order to comply with local regulations regarding potable water use for landscapes during drought periods.

Another "trick" that can be performed to reduce ionic content remaining in the root zones of trees is to use recycled water for a number of irrigation cycles (e.g. 4 to 9 cycles), then "flush" the root

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zones by using a 5th or 10th irrigation cycle of 100% municipal drinking water (anecdotal reference). This would require that a very detailed record of irrigation be maintained by a groundsperson on site, to record exactly when recycled water and drinking water was applied to very specific landscape zones. Both recycled water and drinking water would need to be available side by side as irrigation system inputs with manual levers that would be operated by the groundsperson.

OAK TREES BEING INSTALLED

Per discussions with arborist Dave Muffly who is an expert in oak tree selection and cultivation, oak species being installed at the project should be provided with municipal drinking water as the irrigation water source, without any blending with recycled water. This is recommended to avoid potential problems with ion sensitivity by the oaks. Mr. Muffly notes that an adjacent project will not use recycled water for irrigation of the oaks (this project is also within the jurisdiction of City of Cupertino, and has recycled water piping that will be used for irrigation of non-oak landscape zones).

As regards the project roof planting area where many oak species will be installed, we may need to develop a special dual piping system which will allow for recycled water and standard drinking water sources to be piped up separately. This would allow the two water sources to be applied in an alternating manner and/or blended in a tank prior to being applied to sensitive species such as the oaks and fruit bearing orchard trees, to reduce the overall ionic content being applied to the landscape over time.

WEEPING WILLOW AND FREMONT COTTONWOOD AT ROOF DRAINAGE SWALES

The Abiotic Disorders text (citation #3) noted above in this report contains a list of various tree species along with referenced scientific studies during which salinity and boron tolerance was determined for certain species. Per this list, Fremont cottonwood, proposed to be installed at The Hills in swales where runoff collection will occur, exhibit “moderate” to “high” tolerance of salinity (i.e. ionic concentrations) in recycled water, which would suggest that they can tolerate soil moisture derived from runoff water that may contain higher than normal ionic concentration. Weeping willow, also proposed by the project team for inclusion in drainage runoff swales at our site, also appears to exhibit “moderate” to “high” tolerance of ionic concentration in irrigation water, which also suggests tolerance to runoff water as the main source of their root zone soil moisture. Even so, WLCA suggests considering removal of these two species from the proposed plant palette list, given that they require heavy irrigation year round to maintain vigor.

RECYCLED WATER EFFECTS ON FRUIT-BEARING ORCHARD TREES

Per the text referenced in citation #3 in this report, fruit-bearing tree species proposed by the team for the rooftop orchard which will be for human consumption are noted in the text as exhibiting “low” relative tolerance to ionic content in recycled water used for irrigation. Given that fruit bearing orchard trees generally require heavy irrigation, this is of concern if recycled water is going to be used on the project’s greenroof where the orchard areas will be located. As noted above in this section of the report, blending recycled water with municipal drinking water can bring down ionic concentration to levels below the safe thresholds noted above in the matrix. Flushing the tree root zones by use of 100% drinking water on a periodic basis may also be a viable method of reducing ionic concentration buildup in the root zones of the trees, such as the example WLCA noted of 4 to 9 irrigation cycles using recycled water, followed by a 5th or a 10th irrigation cycle using 100% municipal drinking water (anecdotal reference).

Per the author's recent conversation with a Northern California soil scientist who specializes in orchard soils, the inability for fruit trees such as cherry, apricot and apple to tolerate ion content in recycled water used for irrigation appears to be verified. Blending and/or other dilution is warranted.

Again, use of a dual piping system to bring up both standard drinking water and recycled water sources to the greenroof may be able to solve the problem of ionic content in recycled water being applied to the orchard areas, as it will allow us to blend the two sources of water and/or apply them to the landscape in an alternating manner to flush salts through the soil.

WLCA suspects that over time, municipal recycled water may become of increasingly higher quality in terms of ionic content being reduced to below the low-tolerance sensitivity threshold of 0.7 Mmhos/cm salinity. Refer to the ionic content table on page 14 above for more information.

3.6 **Effects of Proposed New Utilities Plan on Woody Roots**

The negative effect of proposed new utility trenching per project sheet P-0506 on existing trees to be retained could be significant to severe, depending on the actual final sprayed routes of these utility trenches. The current plan sheet shows utilities as conceptual routing only, and it is therefore difficult to determine actual impacts to specific trees. However, WLCA did note various groupings of trees and expected (potential) impacts to those trees from utility trenching, in the summary matrix section 1.0 lines #6 through #10 above in this report.

Typical woody lateral root growth extends from trees at least 3X to 5X the canopy dripline radius per previously published arboriculture science texts. This growth is generally present between grade elevation (i.e. soil surface) and down to approximately 24 inches below grade in our western Bay Area urban clay-based soils, though in some cases, older redwoods and oaks can achieve large diameter woody root growth at depths as far as 50 to 60 inches below grade[4]

For tree stability maintenance, it is acceptable to sever roots at locations within 25 to 30 feet of large diameter coast redwoods and shamel ash. However, utility trenching within 25 feet of those trees may cause severe negative impacts to the trees' health and structural condition, resulting in premature decline and/or death. In those cases where utilities need to be routed within 25 feet of large trees being retained, WLCA suggests using pit to pit directional bore technology whereby conduit is pushed and pulled **below** the root systems of trees being retained, thereby allowing for almost complete root preservation when done correctly. See image of pit to pit directional bore in action below on one of my projects in the Bay Area. In this particular case, the bore started above ground, and ended at a pit. Typical method would be to start and end at a small dug pit.

[4] Levison, Walter. Professional experience on Bay Area construction sites from 1999 to 2015.

4.0 Risk of Failure / Tree Risk Assessment Qualified (TRAQ)

Prior to the newer International Society of Arboriculture (ISA) TRAQ system (tree risk assessment qualified) coming into place as the new international standard for tree part and whole tree failure risk assessment, arborist consultants referred to an older numeric system of 12 points which consisted of:

- Failure potential of identified part (1 to 4 points)
- Size of part (1 to 4 points)
- Target rating (1 to 4 points)

The final numeric "hazard rating" derived from this system ranged from 3 to 12 points[5].

The newer system is based on alpha-type ratings, and requires the tree risk assessor to attend a rigorous training class sponsored by the ISA, after which the assessor takes a final exam. Assessors that pass the final exam are then given the title "tree risk assessment qualified", after which time they are allowed to use the published system and its components[6] and prepare information on tree risk in written reports. Qualified tree risk assessors must retake the qualification course and exam every few years to renew status as tree risk assessment qualified.

The basic TRAQ process has been amalgamated into a matrix below (next page) for readers of this report.

Note that TRAQ risk ratings are derived after consideration of various different failure modes (e.g. branch, scaffold limb, mainstem, whole tree) and different targets such as vehicles, pedestrians, bicyclists, residential structures, commercial buildings, etc. Target frequency and duration at a specific target zone, such as cars and pedestrians stopped at a traffic light, are considered when determining target "occupancy", in order to determine risk of tree part failure and impact of that tree or tree part onto that specific target at that moment when the target is occupying the target zone radius.

[5] Matheny, Nelda and Clark, James. 1994. *Evaluation of Hazard Trees in Urban Areas. 2nd edition*. International Society of Arboriculture, Urbana, Illinois.
[6] Duster, Julian et. al. 2013. *Tree Risk Assessment Manual*. International Society of Arboriculture, Champaign, Illinois.

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TRAQ Protocol Amalgamation

Likelihood of Failure	Likelihood of Impacting Target			
	Very Low	**Low**	**Medium**	**High**
Imminent	Unlikely	Somewhat Likely	Likely	Very Likely
Probable	Unlikely	Unlikely	Somewhat Likely	Likely
Possible	Unlikely	Unlikely	Unlikely	Somewhat Likely
Improbable	Unlikely	Unlikely	Unlikely	Unlikely

Improbable: The tree or branch is not likely to fail during normal weather conditions and may not fail in many severe weather conditions.

Possible: Failure could occur, but it is unlikely during normal weather conditions.

Probable: Failure may be expected during normal weather conditions.

Imminent: Failure has started or is most likely to occur in the near future, even if there is no significant wind or increased load.

Very Low: Remote chance that failure will impact target. Rarely used site fully exposed; occassionally used site partially protected. Rarely used trail or trailhead in a rural area, or an occassionally used area that has some protection due to other trees between the failure and the target.

Low: Not likely that failure will impact target. Occassionally used area fully exposed; frequently used area partially exposed; constant target well protected. EX: a little-used service road next to the tree, or a frequently used street with a street tree between the assessed tree and the street.

Medium: Even odds that failure will impact target. Frequently used area fully exposed on one side of tree; constantly occupied area partially protected. EX: suburban street next to street tree, or a house partially protected by an intermediate tree.

High: Likely that the failure will contact the target. A fixed target is fully exposed. EX: near a high-use road or walkway with an adjacent street tree.

Likelihood of Failure	Consequences			
and Impact	**Negligible**	**Minor**	**Significant**	**Severe**
Very Likely	Low	Moderate	High	Extreme
Likely	Low	Low	Moderate	High
Somewhat Likely	Low	Low	Low	Moderate
Unlikely	Low	Low	Low	Low

Negligible: low value damage or disruption, no personal injury.

Minor: low to moderate damage, small disruptions to traffic or communication lines, or very minor personal injury.

Significant: moderate to high value damage, considerable disruption, or personal injury.

Severe: high value damage, major disruption, severe personal injury or death.

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Approximately 360 trees at the project site are proposed to be removed from the interior sections of the existing property, and approximately 90 additional trees are proposed by WLCA to be removed due to very poor overall condition or structural and/or health issues that are unmitigable, for a total of approximately 450 potential removals. This leaves a total of approximately 450 trees to remain on site, mainly coast redwoods and shamel ash, along the perimeters of the site that are vulnerable to proposed construction damages in terms of both subgrade impacts to roots from trenching, soil compaction, etc. and above-grade physical impacts to the trunk tissues and canopy live wood and foliage.

Use of WLCA and/or other arborists as monitors will help minimize risk of tree damages that could increase risk of whole tree and tree part failure and impact to targets.

Designing around trees to avoid deep excavation, trenching, grading, construction, and other work within 20 horizontal feet of trunk edges can go a long way toward reducing impacts to the trees being retained, and reducing risk of tree failure and impact to targets.

Given the existing issue of soil moisture deficit (i.e. “drought stress”) and lack of adequate irrigation to boost soil moisture within the root zones of trees being retained, WLCA expects that many of the trees to remain may actual become moderate risk or high risk specimens over time due to their premature decline in terms of loss of live twig density. As an example of our current risk exposure and future risk of tree failure and impact to targets as related to irrigation, WLCA offers the following sample risk assessment of a typical coast redwood along the west perimeter road:

SAMPLE RISK ASSESSMENT FOR A COAST REDWOOD TO REMAIN AT THE PROJECT

Typical coast redwood specimen / Mode of Failure	Location	Condition (Average existing)	Likelihood of failure	Likelihood of impacting target pedestrians and cars	Likelihood of failure and impact	Consequences	**Risk of Failure and Impact (Existing)**
#772 to #871 Failure Mode: **Branch**	West side of west perimeter road	Fair	Possible	High	Somewhat Likely	Significant	**Low**
Typical coast redwood specimen / Mode of Failure	Location	Condition (Future estimated)	Likelihood of failure (Future est.)	Likelihood of impacting target pedestrians and cars	Likelihood of failure and impact	Consequences	**Risk of Failure and Impact (Future est.)**
#772 to #871 Failure Mode: **Whole Tree**	West side of west perimeter road	**Very Poor** **(if trees not heavily irrigated year round)**	Probable	High	Likely	Severe	**High**

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EXISTING "ELEVATED RISK" TYPE TREES

Although outside of the initial scope of WLCA's tree assessment assignment, it is noteworthy that some existing trees exhibiting significant lean off from vertical, girdling roots, and/or woody buttress roots severed on one or more side of the root plate during landscape irrigation pipe trenching and/or sidewalk replacement could be categorized as "elevated risk" type trees that currently rate out as moderate or high risk of failure and impact to target. These include trees such as, but not limited to:

Trees #434, 435, 438, 726. 1109, 1110, 1111, 1112, and 1115.

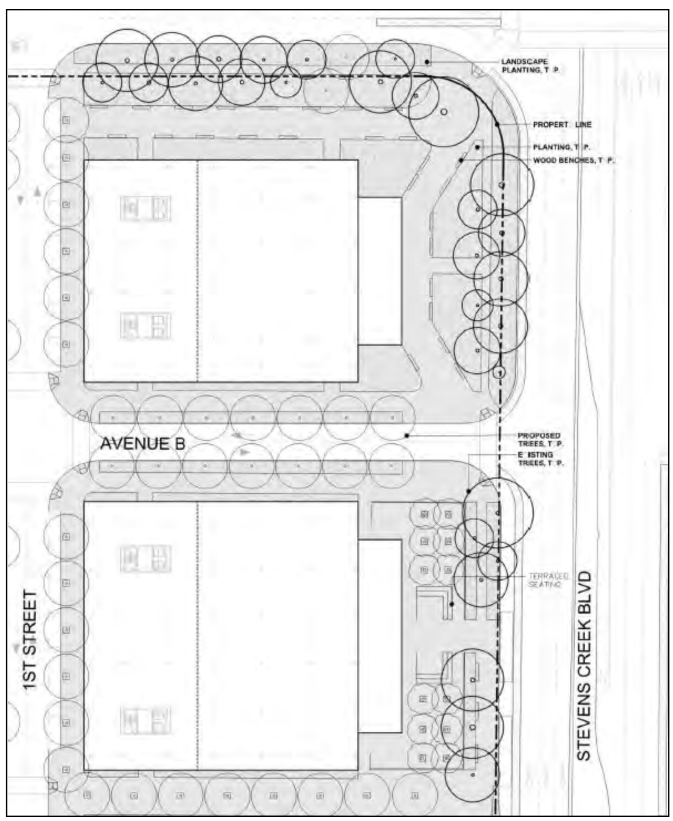
Many of these elevated-risk type trees are included in the group of trees suggested to be removed per WLCA in summary matrix 1.0 line 5, or are to be removed outright due to site plan conflicts. However, N. Wolfe Road median shamel ash specimen **#1115**, for example, is proposed to remain per the current proposed site plan tree disposition sheet.

There may be many additional trees that become "elevated risk" specimens due to root loss, root damage, and continued soil moisture deficit, during the actual construction of phases 1, 2, and 3 at the project over time. Use of heavy irrigation at the site starting now (Fall 2015) may be very beneficial in the long run in terms of reducing dieback and lengthening expected useful lifespan of the trees by providing good soil moisture to trees being retained.

5.0 Landscape & Irrigation Pipe Installation Concerns

Demolition of Existing Planters / Concerns:

Demolition of existing curbs, planting areas, asphalt parking stall surface materials, etc. to make way for new landscaping may cause significant or severe damage to the below ground portions of trees being retained such as shamel ash at the southwest end of the site along the south boundary of the former Sears parking lot. The image capture at right shows a portion of project team sheet P-0609 main entry area landscaping proposed for this southwest corner area of the project:



Some of the trees such as those circles drawn along the hard black line property boundary that rings the site are shamel ash specimens being retained, while other trees drawn on this sheet by the landscape architect are proposed new "in-fill" trees to augment existing screening.

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WLCA's main concern in areas such as this involves demolition crew activities during removal of surface hardscape and deep curbs, which may be comingled with existing woody tree root systems. When pulling out the curbs and hardscape piece by piece, these roots may become tangled with the machinery bucket teeth and be pulled, ripped, or otherwise destroyed or damaged in the process. Therefore, an arborist monitor is suggested during demolition of any material within approximately 20 feet of a tree to be retained. As noted above in this report, we know that woody tree roots can extend laterally as far as 3x to 5x the canopy dripline distance from the trunk edge, which means that a 20 foot radius canopy tree may theoretically have roots extending as far as 60 to 100 feet radius out from trunk, even under asphalt, if there are no physical impediments to growth extension such as deep curbs or deep foundation footings.

Irrigation Pipe Trenching / Concerns:

New irrigation pipe trenching will need to be performed in a manner that allows for maximum lateral woody root retention when within 20 horizontal feet of trees being retained such as those shown in the image above near Stevens Creek Blvd. Toward this end, we will need to modify the standard (typ.) municipal code 18 inch depth of cover spec detail used in most jurisdictions for schedule 40 PVC piping, and instead use one of the following options:

a. Option 1: "No Dig". This irrigation type uses flexible ½" diameter tubing that starts at a PVC riser at 20 feet or farther from a tree trunk of a tree being retained, and proceeds to snake over the ground to locations within 20 feet of a trunk of an existing tree where irrigation is needed. Bubblers are either affixed to the tubing itself, or to offshoot ¼" diameter tubing with bubblers. There is also emitter line that is available in ½" diameter, with built in bubblers, though these tend to clog easily.

   The no-dig option is optimal in terms of protecting lateral tree roots extending out from existing trees. However, vandalism is always a problem. The tubing can be buried slightly by covering it with a 4 inch thick layer of wood chip mulch to avoid some vandalism, but further measures may need to be taken to keep the tubing flush with the soil surface, such as pinning down the tubing with professional grade steel landscape U-pins, etc. See image at right.

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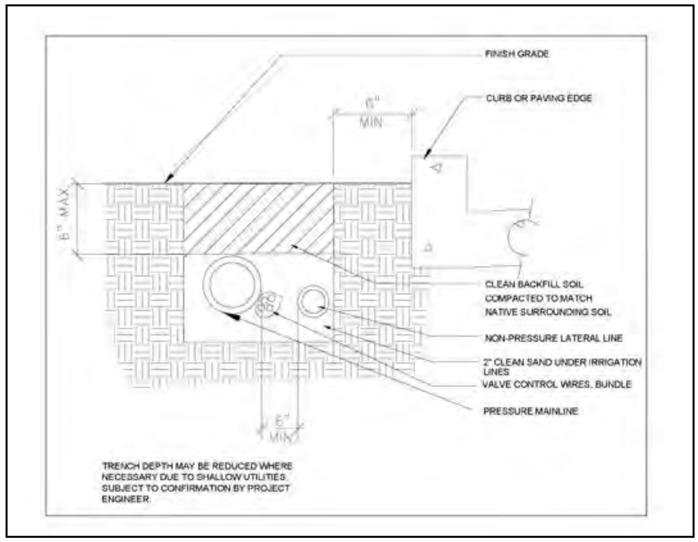
b. Option 2: "Six Inch Cover" Rule: Use a modified specification such as a setup where a maximum of six (6) inches of soil cover is specified as the maximum allowable vertical space between top of newly installed PVC irrigation pipe and original soil grade elevations, within 20 feet of a tree trunk. Below is a sample specification side cut detail showing this "shallow cut" type setup that was used for a recent project where new landscaping was to be installed within 20 feet of valuable cedar specimens being retained in Palo Alto, California:



6.0 Tree Transplant Options

Transplanting, depending on whether a tree is immediately moved and installed at another location, or is boxed up and held above ground with temporary irrigation for a number of months or years prior to permanent reinstallation at the transplant site, can cost on the order of $5,000 to $20,000 per tree for larger trees (e.g. a 15 inch diameter coast live oak). Thus, the costs of transplant are generally infeasible in terms of the cost of transplant versus appraised dollar value of the tree.

Typically, smaller diameter trees such as those 10 inches trunk diameter or less, in good overall condition (i.e. 70% overall condition rating or better), with upright, symmetrical branch and limb architecture are the best candidates for transplant.

Larger diameter trees, older trees, trees in poor or fair condition, and specimens with asymmetrical root systems, sloping root systems on a non-level slope, and those which exhibit asymmetrical above-ground branch architecture, are for the most part not good transplant candidates.

Trees currently proposed by the project team for transplant include two (2) protected-size California sycamore specimens protected by City tree ordinance:

1. **Sycamore #260.** This tree is in good overall condition, but is of relatively large diameter at over 15 inches diameter. The tree is an older specimen, and exhibits lean to the northeast as well as a canopy lopsided to the northeast.

   The asymmetrical nature of the tree's above-ground architecture, plus the fact that the root system could be limited or asymmetrical in the median planting area that it currently resides in, are negative factors when considering the tree for transplant. I suggest attempting to work around the tree, and retaining it during construction, rather than attempting to transplant this specimen. See the images section below in this report which shows the severe westward lean of the canopy.

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2. **Sycamore #416**. This tree is in fair overall condition (50% out of 100% possible points), which is the lowest possible “fair” rating just 1 point above the threshold for “poor” (49%).

   The tree exhibits a lopsided canopy that extends eastward, and also exhibits a severe girdling root issue that downgraded the structural value of the tree to a 30%. This girdling root issue caused the overall condition rating to be bumped down to a 50%.

   Trees with lopsided canopies, and limited or otherwise asymmetrical root systems such as this tree with its girdling root problem, are poor candidates for transplant, especially since the overall condition rating is only 50%. Again, I suggest trying to retain the tree and work around it during construction. See the images section below which shows the tree’s eastward lopsided canopy.

In summary, WLCA recommends avoiding any transplants of existing trees at the project site. If trees #260 and #416 are required to be removed due to issues related to conflicts with proposed new construction, then remove the trees, or redesign the project to work around the trees. Note that many trees currently proposed to be retained may need to be removed due to root loss and root damage that could occur during construction activities, especially during utility installations if those pipes and conduits are not installed using pit to pit bore technology to avoid trenching.

7.0 Assumptions and Limiting Conditions

Any legal description provided to the consultant/appraiser is assumed to be correct. Any titles and ownership to any property are assumed to be good and marketable. No responsibility is assumed for matters legal in character. Any and all property is appraised and evaluated as through free and clean, under responsible ownership and competent management.

It is assumed that any property is not in violation of any applicable codes, ordinance, statutes, or other government regulations.

Care has been taken to obtain all information from reliable sources. All data has been verified insofar as possible; however, the consultant/appraiser can neither guarantee nor be responsible for the accuracy of information provided by others.

The consultant/appraiser shall not be required to give testimony or to attend court by reason of this report unless subsequent contractual arrangements are made, including payment of an additional fee for such services as described in the fee schedule and contract of engagement.

Unless required by law otherwise, the possession of this report or a copy thereof does not imply right of publication or use for any other purpose by any other than the person to whom it is addressed, without the prior expressed written or verbal consent of the consultant/appraiser.

Unless required by law otherwise, neither all nor any part of the contents of this report, nor copy thereof, shall be conveyed by anyone, including the client, to the public through advertising, public relations, news, sales, or other media, without the prior expressed conclusions, identity of the consultant/appraiser, or any reference to any professional society or institute or to any initiated designation conferred upon the consultant/appraiser as stated in his qualifications.

This report and any values expressed herein represent the opinion of the consultant/appraiser, and the consultant’s/appraiser’s fee is in no way contingent upon the reporting of a specified value, a stipulated result, the occurrence of a subsequent event, nor upon any finding to be reported.

Sketches, drawings, and photographs in this report, being intended for visual aids, are not necessarily to scale and should not be construed as engineering or architectural reports or surveys unless expressed otherwise. The reproduction of any information generated by engineers, architects, or other consultants on any sketches, drawings, or photographs is for the express purpose of coordination and ease of reference only. Inclusion of said information on any drawings or other documents does not constitute a representation by Walter Levison to the sufficiency or accuracy of said information.

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Unless expressed otherwise:
a. information contained in this report covers only those items that were examined and reflects the conditions of those items at the time of inspection; and
b. the inspection is limited to visual examination of accessible items without dissection, excavation, probing, or coring. There is no warranty or guarantee, expressed or implied, that problems or deficiencies of the plants or property in question may not arise in the future.

Loss or alteration of any part of this report invalidates the entire report.

Arborist Disclosure Statement:

Arborists are tree specialists who use their education, knowledge, training, and experience to examine trees, recommend measures to enhance the beauty and health of trees, and attempt to reduce the risk of living near trees. Clients may choose to accept or disregard the recommendations of the arborist, or to seek additional advice.

Arborists cannot detect every condition that could possibly lead to the structural failure of a tree. Tree are living organisms that fail in ways we do not fully understand. Conditions are often hidden within trees and below ground. Arborist cannot guarantee that a tree will be healthy or safe under all circumstances, or for a specified period of time. Likewise, remedial treatments, like any medicine, cannot be guaranteed.

Treatment, pruning, and removal of trees may involve considerations beyond the scope of the arborist's services such as property boundaries, property ownership, site lines, disputes between neighbors, and other issues. Arborists cannot take such considerations into account unless complete and accurate information is disclosed to the arborist. An arborist should then be expected to reasonably rely upon the completeness and accuracy of the information provided.

Trees can be managed, but they cannot be controlled. To live near trees is to accept some degree of risk. The only way to eliminate all risk associated with trees is to eliminate the trees.

8.0 Certification

I hereby certify that all the statements of fact in this report are true, complete, and correct to the best of my knowledge and belief, and are made in good faith.

Signature of Consultant

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9.0 Digital Images Archived 9/25/2015 (WLCA)

Tree #	Image	Tree #	Image
285 to 289 to be removed, looking northeast		277 to 284 to be retained, looking north	
261 and 262 to be retained, looking south		Sycamore 260 initially proposed by team to be transplanted. WLCA suggests removal of tree, or redesign the plan to work around it.	

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Tree #	Image	Tree #	Image
414 and 415 to be retained		416 initially proposed by the project team to be transplanted (WLCA suggests removal, or redesign the project to work around it)	
426 to 444 along west side of Alexander's Steakhouse Some of these trees are to remain, and others are suggested by WLCA to be removed due to safety (risk) concerns		Close-up of the roots severed along the west side of tree 438, (suggested by WLCA to be removed), during sidewalk replacement.	

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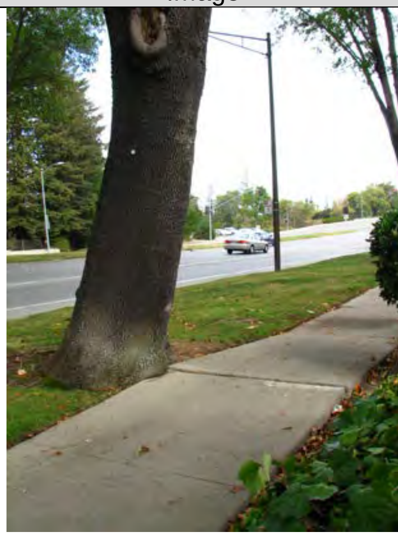
Tree #	Image	Tree #	Image
Sidewalk heave (vertical displacement) along the east side of tree 431 to be retained. Infrastructure such as this with roots likely travelling under the hardscape should be left in-situ instead of being removed (if possible), since severe root loss could occur if the walk were rebuilt. Use diamond grinding to level.		Redwoods 423, 424, 425 to be removed at the steakhouse parking lot.	
Italian stone pines in JC Penny parking lot, looking south.		Example of redwoods and ash specimens 332, 333, and 335 in very poor condition due to soil moisture deficit, at the JC Penny parking lot.	

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Tree #	Image	Tree #	Image
Trees 338 to 358 to be removed along the east side of the JC Penny parking lot.		Chinese elms and other trees being retained 521 to 541, looking south along the Apple Inc. property.	
Redwoods 500, 501, and 502 are dead in the southeast corner of the JC Penny parking lot area. These trees are planned to be removed.		In contrast to dead redwoods 500, 501, and 502 shown in the image at left, redwoods 505 and 510 at right are in decent condition just 30 or 40 feet west. The trees are to be removed.	
Shamel ash and redwoods 396 to 404 to be removed at the west side of JC Penny parking lot		Shamel ash 452 to 457 to be removed from the east side of N. Wolfe Rd.	

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Tree #	Image	Tree #	Image
Close-up of tree 267 to be removed, which exhibits a severe girdling root issue due to planting strip width which severely restricted normal lateral root extension from the trunk		Grove of redwoods 204 to 218 to be removed just west of Dynasty Restaurant.	
Looking south down west perimeter road, at rows starting with tree 240 on left (row to be removed), and 703 at right (row to be retained)		Redwood specimens along the west side of west perimeter road are suffering severely from soil moisture deficit, and are generally declining or dying	

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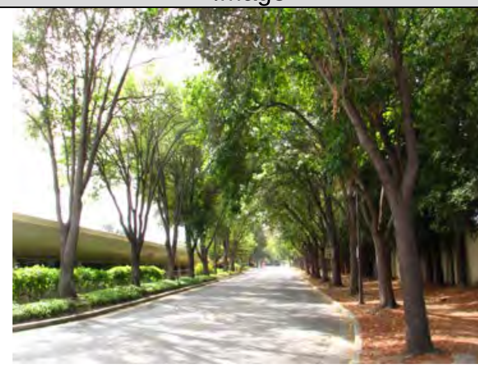
Tree #	Image	Tree #	Image
Monterey pine 726 rates out with a probable risk of failure due to lean, girdling roots, etc. This tree is in WLCA's suggested removal list.		Looking south along west perimeter road, again with trees on left to be removed (tree 165 southward), and trees on right to be retained (tree 771 southward)	
The dense screen along the west side of west perimeter road as shown here near tree 771 is in danger of dying due to soil moisture deficit. Replacement of these high water use trees with drought tolerant evergreen species is a viable option.			 Looking south along west perimeter road. The trees at right are trees 752 southward, and 852 southward, and are currently proposed to be retained. Trees along the left side (east side) of west perimeter road are to be removed.

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Tree #	Image	Tree #	Image
Shamel ash trees 8 and 9 to be retained at the southwest corner of the project site. Note curb and asphalt displacement from root growth. If this hardscape is removed and replaced, severe root loss and root damage may result, ending in further tree decline or death.			 Shamel ash 9 to 36 to be retained along this south border of the site, looking east. Again, removal of or alternation of existing curb and asphalt materials could cause severe root damage to these already drought-stressed specimens, resulting in further tree decline or death.
Shamel ash 23 to 36 to be retained, looking southeast.		Shamel ash 42 to 50 to be retained along south border. Looking southeast.	

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Tree #	Image	Tree #	Image
Monterey pine 51 at southeast corner of the project site. This tree is dead, and needs to be removed at this time as a high risk of failure and impact to targets.		Looking north at shamel ash 55, 57, 59, 61, 63, 65 to be retained.	
Southern magnolias 1106, 1107, 1108 proposed by the project team to be retained, are in decline due to severe soil moisture deficit, and may need to be removed.		Looking north at shamel ash 102, 103, 104, and 105 to be retained. Note canopy dieback in the form of live twig density decline.	

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Tree #	Image	Tree #	Image
Looking northeast at shamel ash 459 to 475 to be retained along the east side of N. Wolfe Rd.		Long-lived, drought tolerant oak species like these two existing holly oaks 97 and 98 to be removed at the project site are the types of trees we should be installing as new landscaping.	

10.0 Tree Maintenance Recommendations / Phase

The following matrix shows all tree maintenance recommendations by WLCA for those trees located south of the alternate lot west area. Note:

- Trees being removed as shown on the proposed tree disposition plan sheet P-0602 are not included in this list.
- Trees recommended to be removed by WLCA due to very poor condition, extreme lean, etc. are not included in this list (see list of eighty nine (89) WLCA-recommended removals in section 1.0 matrix, line 5, above in this report).

Line Number	Maintenance Action Suggested	Tree Tag Number	Phase
1	Branch endweight reduction pruning on lengthy sections of canopy	#8, 9, 104, 414, 442	Prior to phase 1 demolition.
2	Arborist cable and/or bracing installation per ANSI A300 support system standards	#443	Prior to phase 1 demolition.
3	Verify spring 2016 leafout of tree. If no leafout occurs, then remove tree as "dead"	#17, 518, 554	May, 2016.

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Line Number	Maintenance Action Suggested	Tree Tag Number	Phase
4	Arborist monitor tree for stability and for declines in vigor (recent pre-project trenching or other work in 2015 resulted in root damage to many of these trees, the impacts of which may be significant or severe)	#225, 226, 228, 282, 283, 285, 454, 459, 460, 463, 465, 468, 469, 473, 475, 695, 737, 744, 865, 1115, 1122, 1123, 1124, 1125.	2x/year.
5	Remove one of two existing codominant mainstems at the fork, by an ISA Certified Arborist, per ANSI A300 pruning standards.	#246	Prior to phase 1 demolition.
6	Commence heavy weekly irrigation over root zone, and continue through winter. Rate of approx. 25 to 100 gallons per tree per week, year-round. Consider use of aerial based sprinkler systems and/or aerial based misting systems to be installed in redwood specimens.	(All trees to remain)	As soon as possible, continuing 1x/week minimum, year-round.
7	Add 4 inch layer of chipper truck type wood chips over soil to reduce irrigation water evaporation. Pull mulch out at least 6 to 12 inches away from trunk edges to avoid moisture retention at root crown.	(All trees to remain)	Prior to start heavy periodic irrigation.
8	Remove electrical utility company guy wire and strapping that is surrounding the trunk.	#669	Call utility representatives to schedule this for prior to start of phase 1 demolition.

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11.0 Tree Protection Recommendations / Phase

Phase:	Acronym:
Phase 1 Demolition	1D
Phase 1 Construction	1C
Phase 2 Demolition	2D
Phase 2 Construction	2C
Phase 3 Demolition	3D
Phase 3 Construction	3C

Line Number	Protection Action	Sample Image	Tree Tag Number	Phase
1	ROOT PROTECTION FENCE – 5-foot high chain link, hung on 7-foot long 2-inch diameter iron tube posts driven 24-inches into the ground, max. 6 feet spacing on-center.		219, 220, 221, 239, 240, 241, (245 through 251), 277, 278, (280 through 292), (571 through 703), (1114 through 1125). (Not including individual trees in this group that are to be removed per author recommendation in report section 1.0 line 5).	1D, 1C
2	TRUNK BUFFER – 20 wraps of orange plastic with wood boards overlaid and duct taped in place around the wood		260, 261, 262, plus all trees at the outermost portions of the tree root zone protection fence sections that face construction work.	1D, 1C

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Line Number	Protection Action	Sample Image	Tree Tag Number	Phase
3	WOOD CHIP MULCH – 4 inch thick layer of chipper truck type wood chips (not bark chips). Place over entire open soil root zone areas, and pull 6 to 12 inches away from tree trunk edges.		Where possible, all trees to remain	1D, 1C
4	IRRIGATION TEMPORARY Heavy 1x/week 25 to 100 gallons per tree, per week, minimum, year-round		Where possible, all trees to remain	1D, 1C
5	ROOT PRUNING Back-dig around exposed roots, and prune at right angle to root growth direction, removing all broken, shattered, or otherwise damaged sections of roots		Where applicable during excavation, trenching, grading, etc.	1D, 1C
6	HARDSCAPE REMAIN Allow existing hardscape areas to remain, where possible, to avoid root loss and root damage. Arborist monitoring required during demolition within 20 feet of trunk.		219, 220, 221, 239, 240, 241, (245 through 251), (260?), 261, 262, 277, 278, (280 through 292)	1D, 1C

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Line Number	Protection Action	Sample Image	Tree Tag Number	Phase
7	PIT TO PIT DIRECTIONAL BORE for all trenching, including utilities, drain pipes, downspout drain lines, etc., for all trenches within 20 feet of trunks of trees being retained.		Various, along west perimeter road and N. Wolfe Rd.	1D, 1C
8	IRRIGATION PERMANENT Use no-dig over grade tubing, or max. of "6 inch cover within 20 feet of trees" as blurb-specified on all plans.		All areas	1D, 1C
9	ROOT PROTECTION FENCE – 5-foot high chain link, hung on 7-foot long 2-inch diameter iron tube posts driven 24-inches into the ground, max. 6 feet spacing on-center.		(7 through 36), (42 through 65), (69 through 88), (746 through 754), (840 through 871), 317, 318, 319, 426, 427, 430, 431, 432, 433, 435, 435, 437, 438, 439, 442, 443, 444 (518 through 546), (550 through 570). (Not including individual trees in this group that are to be removed per author recommendation in section 1.0 line 5).	2D, 2C

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Line Number	Protection Action	Sample Image	Tree Tag Number	Phase
10	TRUNK BUFFER – 20 wraps of orange plastic with wood boards overlaid and duct taped in place around the wood		317, 318, 319, 426, 427, 430, 431, 432, 433, 435, 435, 437, 438, 439, 442, 443, 444, 451, 452, 454, 414, 415, (416?), 740, 741, 742, 743, 744, 745, 1106, 1107, 1108, plus all trees at the outermost portions of the tree root zone protection fence sections that face construction work),	2D, 2C
11	WOOD CHIP MULCH – 4 inch thick layer of chipper truck type wood chips (not bark chips). Place over entire open soil root zone areas, and pull 6 to 12 inches away from tree trunk edges.		Where possible, all trees to remain	2D, 2C
12	IRRIGATION TEMPORARY Heavy 1x/week 25 to 100 gallons per tree per week minimum, year-round		Where possible, all trees to remain	2D, 2C
13	ROOT PRUNING Back-dig around exposed roots, and prune at right angle to root growth direction, removing all broken, shattered, or otherwise damaged sections of roots		Where applicable during excavation, trenching, grading, etc.	2D, 2C

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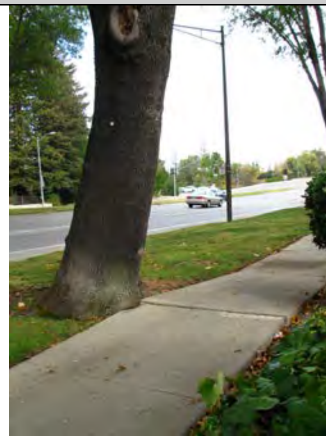
Line Number	Protection Action	Sample Image	Tree Tag Number	Phase
14	HARDSCAPE REMAIN Allow existing hardscape areas to remain where possible, to avoid root loss and root damage. Arborist monitoring required during demolition within 20 feet of trunk.		8, 9, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 33, 35, 43, 45, 47, 49, 52, 54, 56, 58, 60, 62, 64, 69, 70, 71, 73, 75, 77, 79, 81, 83, 85, 87, 88, 317, 318, 319, 426, 427, 430, 431, 432, 433, 435, 435, 437, 438, 439, 442, 443, 444, 451, 452, 454, 414, 415, (416?), (740 through 745)	2D, 2C
15	PIT TO PIT DIRECTIONAL BORE for all trenching, including utilities, drain pipes, downspout drain lines, etc., for all trenches within 20 feet of trunks of trees being retained.		Various, along N. Wolfe Rd., east perimeter road, north perimeter road, and west perimeter road.	2D, 2C
16	IRRIGATION PERMANENT Use no-dig over grade tubing, or max. of “6 inch cover within 20 feet of trees” as blurb-specified on all plans.		All areas	2D, 2C

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Line Number	Protection Action	Sample Image	Tree Tag Number	Phase
17	ROOT PROTECTION FENCE – 5-foot high chain link, hung on 7-foot long 2-inch diameter iron tube posts driven 24-inches into the ground, max. 6 feet spacing on-center.		102, 102, 104, 105, (459 through 475), 671, 672, 673, (704 through 839) (Not including individual trees in this group that are to be removed per author recommendation in report section 1.0 line 5).	3D, 3C
18	TRUNK BUFFER – 20 wraps of orange plastic with wood boards overlaid and duct taped in place around the wood		102, 102, 104, 105, (459 through 475), plus all trees at the outermost portions of the tree root zone protection fence sections that face construction work)	3D, 3C
19	WOOD CHIP MULCH – 4 inch thick layer of chipper truck type wood chips (not bark chips). Place over entire open soil root zone areas, and pull 6 to 12 inches away from tree trunk edges.		Where possible, all trees to remain	3D, 3C
20	IRRIGATION TEMPORARY Heavy 1x/week 25 to 100 gallons per tree per week minimum, year-round		Where possible, all trees to remain	3D, 3C

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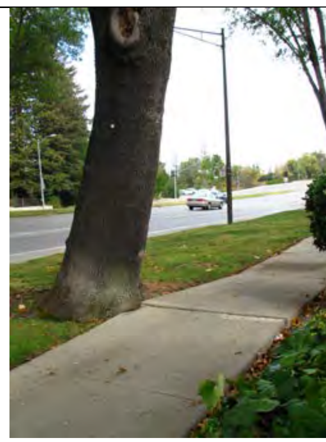
Line Number	Protection Action	Sample Image	Tree Tag Number	Phase
21	ROOT PRUNING Back-dig around exposed roots, and prune at right angle to root growth direction, removing all broken, shattered, or otherwise damaged sections of roots		Where applicable during excavation, trenching, grading, etc.	3D, 3C
22	HARDSCAPE REMAIN Allow existing hardscape areas to remain where possible, to avoid root loss and root damage. Arborist monitoring required during demolition within 20 feet of trunk.		102, 102, 104, 105, (459 through 475)	3D, 3C
23	PIT TO PIT DIRECTIONAL BORE for all trenching, including utilities, drain pipes, downspout drain lines, etc., for all trenches within 20 feet of trunks of trees being retained.		Various, along N. Wolfe Rd., and west perimeter road.	3D, 3C

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Line Number	Protection Action	Sample Image	Tree Tag Number	Phase
24	IRRIGATION PERMANENT Use no-dig over grade tubing, or max. of “6 inch cover within 20 feet of trees” as blurb-specified on all plans.		All areas.	3D, 3C

12.0 Attached, Tree Data Charts Updated (WLCA)

13.0 Attached, Tree Location Map (Landscape Architect)

14.0 Attached, U.S. Forest Service Fact Sheet (coast redwood)

Tree Tag #	To be Removed Per Current Site Plan	Author Recommends Removal Due to Very Poor Condition or Elevated Risk of Failure	Project Team Desires to Transplant	Trunk 1 (in.)	Trunk 2 (in.)	Trunk 3 (in.)	Trunk 4 (in.)	Trunk 5 (in.)	Trunk 6 (in.)	Adjusted Trunk Diameter Inches @ 54" A.G. (1+2+3+4+5)	"Protected Tree" per City of Cupertino Ordinance (10.0" single stem, 20" multi, various specified native and non-native species)	Common Name	Scientific Name (*Genus, species*)	Height and Canopy Spread (ft.)	Health & Structural Ratings (0-100% each)	Overall Condition Rating (0-100%)	Live Twig Density (Very Poor, Poor, Mod, Good, Exc.)	Lopsided Canopy (Direction Noted)	Trunk Lean (Direction Noted)	Historical Stem Splitout Evidence (Note Elevation)	Topped or Severely Pruned in Past	Buried Root Crown (BRC) or Girdling Roots (GR)	Stem Decay (Note Elevation)	Codominant Mainstems with Severe Bark Inclusion(s) (Note Height)	Root Extension Restricted in Planter	Soil Moisture Deficit ("Drought Stress")	WLCA Notes from Spring 2015 Survey	Record Notes on Actual Status of Tree Over Time (removed, pruned, declining, irrigation regime, etc.)
1	X			13.0						13.0		Shamel ash	*Fraxinus uhdei*	30/18	20/30	25% very poor	poor			6				11	X			
2	X			10.9						10.9		Shamel ash	*Fraxinus uhdei*	25/20	50/35	40% poor	moderate			7								
3	X			13.9						13.9		Shamel ash	*Fraxinus uhdei*	30/25	60/45	50% fair	moderate											
4	X			16.6						16.6		Shamel ash	*Fraxinus uhdei*	35/30	55/60	57% fair	moderate											
5	X			22.0						22.0		Shamel ash	*Fraxinus uhdei*	45/45	75/60	66% fair	good			12								
6	X			13.3						13.3		Shamel ash	*Fraxinus uhdei*	35/15	50/35	43% poor	moderate											
7				27.6						27.6		Monterey pine	*Pinus radiata*	55/30	65/65	65% fair	moderate											
8				19.9						19.9		Shamel ash	*Fraxinus uhdei*	55/30	70/60	64% fair	moderate	W									Needs endweight reduction pruning	
9				26.2						26.2		Shamel ash	*Fraxinus uhdei*	55/40	60/50	55% fair	poor to mod					GR					Needs endweight reduction pruning	
10				27.0						27.0		Shamel ash	*Fraxinus uhdei*	55/30	60/50	55% fair	poor to mod	N										
11				28.8						28.8		Shamel ash	*Fraxinus uhdei*	55/30	60/60	60% fair	moderate	S				GR						
12				20.2						20.2		Shamel ash	*Fraxinus uhdei*	55/25	55/50	53% fair	poor to mod	E										
13				22.2						22.2		Shamel ash	*Fraxinus uhdei*	55/25	60/50	55% fair	poor to mod	S										
14				24.7						24.7		Shamel ash	*Fraxinus uhdei*	60/28	60/60	60% fair	moderate	N										

Tree Tag #	To be Removed Per Current Site Plan	Author Recommends Removal Due to Very Poor Condition or Elevated Risk of Failure	Project Team Desires to Transplant	Trunk 1 (in.)	Trunk 2 (in.)	Trunk 3 (in.)	Trunk 4 (in.)	Trunk 5 (in.)	Trunk 6 (in.)	Adjusted Trunk Diameter Inches @ 54" A.G. (1+2+3+4+5)	"Protected Tree" per City of Cupertino Ordinance (10.0" single stem, 20" multi, various specified native and non-native species)	Common Name	Scientific Name (*Genus, species*)	Height and Canopy Spread (ft.)	Health & Structural Ratings (0-100% each)	Overall Condition Rating (0-100%)	Live Twig Density (Very Poor, Poor, Mod, Good, Exc.)	Lopsided Canopy (Direction Noted)	Trunk Lean (Direction Noted)	Historical Stem Splitout Evidence (Note Elevation)	Topped or Severely Pruned in Past	Buried Root Crown (BRC) or Girdling Roots (GR)	Stem Decay (Note Elevation)	Codominant Mainstems with Severe Bark Inclusion(s) (Note Height)	Root Extension Restricted in Planter	Soil Moisture Deficit ("Drought Stress")	WLCA Notes from Spring 2015 Survey	Record Notes on Actual Status of Tree Over Time (removed, pruned, declining, irrigation regime, etc.)
15				24.6						24.6		Shamel ash	*Fraxinus uhdei*	60/30	60/45	55% fair	moderate	N										
16				20.6						20.6		Shamel ash	*Fraxinus uhdei*	55/30	55/55	55% fair	moderate	N										
17				17.7						17.7		Shamel ash	*Fraxinus uhdei*	45/25	0/0	0% dead (not verified)		S									Verify tree condition once spring leafout is complete in April/May.	
18				31.6						31.6		Shamel ash	*Fraxinus uhdei*	60/30	65/48	59% fair	moderate	N				GR		10 to 12				
19				18.2						18.2		Shamel ash	*Fraxinus uhdei*	45/25	60/50	55% fair	moderate	S										
20				21.5						21.5		Shamel ash	*Fraxinus uhdei*	50/35	55/55	55% fair	poor to mod											
21				17.0						17.0		Shamel ash	*Fraxinus uhdei*	35/20	50/60	55% fair	moderate	S				GR						
22				32.3						32.3		Shamel ash	*Fraxinus uhdei*	55/50	75/65	70% good	good	NE										
23				24.5						24.5		Shamel ash	*Fraxinus uhdei*	55/30	65/40	50% fair	moderate	S		30		GR						
24				29.7						29.7		Shamel ash	*Fraxinus uhdei*	55/40	65/50	60% fair	moderate	N				GR						
25				20.7						20.7		Shamel ash	*Fraxinus uhdei*	50/30	55/45	50% fair	moderate	SE		30		serious GR						
26				20.2						20.2		Shamel ash	*Fraxinus uhdei*	35/35	50/50	50% fair	moderate	N				GR						
27				25.8						25.8		Shamel ash	*Fraxinus uhdei*	55/35	65/50	57% fair	moderate	S										
28				36.9						36.9		Shamel ash	*Fraxinus uhdei*	60/40	75/45	60% fair	good	N				GR						

Tree Tag #	To be Removed Per Current Site Plan	Author Recommends Removal Due to Very Poor Condition or Elevated Risk of Failure	Project Team Desires to Transplant	Trunk 1 (in.)	Trunk 2 (in.)	Trunk 3 (in.)	Trunk 4 (in.)	Trunk 5 (in.)	Trunk 6 (in.)	Adjusted Trunk Diameter Inches @ 54" A.G. (1+2+3+4+5)	"Protected Tree" per City of Cupertino Ordinance (10.0" single stem, 20" multi, various specified native and non-native species)	Common Name	Scientific Name (*Genus, species*)	Height and Canopy Spread (ft.)	Health & Structural Ratings (0-100% each)	Overall Condition Rating (0-100%)	Live Twig Density (Very Poor, Poor, Mod, Good, Exc.)	Lopsided Canopy (Direction Noted)	Trunk Lean (Direction Noted)	Historical Stem Splitout Evidence (Note Elevation)	Topped or Severely Pruned in Past	Buried Root Crown (BRC) or Girdling Roots (GR)	Stem Decay (Note Elevation)	Codominant Mainstems with Severe Bark Inclusion(s) (Note Height)	Root Extension Restricted in Planter	Soil Moisture Deficit ("Drought Stress")	WLCA Notes from Spring 2015 Survey	Record Notes on Actual Status of Tree Over Time (removed, pruned, declining, irrigation regime, etc.)
29				32.3						32.3		Shamel ash	*Fraxinus uhdei*	60/35	70/50	60% fair	good	S				GR						
30				29.5						29.5		Shamel ash	*Fraxinus uhdei*	50/40	60/55	59% fair	good	NE										
31				6.3						6.3		Shamel ash	*Fraxinus uhdei*	18/10	40/30	35% poor	moderate	S				BRC					Stunted	
32				17.9						17.9		Shamel ash	*Fraxinus uhdei*	55/35	60/40	50% fair	moderate	N										
33				26.0						26.0		Shamel ash	*Fraxinus uhdei*	55/35	60/50	57% fair	moderate					GR					Diameter estimated.	
34				24.0						24.0		Shamel ash	*Fraxinus uhdei*	50/25	50/40	45% poor	?	S						9			Tree out of leaf. Condition estimated.	
35				23.3						23.3		Shamel ash	*Fraxinus uhdei*	55/25	60/55	57% fair	moderate	N										
36				26.6						26.6		Shamel ash	*Fraxinus uhdei*	55/45	65/60	63% fair	moderate											
37				32.9						32.9		Shamel ash	*Fraxinus uhdei*	60/35	70/60	65% fair	good	N										
38				18.2						18.2		Shamel ash	*Fraxinus uhdei*	50/25	65/50	56% fair	moderate	S										
39				23.0						23.0		Shamel ash	*Fraxinus uhdei*	55/40	65/50	57% fair	good	N						GR			Diameter estimated.	
40				28.2						28.2		Shamel ash	*Fraxinus uhdei*	55/45	60/45	52% fair	moderate	S		25		GR						
41				18.3						18.3		Shamel ash	*Fraxinus uhdei*	50/20	60/50	55% fair	moderate	NE										
42				6.5						6.5		Shamel ash	*Fraxinus uhdei*	20/8	30/25	28% very poor	poor	S	S									

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43				24.0						24.0		Shamel ash	*Fraxinus uhdei*	55/30	65/60	63% fair	good	N				GR					Diameter estimated.	
44				30.7						30.7		Shamel ash	*Fraxinus uhdei*	50/35	65/45	55% fair	good	S				GR						
45				18.0						18.0		Shamel ash	*Fraxinus uhdei*	50/20	50/50	50% fair	poor to mod	N										
46				30.5						30.5		Shamel ash	*Fraxinus uhdei*	55/35	65/45	55% fair	good	S				GR		7 to 9				
47				26.0						26.0		Shamel ash	*Fraxinus uhdei*	55/30	70/60	67% fair	good	N									Diameter estimated.	
48				31.6						31.6		Shamel ash	*Fraxinus uhdei*	55/30	60/55	57% fair	mod to good	S				GR						
49				24.5						24.5		Shamel ash	*Fraxinus uhdei*	55/25	55/55	55% fair	moderate	N										
50				39.5						39.5		Shamel ash	*Fraxinus uhdei*	55/40	55/55	55% fair	moderate	E				serious GR						
51		X		45.7						45.7		Monterey pine	*Pinus radiata*	55/45	25/25	25% very poor	poor										Bark beetle issues	
52				25.9						25.9		Monterey pine	*Pinus radiata*	55/30	40/40	40% poor	poor											
53				16.9						16.9		Shamel ash	*Fraxinus uhdei*	45/25	65/60	63% fair	good	E	E									
54				31.6						31.6		Shamel ash	*Fraxinus uhdei*	55/40	60/50	55% fair	moderate	W				GR						
55				21.8						21.8		Shamel ash	*Fraxinus uhdei*	50/25	65/60	60% fair	good											
56				18.3						18.3		Shamel ash	*Fraxinus uhdei*	50/20	55/55	55% fair	moderate	W										

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57				19.5						19.5		Shamel ash	*Fraxinus uhdei*	55/30	65/60	63% fair	good	E										
58				26.4						26.4		Shamel ash	*Fraxinus uhdei*	55/30	60/55	58% fair	moderate	W										
59				33.8						33.8		Shamel ash	*Fraxinus uhdei*	55/30	60/50	55% fair	good	E						11				
60				24.9						24.9		Shamel ash	*Fraxinus uhdei*	45/35	65/55	60% fair	good	W										
61				24.4						24.4		Shamel ash	*Fraxinus uhdei*	55/35	60/60	60% fair	moderate	E										
62				27.9						27.9		Shamel ash	*Fraxinus uhdei*	55/25	50/50	50% fair	poor to mod	W										
63				31.5						31.5		Shamel ash	*Fraxinus uhdei*	55/40	70/65	68% fair	good											
64				20.8						20.8		Shamel ash	*Fraxinus uhdei*	40/25	50/50	50% fair	poor to mod	W										
65				20.7						20.7		Shamel ash	*Fraxinus uhdei*	50/25	65/53	55% fair	good	E				GR						
66	X			37.8						37.8		Shamel ash	*Fraxinus uhdei*	60/25	70/63	68% fair	good	W										
67	X			18.3						18.3		Shamel ash	*Fraxinus uhdei*	55/25	65/65	65% fair	moderate	W										
68	X			41.0						41.0		Shamel ash	*Fraxinus uhdei*	55/50	60/55	58% fair	mod to good	NW						possible bark inclusion issues				
69				19.4						19.4		holly oak	*Quercus ilex*	45/20	60/60	60% fair	moderate	W										
70				13.2						13.2		holly oak	*Quercus ilex*	25/20	60/60	60% fair	moderate	W										

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71				40.8						40.8		Shamel ash	*Fraxinus uhdei*	60/45	65/55	60% fair	good							10				
72				24.3						24.3		Shamel ash	*Fraxinus uhdei*	55/25	55/50	50% fair	moderate	E				serious GR						
73				26.2						26.2		Shamel ash	*Fraxinus uhdei*	55/35	50/50	50% fair	poor	W						16				
74				28.0						28.0		Shamel ash	*Fraxinus uhdei*	55/30	60/60	60% fair	moderate	E										
75				21.4						21.4		Shamel ash	*Fraxinus uhdei*	40/25	50/50	50% fair	moderate	W										
76				20.2						20.2		Shamel ash	*Fraxinus uhdei*	50/18	40/50	47% poor	poor to mod	E										
77				15.8						15.8		Shamel ash	*Fraxinus uhdei*	45/15	40/30	35% poor	poor	W										
78				17.0						17.0		Shamel ash	*Fraxinus uhdei*	55/35	65/40	50% fair	moderate					serious GR						
79				21.2						21.2		Shamel ash	*Fraxinus uhdei*	55/25	55/55	55% fair	poor to mod	W				GR						
80				28.2						28.2		Shamel ash	*Fraxinus uhdei*	55/35	60/50	55% fair	moderate	E										
81				24.7						24.7		Shamel ash	*Fraxinus uhdei*	55/35	55/50	53% fair	moderate	W										
82				19.0						19.0		Shamel ash	*Fraxinus uhdei*	55/20	45/50	49% poor	poor to mod	E										
83				17.8						17.8		Shamel ash	*Fraxinus uhdei*	55/30	60/55	57% fair	moderate	W										
84				21.2						21.2		Shamel ash	*Fraxinus uhdei*	35/30	55/55	55% fair	moderate	E										

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85				20.3						20.3		Shamel ash	*Fraxinus uhdei*	55/30	65/60	65% fair	moderate to good	W										
86				23.2						23.2		Shamel ash	*Fraxinus uhdei*	55/35	65/50	58% fair	good					GR						
87				22.8						22.8		Shamel ash	*Fraxinus uhdei*	55/35	65/55	60% fair	mod to good	NW										
88				5.9	5.0	4.9				15.8		Monterey pine	*Pinus radiata*	9/11	65/65	65% fair	moderate										ID of species not verified	
89	X			23.5						23.5		Canary Island pine	*Pinus canariensis*	45/18	80/75	78% good	good						0 to 4					
90	X			16.0						16.0		Monterey pine	*Pinus radiata*	18/25	30/30	30% poor	moderate					GR					ID of species not verified. Tree appears to be infected by pine pitch canker fungus.	
91	X			20.4						20.4		Monterey pine	*Pinus radiata*	25/25	40/40	40% poor	poor to mod		W								Tree has bark beetle issues and/or pine pitch canker infection.	
92	X	X		15.5						15.5		carrotwood, or carob tree	*Cupaniopsis anacardioides, or Ceratonia siliqua*	20/15	25/10	15% very poor	poor to mod	W					0 to 8					
93	X			11.6						11.6		carrotwood, or carob tree	*Cupaniopsis anacardioides, or Ceratonia siliqua*	20/15	50/30	45% poor	moderate						4 to 7					
94	X			13.0						13.0		carrotwood, or carob tree	*Cupaniopsis anacardioides, or Ceratonia siliqua*	20/20	45/35	40% poor	poor to mod						6 to 12					
95	X			6.0	6.0	6.0	6.0	6.0	5.0	35.0		carrotwood, or carob tree	*Cupaniopsis anacardioides, or Ceratonia siliqua*	20/20	65/10	30% poor	good							1			Failing at bark inclusion at 1 foot above grade.	
96	X			34.0						34.0		Shamel ash	*Fraxinus uhdei*	40/25	65/55	57% fair	good								X			
97	X			15.3						15.3		holly oak	*Quercus ilex*	20/25	75/75	75% good	good											
98	X			14.0						14.0		holly oak	*Quercus ilex*	25/25	75/75	75% good	good											

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99	X			11.6						11.6		holly oak	*Quercus ilex*	22/20	70/70	70% good	moderate											
100	X			12.3						12.3		Monterey pine	*Pinus radiata*	18/15	50/50	50% fair	moderate		SE	13							ID of species not verified.	
101	X			16.0						16.0		Monterey pine	*Pinus radiata*	28/20	50/50	50% fair	moderate											
102				25.9						25.9		Shamel ash	*Fraxinus uhdei*	50/35	50/35	40% poor	moderate				X			12				
103				24.7						24.7		Shamel ash	*Fraxinus uhdei*	55/35	50/40	45% poor	moderate		E		X			9				
104				16.5						16.5		Shamel ash	*Fraxinus uhdei*	55/30	55/50	50% fair	moderate	E	E		X						Needs endweight reduction pruning	
105				16.0						16.0		Shamel ash	*Fraxinus uhdei*	45/25	45/45	45% poor	moderate	E			X		4					
106	X			21.7						21.7		Shamel ash	*Fraxinus uhdei*	50/35	60/50	55% fair	good				X				X			
107	X			19.4						19.4		Shamel ash	*Fraxinus uhdei*	50/25	60/45	55% fair	moderate	S			X							
108	X			15.9						15.9		Shamel ash	*Fraxinus uhdei*	35/30	55/55	55% fair	poor to mod											
109	X			14.4						14.4		Shamel ash	*Fraxinus uhdei*	35/25	40/40	40% poor	poor to mod	N										
110	X			18.9						18.9		Shamel ash	*Fraxinus uhdei*	45/30	40/30	35% poor	poor							11				
111	X	X		29.7						29.7		Monterey pine	*Pinus radiata*	45/35	60/55	57% fair	moderate										Measured at 2 feet.	
112	X	X		19.1						19.1		Monterey pine	*Pinus radiata*	25/18	0/0	0% Dead												

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113	X	X		28.0	15.0					43.0		Monterey pine	*Pinus radiata*	30/20	25/25	25% very poor	poor	W									Bark beetle issues and/or pine pitch canker fungus.	
114	X			41.0						41.0		Monterey pine	*Pinus radiata*	35/35	55/45	50% fair	moderate	S									Measured at 2 feet.	
115	X			19.8						19.8		Shamel ash	*Fraxinus uhdei*	50/30	50/40	43% poor	poor to mod	E							X			
116	X			12.7						12.7		Shamel ash	*Fraxinus uhdei*	35/25	45/50	47% poor	poor to mod								X			
117	X			14.4						14.4		Shamel ash	*Fraxinus uhdei*	35/25	40/45	45% poor	poor to mod								X			
118	X			7.9						7.9		Shamel ash	*Fraxinus uhdei*	25/15	30/30	30% poor	poor								X			
119	X			10.3						10.3		Shamel ash	*Fraxinus uhdei*	25/20	45/50	48% poor	poor to mod	E							X			
120	X			11.4						11.4		Shamel ash	*Fraxinus uhdei*	25/20	40/30	37% poor	poor to mod	E							X			
121	X			10.9						10.9		Shamel ash	*Fraxinus uhdei*	30/20	60/50	57% fair	mod to good	E							X			
122	X			8.3						8.3		Shamel ash	*Fraxinus uhdei*	25/15	40/30	30% poor	poor		E			GR						
123	X			30.1						30.1		coast redwood	*Sequoia sempervirens*	60/25	30/30	30% poor	poor								X	X		
124	X			22.9						22.9		Shamel ash	*Fraxinus uhdei*	55/40	60/50	55% fair (? Tree is leafless).						GR					Tree condition needs to be verified after spring leafout.	
125	X			24.9						24.9		Shamel ash	*Fraxinus uhdei*	60/30	40/40	40% poor	poor					GR			X			
126	X			12.0						12.0		Shamel ash	*Fraxinus uhdei*	50/20	30/30	30% poor	poor	E							X			

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127	X			25.1						25.1		Shamel ash	*Fraxinus uhdei*	55/35	45/55	50% fair	moderate	E	E			GR			X			
128	X			19.4						19.4		Shamel ash	*Fraxinus uhdei*	50/35	40/50	42% poor	poor	E							X			
129	X			4.0						4.0		fern pine	*Podocarpus gracilior*	15/3	70/50	55% fair	moderate				X						Located at P1 parking level.	
130	X			4.0						4.0		fern pine	*Podocarpus gracilior*	15/3	70/50	55% fair	moderate				X						Located at P1 parking level.	
131	X			4.2						4.2		fern pine	*Podocarpus gracilior*	15/3	70/50	55% fair	moderate				X						Located at P1 parking level.	
132	X			4.4						4.4		fern pine	*Podocarpus gracilior*	15/3	70/50	55% fair	moderate				X						Located at P1 parking level.	
133	X			4.3						4.3		fern pine	*Podocarpus gracilior*	15/3	70/50	55% fair	moderate				X						Located at P1 parking level.	
134	X			4.0						4.0		fern pine	*Podocarpus gracilior*	15/3	70/50	55% fair	moderate				X						Located at P1 parking level.	
135	X			4.8						4.8		fern pine	*Podocarpus gracilior*	15/3	70/50	55% fair	moderate				X						Located at P1 parking level.	
136	X			4.7						4.7		fern pine	*Podocarpus gracilior*	15/3	70/50	55% fair	moderate				X						Located at P1 parking level.	
137	X			4.6						4.6		fern pine	*Podocarpus gracilior*	15/3	70/50	55% fair	moderate				X						Located at P1 parking level.	
138	X			7.8	4.9					12.7		Ficus species	*Ficus sp.*	20/12	70/50	55% fair	moderate				X						Located at P1 parking level.	
139	X			6.8	4.1					10.9		Ficus species	*Ficus sp.*	20/12	70/50	55% fair	moderate				X						Located at P1 parking level.	
140	X			6.8						6.8		Ficus species	*Ficus sp.*	20/12	70/50	55% fair	moderate				X						Located at P1 parking level.	

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141	X			5.9	3.7					9.6		Ficus species	*Ficus sp.*	20/12	70/50	55% fair	moderate				X						Located at P1 parking level.	
142	X			5.0	4.3					9.3		Ficus species	*Ficus sp.*	20/12	70/50	55% fair	moderate				X						Located at P1 parking level.	
143	X			5.0	4.1					9.1		Ficus species	*Ficus sp.*	20/12	70/50	55% fair	moderate				X						Located at P1 parking level.	
144	X			5.0	4.6	4.4				14.0		Ficus species	*Ficus sp.*	20/12	70/50	55% fair	moderate				X						Located at P1 parking level.	
145	X			24.7						24.7		Monterey pine	*Pinus radiata*	35/25	60/60	60% fair	moderate											
146	X			8.1						8.1		evergreen pear	*Pyrus kawakamii*	20/15	60/50	57% fair	moderate											
147	X			7.2						7.2		evergreen pear	*Pyrus kawakamii*	15/12	40/40	40% poor	poor	W										
148	X			42.2						42.2		coast redwood	*Sequoia sempervirens*	60/25	80/80	80% good	good									X		
149	X			28.0						28.0		coast redwood	*Sequoia sempervirens*	55/15	35/45	40% poor	poor								X	X		
150	X			4.0	3.1					7.1		flowering cherry cultivar	*Prunus serrulata* Cult.	12/8	30/30	30% poor	? Out of leaf					BRC					Needs root crown excavation. Condition not verified (tree out of leaf during survey).	
151	X			27.7						27.7		coast redwood	*Sequoia sempervirens*	60/20	80/60	66% fair	good						0 to 3		X	X		
152	X			31.2						31.2		coast redwood	*Sequoia sempervirens*	55/15	60/60	60% fair	moderate									X		
153	X			29.5						29.5		coast redwood	*Sequoia sempervirens*	55/15	60/60	60% fair	moderate									X		
154	X			18.0						18.0		coast redwood	*Sequoia sempervirens*	50/15	70/70	70% good	moderate									X		

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155	X			20.0						20.0		coast redwood	*Sequoia sempervirens*	50/15	70/70	70% good	moderate									X		
156	X			27.4						27.4		coast redwood	*Sequoia sempervirens*	60/18	75/75	75% good	good									X		
157	X			29.0						29.0		coast redwood	*Sequoia sempervirens*	60/18	70/70	70% good	moderate									X		
158	X			27.2						27.2		coast redwood	*Sequoia sempervirens*	60/15	50/40	40% poor	poor									X	Root system severed during ADA ramp installation.	
159	X			34.9						34.9		coast redwood	*Sequoia sempervirens*	70/25	60/40	48% poor	poor to mod									X	Root system severed during ADA ramp installation.	
160	X			16.2						16.2		fern pine	*Podocarpus gracilior*	55/12	70/20	35% poor	moderate				X			3				
161	X			14.6						14.6		fern pine	*Podocarpus gracilior*	50/6	40/20	27% very poor	poor				X			17				
162	X			11.1						11.1		tree species out of leaf	*Genus species*	45/16	50/25	32% poor	poor	S	S					At various elevations				
163	X			21.5						21.5		Shamel ash	*Fraxinus uhdei*	45/30	30/30	30% poor	poor	E						9	X			
164	X			18.8						18.8		Shamel ash	*Fraxinus uhdei*	50/30	35/35	35% poor	poor								X			
165	X			21.4						21.4		Shamel ash	*Fraxinus uhdei*	50/30	30/30	30% poor	poor							6	X			
166	X	X		16.9						16.9		Shamel ash	*Fraxinus uhdei*	35/25	25/25	25% very poor									X			
167	X			21.6						21.6		Shamel ash	*Fraxinus uhdei*	40/25	30/30	30% poor	poor					GR			X			
168	X			12.1						12.1		Shamel ash	*Fraxinus uhdei*	35/20	50/40	45% poor	poor to mod					GR			X			

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169	X	X		20.1						20.1		Shamel ash	*Fraxinus uhdei*	40/25	25/25	25% very poor	very poor								X			
170	X			25.9						25.9		Shamel ash	*Fraxinus uhdei*	55/30	55/40	45% poor	poor					severe GR			X			
171	X			40.2						40.2		coast redwood	*Sequoia sempervirens*	60/25	80/80	80% good	moderate								X	X		
172	X			21.2						21.2		Shamel ash	*Fraxinus uhdei*	45/30	55/45	49% poor	poor							8				
173	X			27.2						27.2		coast redwood	*Sequoia sempervirens*	65/18	45/45	45% poor	poor									X		
174	X			29.5						29.5		Shamel ash	*Fraxinus uhdei*	55/40	30/30	30% poor	poor						0 to 7			X		
175	X			26.5						26.5		Shamel ash	*Fraxinus uhdei*	55/40	50/60	55% fair	moderate									X		
176	X	X		22.5						22.5		Shamel ash	*Fraxinus uhdei*	55/40	25/30	27% very poor	very poor									X		
177	X			37.5						37.5		coast redwood	*Sequoia sempervirens*	65/25	55/60	58% fair	poor to mod								X	X		
178	X			5.7	3.8					9.5		strawberry tree	*Arbutus unedo*	15/15	70/50	60% fair	moderate	W	W		X							
179	X			8.1						8.1		strawberry tree	*Arbutus unedo*	20/12	80/60	70% good	good	W	W									
180	X	X		21.2						21.2		Shamel ash	*Fraxinus uhdei*	55/25	15/15	15% very poor	very poor							11	X			
181	X	X		11.6						11.6		coast redwood	*Sequoia sempervirens*	55/6	10/10	10% very poor	very poor								X	X		
182	X	X		21.2						21.2		coast redwood	*Sequoia sempervirens*	65/12	5/5	5% very poor	very poor									X		

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183	X	X		13.8						13.8		Shamel ash	*Fraxinus uhdei*	45/16	20/20	20% very poor	very poor					GR				X		
184	X	X		11.9						11.9		Shamel ash	*Fraxinus uhdei*	45/12	5/5	5% very poor	very poor									X		
185		X		13.3						13.3		Shamel ash	*Fraxinus uhdei*	50/18	20/20	20% very poor	very poor									X		
186	X	X		9.7						9.7		Shamel ash	*Fraxinus uhdei*	30/12	8/8	8% very poor	very poor									X		
187	X			34.7						34.7		coast redwood	*Sequoia sempervirens*	55/25	60/60	60% fair	moderate									X		
188	X	X		12.2						12.2		dollar gum seedling	*Eucalyptus polyanthemos (seedling)*	50/20	20/20	20% very poor	very poor	N	N							X		
189	X			18.1						18.1		coast redwood	*Sequoia sempervirens*	60/20	40/40	40% poor	poor									X		
190	X			26.9						26.9		coast redwood	*Sequoia sempervirens*	70/25	40/40	40% poor	poor									X		
191	X			17.5						17.5		dollar gum seedling	*Eucalyptus polyanthemos (seedling)*	60/35	60/50	58% fair	moderate		S									
192	X	X		22.3						22.3		coast redwood	*Sequoia sempervirens*	70/12	10/10	10% very poor	very poor											
193	X			21.0						21.0		coast redwood	*Sequoia sempervirens*	70/16	50/50	50% fair	moderate											
194	X			20.4						20.4		dollar gum seedling	*Eucalyptus polyanthemos (seedling)*	60/20	40/40	40% poor	poor								X	X		
195	X			27.6						27.6		coast redwood	*Sequoia sempervirens*	70/20	30/30	30% poor	poor								X	X		
196	X			19.5						19.5		coast redwood	*Sequoia sempervirens*	55/20	55/55	55% fair	moderate								X	X		

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197	X			30.1						30.1		coast redwood	*Sequoia sempervirens*	75/25	70/70	70% good	moderate								X	X		
198	X			5.0						5.0		evergreen pear	*Pyrus kawakamii*	15/12	40/40	40% poor	poor										Stunted.	
199	X			6.0						6.0		evergreen pear	*Pyrus kawakamii*	20/13	40/40	40% poor	poor					GR			X		Infected with bacterial fireblight.	
200	X	X		10.1								evergreen pear	*Pyrus kawakamii*	22/20	30/20	25% very poor	moderate					GR			X		Infected with bacterial fireblight.	
201	X			16.5						16.5		evergreen pear	*Pyrus kawakamii*	30/30	45/55	50% fair	moderate	N	E								Infected with bacterial fireblight.	
202	X			6.0						6.0		evergreen pear	*Pyrus kawakamii*	15/12	50/40	45% poor	poor	N										
203	X	X		18.6						18.6		tulip tree (ID not verified - tree out of leaf during survey)	*Liriodendron tulipifera*	60/20	0/0	0% dead						GR					High risk of failure. Dead tree.	
204	X	X		11.2						11.2		tulip tree (ID not verified - tree out of leaf during survey)	*Liriodendron tulipifera*	45/15	? Tree out of leaf. May be dead.	?			E			GR					High risk of failure. Tree may be dead (verify after spring leafout).	
205	X			36.0						36.0		coast redwood	*Sequoia sempervirens*	80/30	75/75	75% good	good										Possible steep hillslope stability issues.	
206	X			24.1						24.1		coast redwood	*Sequoia sempervirens*	75/20	75/65	70% good	good										Possible steep hillslope stability issues.	
207	X			29.9						29.9		coast redwood	*Sequoia sempervirens*	80/25	75/40	50% fair	good							25			Possible steep hillslope stability issues. Needs arborist cabling between mainstems, or remove one of two mainstems, if retain tree.	
208	X			32.2						32.2		coast redwood	*Sequoia sempervirens*	80/25	75/40	50% fair	good							30			Possible steep hillslope stability issues. Needs arborist cabling between mainstems, or remove one of two mainstems, if retain tree.	
209	X	X		22.4						22.4		tulip tree (ID not verified - tree out of leaf during survey)	*Liriodendron tulipifera*	75/20	0/0	0% dead											High risk of failure. Dead tree.	
210	X			49.0						49.0		coast redwood	*Sequoia sempervirens*	85/25	75/60	65% fair	moderate							65			Possible stability issue on the hill. Roots may have been severed.	

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211	X			14.9						14.9		coast redwood	*Sequoia sempervirens*	50/15	65/65	65% fair	moderate								X	X		
212	X			22.0						22.0		coast redwood	*Sequoia sempervirens*	65/15	75/75	75% good	moderate								X	X		
213	X	X		16.0						16.0		tulip tree (ID not verified - tree out of leaf during survey)	*Liriodendron tulipifera*	35/30	0/0	0% dead (Confirm in spring)		W									Tree appears dead, but may simply be above ground dormant until spring leafout.	
214	X			31.3						31.3		coast redwood	*Sequoia sempervirens*	75/25	75/65	70% good	moderate								X			
215	X			20.3						20.3		fern pine	*Podocarpus gracilior*	50/20	80/60	70% good	good	W										
216	X			15.4						15.4		fern pine	*Podocarpus gracilior*	50/20	75/65	70% good	good	W										
217	X			13.6						13.6		fern pine	*Podocarpus gracilior*	50/20	75/65	70% good	good	W										
218	X	X		17.4						17.4		tulip tree (ID not verified - tree out of leaf during survey)	*Liriodendron tulipifera*	55/20	0/0	0% dead? (Verify once tree has leafed out in spring)		W									Verify condition once tree has leafed out (or not) in spring.	
219				20.8						20.8		Shamel ash	*Fraxinus uhdei*	50/25	40/50	43% poor	poor to mod	W							X			
220				26.8						26.8		Shamel ash	*Fraxinus uhdei*	55/35	60/55	59% fair	moderate											
221				19.3						19.3		Shamel ash	*Fraxinus uhdei*	50/25	50/50	50% fair	moderate											
222	X			19.5						19.5		Shamel ash	*Fraxinus uhdei*	55/35	60/55	58% fair	moderate		E									
223	X			30.4						30.4		Shamel ash	*Fraxinus uhdei*	55/40	70/45	55% fair	good	E	E			GR		12	X			
224	X			18.4						18.4		Shamel ash	*Fraxinus uhdei*	50/15	40/50	40% poor	poor to mod	W										

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225				25.4						25.4		Shamel ash	*Fraxinus uhdei*	55/35	50/40	48% poor	moderate	E									Roots severed on west side.	
226				15.5						15.5		Shamel ash	*Fraxinus uhdei*	45/25	50/30	37% poor	moderate	E	E				0 to 1				Roots severed on west side.	
227		X		18.5						18.5		Shamel ash	*Fraxinus uhdei*	45/25	30/20	25% very poor	poor	E					0 to 5	14			Roots severed on west side.	
228				11.5						11.5		Shamel ash	*Fraxinus uhdei*	30/25	40/30	35% poor	moderate	E									Roots severed on west side.	
229	X			9.6						9.6		coast redwood	*Sequoia sempervirens*	25/12	90/90	90% excellent	good											
230	X			8.9						8.9		coast redwood	*Sequoia sempervirens*	30/14	90/90	90% excellent	good											
231	X			14.4						14.4		Shamel ash	*Fraxinus uhdei*	45/20	35/45	39% poor	poor											
232	X			19.3						19.3		Shamel ash	*Fraxinus uhdei*	55/30	40/45	42% poor	poor to mod	E										
233	X			19.6						19.6		Shamel ash	*Fraxinus uhdei*	55/30	50/40	47% poor	moderate	E					0 to 1					
234	X			15.1						15.1		Shamel ash	*Fraxinus uhdei*	50/25	35/35	35% poor	poor	E										
235	X			17.8						17.8		Shamel ash	*Fraxinus uhdei*	55/25	55/40	50% fair	moderate											
236	X			17.4						17.4		Shamel ash	*Fraxinus uhdei*	55/25	55/55	55% fair	moderate											
237	X			6.5						6.5		Shamel ash	*Fraxinus uhdei*	30/15	75/65	70% good	mod to good											
238	X			9.2						9.2		Shamel ash	*Fraxinus uhdei*	35/18	75/60	72% good	mod to good											

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239				6.8						6.8		Shamel ash	*Fraxinus uhdei*	30/18	70/45	54% fair	mod to good					serious GR						
240				8.1						8.1		Shamel ash	*Fraxinus uhdei*	30/18	70/60	70% good	mod to good											
241				6.4						6.4		coast redwood	*Sequoia sempervirens*	30/10	85/85	85% good	good											
242	X			5.4						5.4		coast redwood	*Sequoia sempervirens*	30/10	85/85	85% good	good											
243	X			5.7						5.7		coast redwood	*Sequoia sempervirens*	30/10	85/85	85% good	good											
244	X			4.6						4.6		coast redwood	*Sequoia sempervirens*	25/10	75/75	75% good	good											
245				6.7						6.7		flowering pear (out of leaf)	*Pyrus calleryana* Cult.	30/14	85/65	75% good	good	N										
246				5.8						5.8		flowering pear (out of leaf)	*Pyrus calleryana* Cult.	25/13	85/60	68% fair	good							see notes			Two codominant mainstems. Remove one of two.	
247				4.9						4.9		flowering pear (out of leaf)	*Pyrus calleryana* Cult.	24/10	85/50	55% fair	moderate	N									Root crown anomaly.	
248				7.8						7.8		flowering pear (out of leaf)	*Pyrus calleryana* Cult.	30/18	85/55	62% fair	good	N						Various elevations				
249				6.5						6.5		flowering pear (out of leaf)	*Pyrus calleryana* Cult.	30/12	85/65	75% good	good	N										
250				6.3						6.3		flowering pear (out of leaf)	*Pyrus calleryana* Cult.	30/12	85/55	60% fair	good	N						12				
251				6.1						6.1		flowering pear (out of leaf)	*Pyrus calleryana* Cult.	20/10	85/60	68% fair	good											
252	X			3.6						3.6		flowering pear (out of leaf)	*Pyrus calleryana* Cult.	18/8	85/75	80% good	good											

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253	X			7.3						7.3		flowering pear (out of leaf)	*Pyrus calleryana* Cult.	30/15	85/65	73% good	good											
254	X			7.5						7.5		flowering pear (out of leaf)	*Pyrus calleryana* Cult.	30/18	85/55	63% fair	good							7				
255	X			9.0						9.0		flowering pear (out of leaf)	*Pyrus calleryana* Cult.	30/20	85/45	55% fair	good				X			7				
256	X			7.5						7.5		flowering pear (out of leaf)	*Pyrus calleryana* Cult.	30/15	85/50	58% fair	good				X			7				
257	X			7.4						7.4		flowering pear (out of leaf)	*Pyrus calleryana* Cult.	30/15	85/55	65% fair	good				X			10				
258	X			6.7						6.7		flowering pear (out of leaf)	*Pyrus calleryana* Cult.	30/15	85/60	67% fair	good			X	X							
259	X			4.9						4.9		flowering pear (out of leaf)	*Pyrus calleryana* Cult.	25/12	85/65	69% fair	good			X								
260			X	35.9						35.9	X	California sycamore	*Platanus racemosa*	65/45	65/50	60% fair	moderate	W	W									
261				22.8	21.9					44.7	X	California sycamore	*Platanus racemosa*	65/45	75/45	57% fair	moderate		N & S			GR	See notes at right	At zero ft.			Bark sloughing at root crown, possibly due to irrigation water spray.	
262				15.4						15.4	X	California sycamore	*Platanus racemosa*	45/30	70/70	70% good	moderate	NE	NE				1 ft.					
263	X			13.5						13.5		Shamel ash	*Fraxinus uhdei*	35/15	50/45	47% poor	moderate	S	S			GR						
264	X			14.9						14.9		Shamel ash	*Fraxinus uhdei*	55/20	55/55	55% fair	poor to mod	S	S									
265	X			19.0						19.0		Shamel ash	*Fraxinus uhdei*	50/20	55/40	45% poor	moderate					GR		25				
266	X			20.8						20.8		Shamel ash	*Fraxinus uhdei*	55/30	50/30	35% poor	poor to mod				X						Roots have been severed.	

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267	X			23.7						23.7		Shamel ash	*Fraxinus uhdei*	50/35	65/30	30% poor	good	SW	SW			GR					Roots have been severed.	
268	X			26.5						26.5		Shamel ash	*Fraxinus uhdei*	55/25	75/55	65% fair	good	S							X			
269	X			27.1						27.1		Shamel ash	*Fraxinus uhdei*	55/25	75/45	55% fair	good					serious GR		25	X			
270	X			28.7						28.7		Shamel ash	*Fraxinus uhdei*	60/35	75/55	63% fair	good							10			Root system asymmetrical	
271	X			35.2						35.2		coast redwood	*Sequoia sempervirens*	60/20	70/70	70% good	moderate									X		
272	X			19.3						19.3		coast redwood	*Sequoia sempervirens*	70/12	68/70	69% fair	moderate									X		
273	X			23.3						23.3		coast redwood	*Sequoia sempervirens*	60/12	70/70	70% good	moderate									X		
274	X			23.9						23.9		coast redwood	*Sequoia sempervirens*	60/12	70/70	70% good	moderate									X		
275	X			17.0						17.0		Shamel ash	*Fraxinus uhdei*	55/16	65/65	65% fair	moderate									X		
276	X			15.4						15.4		Shamel ash	*Fraxinus uhdei*	50/12	40/30	34% poor	poor	E						at root crown	X			
277				19.3						19.3		Shamel ash	*Fraxinus uhdei*	50/25	50/40	40% poor	moderate	E	E			serious GR			X			
278				21.0						21.0		Shamel ash	*Fraxinus uhdei*	60/25	60/50	55% fair	moderate	W	W			GR						
279	X			26.7						26.7		coast redwood	*Sequoia sempervirens*	50/20	80/80	80% good	good											
280				16.4						16.4		Shamel ash	*Fraxinus uhdei*	40/20	30/45	37% poor	poor					serious GR			X			

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281		X		21.2						21.2		Shamel ash	*Fraxinus uhdei*	50/35	30/20	20% very poor	very poor			6					X		Roots severed.	
282				15.0						15.0		Shamel ash	*Fraxinus uhdei*	35/18	30/30	30% poor	poor	E				GR			X		Roots severed.	
283				18.1						18.1		Shamel ash	*Fraxinus uhdei*	50/20	40/30	35% poor	poor to mod		E			GR			X		Roots severed.	
284				14.4						14.4		Shamel ash	*Fraxinus uhdei*	40/25	40/40	40% poor	poor					GR			X			
285				18.4						18.4		Shamel ash	*Fraxinus uhdei*	50/25	50/40	44% poor	poor to mod	E	E			GR			X		Roots severed.	
286				17.0						17.0		Shamel ash	*Fraxinus uhdei*	40/45	60/60	60% fair	moderate	N										
287				24.3						24.3		coast redwood	*Sequoia sempervirens*	60/15	70/70	70% good	moderate									X		
288				15.7						15.7		coast redwood	*Sequoia sempervirens*	60/15	70/70	70% good	moderate									X		
289				26.9						26.9		coast redwood	*Sequoia sempervirens*	60/15	50/65	63% fair	moderate									X	Apical meristem showing physical symptoms of soil moisture deficit.	
290				14.8						14.8		Shamel ash	*Fraxinus uhdei*	40/20	45/35	40% poor	poor to mod	W				serious GR			X			
291				24.2						24.2		Shamel ash	*Fraxinus uhdei*	50/40	55/45	48% poor	moderate	W				serious GR		6				
292				16.3						16.3		coast redwood	*Sequoia sempervirens*	35/10	70/70	70% good	moderate											
293	X			11.0						11.0		giant sequoia	*Metasequoia glyptostroboides*	20/10	30/30	30% poor	poor	W	W								Has a *Botryospheria* infection.	
294	X			18.7						18.7		fern pine	*Podocarpus gracilior*	30/18	50/40	45% poor	moderate	W						5	X			

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295	X			8.6						8.6		southern magnolia	*Magnolia grandiflora*	18/15	25/25	25% very poor	very poor	W		9					X	X		
296	X			17.3						17.3		Shamel ash	*Fraxinus uhdei*	30/15	35/35	35% poor	poor	W	W									
297	X	X		12.1						12.1		Shamel ash	*Fraxinus uhdei*	25/15	35/20	20% very poor	poor						6					
298	X	X		18.8						18.8		coast redwood	*Sequoia sempervirens*	60/12	15/15	15% very poor	very poor									X		
299	X			16.0						16.0		Shamel ash	*Fraxinus uhdei*	45/15	30/45	40% poor	poor		E									
300	X	X		23.3						23.3		coast redwood	*Sequoia sempervirens*	60/15	20/20	20% very poor	very poor									X		
301	X	X		15.2						15.2		Shamel ash	*Fraxinus uhdei*	25/18	20/15	19% very poor	very poor									X		
302	X			26.9	15.0					41.9		coast redwood	*Sequoia sempervirens*	70/25	60/60	60% fair	moderate									X		
303	X			17.2						17.2		Shamel ash	*Fraxinus uhdei*	35/25	55/60	55% fair	moderate	NW										
304	X	X		19.0						19.0		coast redwood	*Sequoia sempervirens*	45/10	5/5	5% very poor	very poor									X		
305	X	X		20.1						20.1		Shamel ash	*Fraxinus uhdei*	20/15	10/10	10% very poor					X			6				
306	X			17.5						17.5		Shamel ash	*Fraxinus uhdei*	45/25	50/40	40% poor	poor to mod	W						8				
307	X	X		17.7						17.7		Shamel ash	*Fraxinus uhdei*	40/20	30/25	29% very poor	poor				X		0 to 6					
308	X			21.1						21.1		coast redwood	*Sequoia sempervirens*	50/15	75/75	75% good	good											

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309	X			16.2						16.2		coast redwood	*Sequoia sempervirens*	50/15	75/70	73% good	good											
310	X			20.6						20.6		Shamel ash	*Fraxinus uhdei*	50/35	50/50	50% fair	moderate	W										
311	X			27.0						27.0		Shamel ash	*Fraxinus uhdei*	55/45	65/55	60% fair	good	W						8				
312	X			16.1						16.1		Shamel ash	*Fraxinus uhdei*	35/20	50/25	32% poor	moderate	W				GR	at root crown due to sprinkler irrigation most likely					
313	X			20.9						20.9		Shamel ash	*Fraxinus uhdei*	45/35	50/35	45% poor	poor	W				GR			X			
314	X			30.6						30.6		Shamel ash	*Fraxinus uhdei*	55/45	70/40	50% fair	Good				X			6			Root system on steep slope	
315	X			21.8						21.8		coast redwood	*Sequoia sempervirens*	60/12	55/60	57% fair	moderate	E								X		
316	X			18.5						18.5		Shamel ash	*Fraxinus uhdei*	55/20	50/45	48% poor	moderate	N									Root system on steep slope	
317				10.2						10.2		Shamel ash	*Fraxinus uhdei*	45/12	40/40	40% poor	poor											
318				9.9						9.9		Shamel ash	*Fraxinus uhdei*	50/12	45/45	45% poor	poor											
319				18.6						18.6		Shamel ash	*Fraxinus uhdei*	50/30	50/50	50% fair	moderate	N										
320	X			13.3						13.3		Shamel ash	*Fraxinus uhdei*	35/12	50/40	45% poor	moderate							7				
321	X			16.2						16.2		Shamel ash	*Fraxinus uhdei*	50/20	55/60	56% fair	mod to good									X		
322	X			11.9						11.9		Shamel ash	*Fraxinus uhdei*	45/15	40/40	40% poor	poor									X		

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323	X			9.4						9.4		Shamel ash	*Fraxinus uhdei*	45/12	30/30	30% poor	poor									X		
324	X			12.8						12.8		Shamel ash	*Fraxinus uhdei*	40/12	30/40	35% poor	poor									X		
325	X	X		7.4						7.4		Shamel ash	*Fraxinus uhdei*	28/12	20/20	20% very poor	very poor									X		
326	X			13.0						13.0		Shamel ash	*Fraxinus uhdei*	45/20	45/55	48% poor	poor									X		
327	X			11.9						11.9		Shamel ash	*Fraxinus uhdei*	45/12	30/30	30% poor	poor		E			GR				X		
328	X	X		5.7						5.7		southern magnolia	*Magnolia grandiflora*	12/6	0/0	0% dead										X		
329	X			14.2						14.2		Shamel ash	*Fraxinus uhdei*	45/20	35/40	38% poor	poor		S							X		
330	X			15.7						15.7		Shamel ash	*Fraxinus uhdei*	40/20	30/40	35% poor	poor		S							X		
331	X			10.1						10.1		Shamel ash	*Fraxinus uhdei*	30/20	40/35	37% poor	poor	S	S							X		
332	X	X		18.9						18.9		coast redwood	*Sequoia sempervirens*	55/12	5/5	5% very poor	very poor									X		
333	X	X		18.4						18.4		coast redwood	*Sequoia sempervirens*	55/8	5/5	5% very poor	very poor									X		
334	X			18.5						18.5		Shamel ash	*Fraxinus uhdei*	45/25	45/55	50% fair	moderate									X		
335	X	X		16.0						16.0		coast redwood	*Sequoia sempervirens*	50/12	5/5	5% very poor	very poor									X		
336	X	X		9.6						9.6		Shamel ash	*Fraxinus uhdei*	25/10	10/10	10% very poor	moderate						mainstem			X		

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337	X	X		8.8						8.8		Shamel ash	*Fraxinus uhdei*	25/7	5/5	5% very poor	very poor						mainstem			X		
338	X			8.7						8.7		Shamel ash	*Fraxinus uhdei*	30/8	30/10	15% very poor	poor						mainstem			X		
339	X			12.8						12.8		Shamel ash	*Fraxinus uhdei*	40/20	40/40	40% poor	poor	W								X		
340	X			14.3						14.3		Shamel ash	*Fraxinus uhdei*	50/20	35/40	38% poor	poor									X		
341	X	X		10.9						10.9		Shamel ash	*Fraxinus uhdei*	35/8	10/10	10% very poor	very poor						mainstem			X		
342	X	X		12.0						12.0		Shamel ash	*Fraxinus uhdei*	45/18	10/10	10% very poor	very poor						mainstem			X		
343	X			13.7						13.7		Shamel ash	*Fraxinus uhdei*	45/18	35/35	35% poor	poor									X	Verify condition once tree leafs out in spring.	
344	X	X		7.3						7.3		Shamel ash	*Fraxinus uhdei*	20/12	20/20	20% very poor	very poor									X		
345	X			14.4						14.4		Shamel ash	*Fraxinus uhdei*	50/20	40/30	35% poor	poor							8		X		
346	X	X		10.7						10.7		Shamel ash	*Fraxinus uhdei*	25/12	10/10	10% very poor	very poor	E								X		
347	X	X		11.3						11.3		Shamel ash	*Fraxinus uhdei*	25/12	25/10	17% very poor	poor									X		
348	X	X		12.9						12.9		Shamel ash	*Fraxinus uhdei*	45/18	25/20	20% very poor	very poor									X		
349	X	X		12.2						12.2		Shamel ash	*Fraxinus uhdei*	30/20	25/25	25% very poor	very poor									X		
350	X	X		14.2						14.2		Shamel ash	*Fraxinus uhdei*	50/15	20/20	20% very poor	very poor									X		

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351	X			14.6						14.6		Shamel ash	*Fraxinus uhdei*	30/20	40/25	28% very poor	poor to mod							6		X		
352	X			11.7						11.7		Shamel ash	*Fraxinus uhdei*	25/20	10/10	10% very poor	very poor	W	W							X		
353	X			17.7						17.7		Shamel ash	*Fraxinus uhdei*	40/25	35/35	35% poor	poor	E								X		
354	X			13.4						13.4		Shamel ash	*Fraxinus uhdei*	35/20	45/35	40% poor	poor									X		
355	X			12.5						12.5		Shamel ash	*Fraxinus uhdei*	35/15	20/15	18% very poor	very poor									X		
356	X			18.0						18.0		Shamel ash	*Fraxinus uhdei*	45/30	20/10	15% very poor	very poor	W	S							X		
357	X			20.8						20.8		Shamel ash	*Fraxinus uhdei*	45/45	40/50	46% poor	M									X		
358	X			10.9						10.9		Shamel ash	*Fraxinus uhdei*	35/15	0/0	0% dead	E	E								X		
359	X			18.3						18.3		Pine species (not verified)	*Pinus sp.*	30/20	80/55	65% fair	good	N					0 to 1 foot		X			
360	X			24.4						24.4		Italian stone pine	*Pinus pinea*	30/35	90/60	77% good	excellent											
361	X			26.6						26.6		Italian stone pine	*Pinus pinea*	30/30	60/60	60% fair	moderate								X	X	Measured at 2 feet.	
362	X			28.6						28.6		Italian stone pine	*Pinus pinea*	25/35	70/70	70% good	good								X		Measured at 2 feet.	
363	X			7.2						7.2		red oak	*Quercus rubra (not verified)*	20/15	80/50	60% fair	good										Tree out of leaf. Needs training pruning.	
364	X			5.5						5.5		oak species	*Quercus sp.*	12/8	60/40	40% poor	moderate				X			5			Tree out of leaf. Needs training pruning.	

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365	X			7.3						7.3		southern magnolia	*Magnolia grandiflora*	18/13	40/40	40% poor	poor to mod									X		
366	X			17.0						17.0		Italian stone pine	*Pinus pinea*	18/25	80/50	60% fair	good	N							X		Measured at 3.5 feet	
367	X			24.3						24.3		Italian stone pine	*Pinus pinea*	25/30	80/35	45% poor	good	N						5	X			
368	X			20.2						20.2		Italian stone pine	*Pinus pinea*	25/30	80/35	45% poor	good	N				GR		7	X		Measured at 3.5 feet.	
369	X			23.8						23.8		Italian stone pine	*Pinus pinea*	25/30	50/50	50% fair	poor to mod			10							Measured at 2.0 feet.	
370	X			5.7						5.7		tree species out of leaf	*(Genus, species)*	25/15	75/55	65% fair	moderate										Verify species in spring after full leafout.	
371	X			26.3						26.3		Aleppo pine	*Pinus halepensis*	30/35	80/60	70% good	good								X		Codominant mainstems at 5 feet.	
372	X			21.6	18.7					40.3		Italian stone pine	*Pinus pinea*	30/35	80/70	75% good	good	N							X			
373	X	X		7.4						7.4		southern magnolia	*Magnolia grandiflora*	20/15	25/25	25% very poor	very poor									X		
374	X	X		7.2						7.2		tulip tree	*Liriodendron tulipifera*	12/8	20/10	15% very poor	very poor	N			X				X	X		
375	X	X		5.6						5.6		tulip tree	*Liriodendron tulipifera*	12/8	20/10	15% very poor	very poor				X				X	X		
376	X	X		5.6						5.6		southern magnolia	*Magnolia grandiflora*	13/10	25/25	25% very poor	very poor									X		
377	X			7.6						7.6		southern magnolia	*Magnolia grandiflora*	19/12	35/35	35% poor	poor									X		
378	X	X		7.0						7.0		southern magnolia	*Magnolia grandiflora*	20/14	20/20	20% very poor	very poor									X		

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379	X	X		6.5						6.5		southern magnolia	*Magnolia grandiflora*	14/12	25/25	25% very poor	very poor									X		
380	X	X		7.4						7.4		southern magnolia	*Magnolia grandiflora*	20/10	20/20	20% very poor	very poor	W								X		
381	X			23.0	14.7					37.7		Italian stone pine	*Pinus pinea*	25/30	75/55	64% fair	moderate							5	X			
382	X			20.8						20.8		Italian stone pine	*Pinus pinea*	25/25	70/60	65% fair	moderate					GR			X			
383	X			19.5						19.5		Italian stone pine	*Pinus pinea*	25/30	80/65	74% good	good		E			GR			X			
384	X			22.0						22.0		Italian stone pine	*Pinus pinea*	25/30	70/60	65% fair	moderate	S	S						X		Measured at 2.0 feet.	
385	X			33.2						33.2		Italian stone pine	*Pinus pinea*	25/35	60/30	38% poor	moderate	S						3	X			
386	X	X		4.5						4.5		southern magnolia	*Magnolia grandiflora*	13/8	15/15	15% very poor	very poor							1	X	X		
387	X	X		7.8						7.8		southern magnolia	*Magnolia grandiflora*	18/18	20/20	20% very poor	very poor									X		
388	X	X		7.5						7.5		southern magnolia	*Magnolia grandiflora*	18/15	20/20	20% very poor	very poor									X		
389	X			31.9	22.3					54.2		Italian stone pine	*Pinus pinea*	30/45	50/40	47% poor	moderate							2	X			
390	X			13.2	13.0					26.2		Italian stone pine	*Pinus pinea*	25/15	80/30	45% poor	good	N	N					3	X			
391	X			12.4	12.0					24.4		Italian stone pine	*Pinus pinea*	25/30	80/60	67% fair	good	E	E					3	X			
392	X			14.6						14.6		Italian stone pine	*Pinus pinea*	25/18	80/65	69% fair	good	E							X			

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393	X			14.3						14.3		Italian stone pine	*Pinus pinea*	20/20	70/70	70% good	good		E						X			
394	X			10.3						10.3		tree species out of leaf	*(Genus, species)*	35/20	80/65	75% good	good											
395	X			9.8						9.8		tree species out of leaf	*(Genus, species)*	35/20	80/65	75% good	good	W										
396	X			18.1						18.1		coast redwood	*Sequoia sempervirens*	65/12	70/70	70% good	moderate										Steep slope	
397	X			20.5						20.5		coast redwood	*Sequoia sempervirens*	65/12	75/75	75% good	moderate										Steep slope	
398	X			13.4						13.4		Shamel ash	*Fraxinus uhdei*	40/25	80/70	74% good	good										Steep slope	
399	X			11.3						11.3		Shamel ash	*Fraxinus uhdei*	35/15	30/30	30% poor	poor										Steep slope	
400	X			21.3						21.3		Shamel ash	*Fraxinus uhdei*	40/25	60/50	55% fair	moderate							6			Steep slope	
401	X			20.2						20.2		Shamel ash	*Fraxinus uhdei*	45/20	50/35	40% poor	moderate	W					8	10			On steep slope.	
402	X			18.4						18.4		Shamel ash	*Fraxinus uhdei*	45/25	60/45	55% fair	good							6			On steep slope.	
403	X			15.0						15.0		Shamel ash	*Fraxinus uhdei*	40/18	40/40	40% poor	poor	W					6	8			On steep slope.	
404	X			25.7						25.7		Shamel ash	*Fraxinus uhdei*	55/35	40/40	40% poor	poor	SW						various elevations			On steep slope.	
405	X			29.5						29.5		Shamel ash	*Fraxinus uhdei*	65/35	40/35	40% poor	poor	S	S					7			On steep slope.	
406	X			17.4						17.4		coast redwood	*Sequoia sempervirens*	50/8	70/70	70% good	moderate										On steep slope.	

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407	X	X		4.1						4.1		southern magnolia	*Magnolia grandiflora*	15/1	5/5	5% very poor	very poor							0 to 10				
408	X	X		5.9	3.8					9.7		southern magnolia	*Magnolia grandiflora*	18/6	10/10	10% very poor	very poor							various elevations				
409	X			18.3						18.3		coast redwood	*Sequoia sempervirens*	55/15	65/65	65% fair	moderate								X			
410	X			20.7						20.7		coast redwood	*Sequoia sempervirens*	55/13	65/65	65% fair	moderate								X			
411	X			22.4						22.4		coast redwood	*Sequoia sempervirens*	55/13	60/60	60% fair	poor to mod								X			
412	X			32.4						32.4		Shamel ash	*Fraxinus uhdei*	65/35	65/55	65% fair	good	S										
413	X			15.6						15.6		Shamel ash	*Fraxinus uhdei*	60/18	50/40	45% poor	poor to mod	N										
414				22.5						22.5	X	California sycamore	*Platanus racemosa*	55/30	50/45	50% fair	moderate	W	W			GR					Will need endweight reduction pruning at west side of canopy.	
415				18.3						18.3	X	California sycamore	*Platanus racemosa*	60/30	50/50	50% fair	moderate	N				GR						
416			X	17.8						17.8	X	California sycamore	*Platanus racemosa*	50/20	50/50	50% fair	moderate	E				GR						
417	X			19.2						19.2		Shamel ash	*Fraxinus uhdei*	30/25	75/55	70% good	good											
418	X			11.5						11.5		Shamel ash	*Fraxinus uhdei*	30/15	45/40	40% poor	moderate					GR						
419	X			17.3						17.3		Shamel ash	*Fraxinus uhdei*	35/40	60/50	55% fair	moderate	W				GR						
420	X			11.1						11.1		Shamel ash	*Fraxinus uhdei*	35/25	75/70	70% good	good	W										

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421	X			13.7						13.7		Shamel ash	*Fraxinus uhdei*	35/25	50/50	50% fair	poor to mod											
422	X			14.3						14.3		Shamel ash	*Fraxinus uhdei*	30/30	75/45	60% fair	good							9				
423	X			29.1						29.1		coast redwood	*Sequoia sempervirens*	70/20	70/70	70% good	moderate											
424	X			33.6						33.6		coast redwood	*Sequoia sempervirens*	70/18	60/60	60% fair	moderate											
425	X			24.9						24.9		coast redwood	*Sequoia sempervirens*	65/15	70/70	70% good	moderate											
426				27.8						27.8		coast redwood	*Sequoia sempervirens*	55/20	75/68	70% good	moderate											
427				17.3						17.3		Shamel ash	*Fraxinus uhdei*	60/20	40/40	40% poor	poor	E							X			
428	X			29.0						29.0		Shamel ash	*Fraxinus uhdei*	60/35	50/50	50% fair	poor to mod	W										
429	X			22.0						22.0		Shamel ash	*Fraxinus uhdei*	55/35	70/55	65% fair	good										Codominant mainstems fork at 13 feet.	
430				27.4						27.4		giant sequoia	*Metasequoia glyptostroboides*	75/15	65/45	55% fair	poor to mod										Tree was limbed up.	
431				27.9						27.9		Shamel ash	*Fraxinus uhdei*	65/45	45/30	40% poor	poor to mod	W	E					9				
432				24.0						24.0		Shamel ash	*Fraxinus uhdei*	55/35	50/60	55% fair	poor to mod	W										
433				16.9						16.9		Shamel ash	*Fraxinus uhdei*	60/25	75/60	63% fair	good	E	E									
434		?		29.3						29.3		giant sequoia	*Metasequoia glyptostroboides*	75/12	35/20	25% very poor	poor	E			X						Roots were severed during installation of ADA walkway.	

Tree Tag #	To be Removed Per Current Site Plan	Author Recommends Removal Due to Very Poor Condition or Elevated Risk of Failure	Project Team Desires to Transplant	Trunk 1 (in.)	Trunk 2 (in.)	Trunk 3 (in.)	Trunk 4 (in.)	Trunk 5 (in.)	Trunk 6 (in.)	Adjusted Trunk Diameter Inches @ 54" A.G. (1+2+3+4+5)	"Protected Tree" per City of Cupertino Ordinance (10.0" single stem, 20" multi, various specified native and non-native species)	Common Name	Scientific Name (*Genus, species*)	Height and Canopy Spread (ft.)	Health & Structural Ratings (0-100% each)	Overall Condition Rating (0-100%)	Live Twig Density (Very Poor, Poor, Mod, Good, Exc.)	Lopsided Canopy (Direction Noted)	Trunk Lean (Direction Noted)	Historical Stem Splitout Evidence (Note Elevation)	Topped or Severely Pruned in Past	Buried Root Crown (BRC) or Girdling Roots (GR)	Stem Decay (Note Elevation)	Codominant Mainstems with Severe Bark Inclusion(s) (Note Height)	Root Extension Restricted in Planter	Soil Moisture Deficit ("Drought Stress")	WLCA Notes from Spring 2015 Survey	Record Notes on Actual Status of Tree Over Time (removed, pruned, declining, irrigation regime, etc.)
435		?		31.1						31.1		Shamel ash	*Fraxinus uhdei*	65/45	40/20	25% very poor	poor	W				GR					Roots severed during sidewalk replacement	
436	X			23.0	12.0					35.0		coast redwood	*Sequoia sempervirens*	65/18	75/60	65% fair	good							3			Diameters estimated.	
437				27.7						27.7		Shamel ash	*Fraxinus uhdei*	60/30	30/30	30% poor	poor	W						9				
438		?		23.5						23.5		Shamel ash	*Fraxinus uhdei*	65/18	60/30	37% poor	moderate	E									Roots severed during sidewalk replacement	
439				27.0						27.0		coast redwood	*Sequoia sempervirens*	75/16	70/70	70% good	good				X						Crown raising pruning was performed to limb up this tree.	
440	X			18.7						18.7		Shamel ash	*Fraxinus uhdei*	60/30	35/35	35% poor	very poor	W	W					1			Condition estimated prior to spring leafout.	
441	X			21.2						21.2		Shamel ash	*Fraxinus uhdei*	60/45	50/50	50% fair	moderate							1			Roots severed during sidewalk replacement	
442				31.2						31.2		Shamel ash	*Fraxinus uhdei*	60/45	60/45	53% fair	moderate	W	S								Roots severed during sidewalk replacement . Will need endweight reduction pruning.	
443				41.0						41.0		coast redwood	*Sequoia sempervirens*	70/20	75/60	68% fair	good							5			Cable installation recommended.	
444				21.5						21.5		Shamel ash	*Fraxinus uhdei*	55/30	70/50	60% fair	moderate	W										
445	X			15.4						15.4		Shamel ash	*Fraxinus uhdei*	60/18	50/50	50% fair	moderate	N			X							
446	X			21.1						21.1		coast redwood	*Sequoia sempervirens*	70/15	75/75	75% good	good											
447	X			17.5						17.5		Shamel ash	*Fraxinus uhdei*	60/20	55/50	52% fair	poor to mod	N										
448	X			15.7						15.7		coast redwood	*Sequoia sempervirens*	70/10	60/60	60% fair	moderate	E									Tree was limbed up.	

Tree Tag #	To be Removed Per Current Site Plan	Author Recommends Removal Due to Very Poor Condition or Elevated Risk of Failure	Project Team Desires to Transplant	Trunk 1 (in.)	Trunk 2 (in.)	Trunk 3 (in.)	Trunk 4 (in.)	Trunk 5 (in.)	Trunk 6 (in.)	Adjusted Trunk Diameter Inches @ 54" A.G. (1+2+3+4+5)	"Protected Tree" per City of Cupertino Ordinance (10.0" single stem, 20" multi, various specified native and non-native species)	Common Name	Scientific Name (*Genus, species*)	Height and Canopy Spread (ft.)	Health & Structural Ratings (0-100% each)	Overall Condition Rating (0-100%)	Live Twig Density (Very Poor, Poor, Mod, Good, Exc.)	Lopsided Canopy (Direction Noted)	Trunk Lean (Direction Noted)	Historical Stem Splitout Evidence (Note Elevation)	Topped or Severely Pruned in Past	Buried Root Crown (BRC) or Girdling Roots (GR)	Stem Decay (Note Elevation)	Codominant Mainstems with Severe Bark Inclusion(s) (Note Height)	Root Extension Restricted in Planter	Soil Moisture Deficit ("Drought Stress")	WLCA Notes from Spring 2015 Survey	Record Notes on Actual Status of Tree Over Time (removed, pruned, declining, irrigation regime, etc.)
449	X			16.5						16.5		coast redwood	*Sequoia sempervirens*	70/10	60/60	60% fair	moderate	E									Tree was limbed up.	
450	X			15.5						15.5		coast redwood	*Sequoia sempervirens*	70/10	60/50	55% fair	moderate	E									Tree was limbed up.	
451				19.6						19.6		Shamel ash	*Fraxinus uhdei*	50/25	70/55	60% fair	good	W										
452				21.5						21.5		Shamel ash	*Fraxinus uhdei*	55/30	50/35	40% poor	poor to mod	W						0 to 2				
453	X	X		15.0						15.0		Shamel ash	*Fraxinus uhdei*	50/10	10/10	10% very poor	very poor											
454				29.4						29.4		Shamel ash	*Fraxinus uhdei*	65/35	50/40	47% poor	poor to mod							12			Roots damaged.	
455	X			17.7						17.7		Shamel ash	*Fraxinus uhdei*	45/18	30/35	33% poor	poor	E									Roots damaged.	
456	X			22.3						22.3		Shamel ash	*Fraxinus uhdei*	60/20	40/35	37% poor	poor	W	W					15				
457	X			28.5						28.5		Shamel ash	*Fraxinus uhdei*	65/35	50/60	55% fair	moderate	W										
458	X			25.1						25.1		Shamel ash	*Fraxinus uhdei*	60/35	30/40	35% poor	poor to mod							various elevations			Bark sluffing off. Phloem/bark disorder.	
459				31.9						31.9		Shamel ash	*Fraxinus uhdei*	75/45	60/60	60% fair	moderate										Roots damaged.	
460				31.8						31.8		Shamel ash	*Fraxinus uhdei*	65/45	60/55	59% fair	moderate										Roots damaged.	
461				25.5						25.5		Shamel ash	*Fraxinus uhdei*	55/40	50/50	50% fair	poor to mod							15				
462				15.3						15.3		Shamel ash	*Fraxinus uhdei*	40/15	50/40	45% poor	moderate							8				

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463				21.0						21.0		Shamel ash	*Fraxinus uhdei*	55/45	75/60	70% good	good	W									Roots damaged.	
464				34.1						34.1		Shamel ash	*Fraxinus uhdei*	55/30	65/45	48% poor	moderate	E					0 to 5					
465				22.8						22.8		Shamel ash	*Fraxinus uhdei*	60/30	55/45	50% fair	moderate	W						16			Roots damaged.	
466				29.3						29.3		Shamel ash	*Fraxinus uhdei*	65/30	60/45	50% fair	mod to good	E						9				
467				25.6						25.6		Shamel ash	*Fraxinus uhdei*	65/45	50/30	37% poor	moderate					GR	3 to 10					
468				24.6						24.6		Shamel ash	*Fraxinus uhdei*	55/30	40/40	40% poor	poor										Roots damaged.	
469				25.2						25.2		Shamel ash	*Fraxinus uhdei*	50/30	40/30	38% poor	poor	W	S			GR		12			Roots damaged.	
470				27.7						27.7		Shamel ash	*Fraxinus uhdei*	60/35	45/35	40% poor	poor											
471				14.9						14.9		Shamel ash	*Fraxinus uhdei*	40/15	45/45	45% poor	poor	W	W									
472				16.4						16.4		Shamel ash	*Fraxinus uhdei*	50/20	45/45	45% poor	poor	E										
473				31.5						31.5		Shamel ash	*Fraxinus uhdei*	60/45	75/65	68% fair	good							9 and 10 (not verified)			Roots damaged	
474				25.3						25.3		Shamel ash	*Fraxinus uhdei*	60/30	75/60	65% fair	good	E				GR						
475				28.7						28.7		Shamel ash	*Fraxinus uhdei*	60/45	70/65	68% fair	moderate										Roots damaged.	
476	X			15.2						15.2		Shamel ash	*Fraxinus uhdei*	30/25	35/40	38% poor	poor to mod	E										

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477	X	X		13.9						13.9		Shamel ash	*Fraxinus uhdei*	35/20	20/20	20% very poor	very poor											
478	X			16.9						16.9		coast redwood	*Sequoia sempervirens*	40/15	50/50	50% fair	poor											
479	X	X		22.1						22.1		coast redwood	*Sequoia sempervirens*	50/20	0/0	0% dead												
480	X			13.1						13.1		Shamel ash	*Fraxinus uhdei*	30/18	45/45	45% poor	poor	SE										
481	X			20.0						20.0		Shamel ash	*Fraxinus uhdei*	35/25	45/45	45% poor	poor	W										
482	X			9.8						9.8		Shamel ash	*Fraxinus uhdei*	30/10	30/20	25% very poor	poor	W										
483	X			12.7						12.7		Shamel ash	*Fraxinus uhdei*	30/16	50/40	50% fair	moderate	N				GR						
484	X			15.9						15.9		Shamel ash	*Fraxinus uhdei*	30/18	60/50	55% fair	moderate											
485	X			13.7						13.7		Shamel ash	*Fraxinus uhdei*	30/20	55/55	55% fair	moderate	E										
486	X			22.3						22.3		coast redwood	*Sequoia sempervirens*	50/18	70/70	70% good	moderate											
487	X			21.9						21.9		coast redwood	*Sequoia sempervirens*	50/18	70/70	70% good	moderate											
488	X			12.4						12.4		Shamel ash	*Fraxinus uhdei*	30/16	50/35	40% poor	moderate	N					0 to 3					
489	X			8.9						8.9		Shamel ash	*Fraxinus uhdei*	30/20	55/35	45% poor	moderate											
490	X			14.3						14.3		Shamel ash	*Fraxinus uhdei*	35/35	55/45	47% poor	poor to mod	W	W									

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491	X	X		9.3						9.3		Shamel ash	*Fraxinus uhdei*	20/12	40/20	27% very poor	poor	W	W					8				
492	X			9.1						9.1		Shamel ash	*Fraxinus uhdei*	25/18	50/35	40% poor	poor to mod	E										
493	X			12.4						12.4		Shamel ash	*Fraxinus uhdei*	30/18	45/30	35% poor	poor to mod	W	W									
494	X			13.8						13.8		Shamel ash	*Fraxinus uhdei*	30/30	40/40	40% poor	poor											
495		X		13.0						13.0		Shamel ash	*Fraxinus uhdei*	30/16	26/20	22% very poor	poor	W	W				0 to 8					
496		X		7.9						7.9		Shamel ash	*Fraxinus uhdei*	25/12	30/20	25% very poor	poor	E										
497		X		10.2						10.2		Shamel ash	*Fraxinus uhdei*	30/20	25/30	29% very poor	poor	W	W									
498	X			11.8						11.8		evergreen pear	*Pyrus kawakamii*	20/20	50/40	44% poor	poor	N		5							Fireblight infection.	
499	X	X		4.0						4.0		evergreen pear	*Pyrus kawakamii*	9/6	0/0	0% dead												
500	X	X		21.4						21.4		coast redwood	*Sequoia sempervirens*	55/15	0/0	0% dead												
501	X	X		19.0						19.0		coast redwood	*Sequoia sempervirens*	55/15	15/15	15% very poor	very poor									X	Steep slope.	
502	X	X		24.4						24.4		coast redwood	*Sequoia sempervirens*	55/12	0/0	0% dead										X		
503	X			6.7						6.7		evergreen pear	*Pyrus kawakamii*	13/14	40/40	40% poor	poor	S						5				
504	X			9.9	9.0					18.9		oak species	*Quercus sp.*	35/30	80/50	60% fair	good	S				GR					Steep slope	

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505	X			32.3						32.3		coast redwood	*Sequoia sempervirens*	50/35	70/70	70% good	moderate									X	Steep slope	
506	X			10.0						10.0		evergreen pear	*Pyrus kawakamii*	25/15	40/40	40% poor	poor	E	E		X						Fireblight infection.	
507	X	X		7.6						7.6		evergreen pear	*Pyrus kawakamii*	18/15	20/20	20% very poor	very poor	N	N		X						Fireblight infection.	
508	X			10.9						10.9		evergreen pear	*Pyrus kawakamii*	25/25	40/30	35% poor	poor	N	N		X						Fireblight infection.	
509	X	X		7.2	6.9	5.5				19.6		southern magnolia	*Magnolia grandiflora*	25/15	15/15	15% very poor	very poor	N								X		
510	X			28.0						28.0		coast redwood	*Sequoia sempervirens*	60/25	80/80	80% good	good									X		
511	X			14.4						14.4		evergreen pear	*Pyrus kawakamii*	20/25	40/50	44% poor	poor				X						Roots damaged on grade. Fireblight infection.	
512	X			6.0						6.0		southern magnolia	*Magnolia grandiflora*	15/8	50/30	37% poor	moderate				X					X		
513				5.6						5.6		southern magnolia	*Magnolia grandiflora*	18/10	40/40	40% poor	poor	E								X		
514				4.4						4.4		southern magnolia	*Magnolia grandiflora*	18/6	40/40	40% poor	poor	E								X		
515				10.5						10.5		evergreen pear	*Pyrus kawakamii*	25/20	30/30	30% poor	poor	E	E		X						Fireblight infection.	
516	X			10.6						10.6		evergreen pear	*Pyrus kawakamii*	25/20	30/40	35% poor	poor	E	E		X						Fireblight infection.	
517	X			6.5						6.5		southern magnolia	*Pyrus kawakamii*	13/7	40/30	30% poor	poor to mod	E					4 to 7					
518				23.2						23.2		Shamel ash	*Fraxinus uhdei*	50/30	55/60	58% fair	poor to mod	W	W								Out of leaf. Overall condition verify in spring after leafout.	

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519				18.5						18.5		Monterey pine	*Pinus radiata*	55/18	60/50	55% fair	poor to mod		E									
520				4.0						4.0		Chinese elm	*Ulmus parvifolia*	15/12	75/45	57% fair	moderate	N	N		X							
521		X		20.2						20.2		Shamel ash	*Fraxinus uhdei*	55/18	30/25	28% very poor	poor	W										
522		X		14.3						14.3		Shamel ash	*Fraxinus uhdei*	35/18	10/10	10% very poor	very poor	W						5				
523		X		14.0						14.0		Monterey pine	*Pinus radiata*	40/12	25/25	25% very poor	poor	S	S									
524				10.6						10.6		Chinese elm	*Ulmus parvifolia*	40/30	75/75	75% good	good	E			X							
525				17.6						17.6		Shamel ash	*Fraxinus uhdei*	40/25	35/35	35% poor	poor	W	W									
526				6.7						6.7		Chinese elm	*Ulmus parvifolia*	18/12	65/50	55% fair	moderate	E			X							
527				8.2						8.2		Shamel ash	*Fraxinus uhdei*	20/15	70/40	55% fair	good	S	S									
528				11.1						11.1		Chinese elm	*Ulmus parvifolia*	25/35	70/60	66% fair	moderate				X							
529				12.7						12.7		Shamel ash	*Fraxinus uhdei*	30/20	45/45	45% poor	poor to mod	W	W									
530				10.4						10.4		Chinese elm	*Ulmus parvifolia*	30/30	75/65	73% good	moderate	S			X							
531				9.2						9.2		Shamel ash	*Fraxinus uhdei*	30/18	50/40	45% poor	W	S										
532				12.3						12.3		Chinese elm	*Ulmus parvifolia*	50/40	65/70	70% good	moderate	SE			X							

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533				13.2						13.2		Shamel ash	*Fraxinus uhdei*	30/30	60/60	60% fair	moderate											
534				10.2						10.2		Chinese elm	*Ulmus parvifolia*	40/20	70/60	70% good	good	E			X							
535				20.6						20.6		Shamel ash	*Fraxinus uhdei*	35/35	60/50	55% fair	good											
536		X		12.1						12.1		Shamel ash	*Fraxinus uhdei*	30/20	20/20	20% very poor	very poor											
537				13.1						13.1		Chinese elm	*Ulmus parvifolia*	35/35	60/55	60% fair	moderate	E			X							
538				19.9						19.9		Shamel ash	*Fraxinus uhdei*	35/35	50/45	50% fair	poor to mod											
539				12.7						12.7		Chinese elm	*Ulmus parvifolia*	25/30	75/65	70% good	good	E	E		X							
540				21.9						21.9		Shamel ash	*Fraxinus uhdei*	45/45	65/55	60% fair	moderate					GR						
541				12.5						12.5		Chinese elm	*Ulmus parvifolia*	30/30	60/50	55% fair	moderate				X							
542				13.7						13.7		Shamel ash	*Fraxinus uhdei*	35/25	50/50	50% fair	moderate	W	W									
543				15.2						15.2		Shamel ash	*Fraxinus uhdei*	40/25	55/30	34% poor	moderate	S				GR		5				
544				14.1						14.1		Chinese elm	*Ulmus parvifolia*	40/35	70/60	67% fair	moderate	E	E		X							
545				17.4						17.4		Shamel ash	*Fraxinus uhdei*	40/30	75/55	64% fair	good	W									Tight forks at 8 feet.	
546				11.2						11.2		Chinese elm	*Ulmus parvifolia*	30/35	70/60	66% fair	moderate	E	E		X							

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547	X	X		12.5						12.5		Shamel ash	*Fraxinus uhdei*	40/20	25/25	25% very poor	very poor	W	W			GR						
548	X			16.0	13.0					29.0		Monterey pine	*Pinus radiata*	55/35	50/35	38% poor	poor to mod	E						4			Diameters of mainstems estimated.	
549	X			16.3						16.3		Shamel ash	*Fraxinus uhdei*	45/30	65/55	61% fair	moderate	W										
550				17.5						17.5		Shamel ash	*Fraxinus uhdei*	50/30	75/65	70% good	good	W										
551				23.0						23.0		Monterey pine	*Pinus radiata*	50/35	40/40	40% poor	poor	E	E								Diameter estimated	
552				11.2						11.2		Chinese elm	*Ulmus parvifolia*	25/25	60/60	60% fair	moderate	N	N		X							
553				14.2						14.2		Shamel ash	*Fraxinus uhdei*	30/20	75/65	70% good	good	W	W									
554				4.0						4.0		elm species	*Ulmus sp.*	20/10	75/75	75% good	good										Tree out of leaf. ID not verified at time of writing.	
555		X		9.8						9.8		Shamel ash	*Fraxinus uhdei*	20/15	10/10	10% very poor	very poor						0 to 10					
556				16.8						16.8		Shamel ash	*Fraxinus uhdei*	30/30	55/60	59% fair	moderate						0 to 1				Vehicle impact scar.	
557				12.9						12.9		Shamel ash	*Fraxinus uhdei*	50/25	35/35	35% poor	poor	W	W									
558				13.8						13.8		Chinese elm	*Ulmus parvifolia*	35/35	75/70	73% good	good	N	N		X							
559				15.9						15.9		Shamel ash	*Fraxinus uhdei*	50/25	55/50	54% fair	poor to mod	W										
560				11.5						11.5		Chinese elm	*Ulmus parvifolia*	30/30	65/70	68% fair	moderate	E			X							

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561				13.7						13.7		Chinese elm	*Ulmus parvifolia*	30/30	70/50	60% fair	good	N			X							
562				13.8						13.8		Shamel ash	*Fraxinus uhdei*	30/30	40/35	38% poor	poor	N							X			
563				23.6						23.6		Monterey pine	*Pinus radiata*	35/30	30/30	30% poor	poor	N									Bark beetle frass noted at root crown.	
564		X		14.8						14.8		Shamel ash	*Fraxinus uhdei*	35/25	25/20	23% very poor	very poor	W	W									
565				19.0						19.0		Monterey pine	*Pinus radiata*	35/25	45/45	45% poor	poor to mod											
566				17.5						17.5		Shamel ash	*Fraxinus uhdei*	45/35	40/40	40% poor	moderate	W	W									
567		X		16.2						16.2		Shamel ash	*Fraxinus uhdei*	30/15	25/25	25% very poor	very poor											
568				18.0						18.0		Shamel ash	*Fraxinus uhdei*	45/35	75/65	70% good	good	W										
569				13.5						13.5		Shamel ash	*Fraxinus uhdei*	30/25	70/65	68% fair	good	W										
570				12.7						12.7		Shamel ash	*Fraxinus uhdei*	18/10	50/30	40% poor	moderate	W	W		X							
571				22.7						22.7		coast redwood	*Sequoia sempervirens*	55/20	60/60	60% fair	moderate									X		
572				31.6						31.6		coast redwood	*Sequoia sempervirens*	55/20	60/45	55% fair	moderate							25		X		
573				16.5						16.5		coast redwood	*Sequoia sempervirens*	50/15	60/50	53% fair	moderate									X		
574				25.6						25.6		coast redwood	*Sequoia sempervirens*	55/15	60/60	60% fair	moderate									X		

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575				12.0						12.0		coast redwood	*Sequoia sempervirens*	35/10	60/40	47% poor	moderate									X		
576				32.1	13.4	12.2				57.7		coast redwood	*Sequoia sempervirens*	55/25	70/70	70% good	poor									X		
577				27.6						27.6		coast redwood	*Sequoia sempervirens*	50/15	40/30	35% poor	poor						various elevations			X		
578				17.1						17.1		coast redwood	*Sequoia sempervirens*	50/12	60/60	60% fair	moderate									X		
579				17.7						17.7		coast redwood	*Sequoia sempervirens*	50/12	65/65	65% fair	moderate									X		
580				31.5	9.0					40.5		coast redwood	*Sequoia sempervirens*	60/20	75/75	75% good	moderate									X		
581				21.5	10.5					32.0		coast redwood	*Sequoia sempervirens*	60/15	60/60	60% fair	moderate									X		
582				31.7						31.7		coast redwood	*Sequoia sempervirens*	70/25	80/80	80% good	good									X		
583				8.3						8.3		coast redwood	*Sequoia sempervirens*	35/6	20/20	20% very poor	very poor									X	Difficult to assess visually.	
584				26.9						26.9		coast redwood	*Sequoia sempervirens*	70/20	65/65	65% fair	moderate									X		
585				15.9	7.3					23.2		coast redwood	*Sequoia sempervirens*	50/15	65/65	65% fair	moderate									X		
586				25.3						25.3		coast redwood	*Sequoia sempervirens*	50/13	65/65	65% fair	moderate									X		
587				19.9						19.9		coast redwood	*Sequoia sempervirens*	50/14	65/65	65% fair	moderate									X		
588				21.0						21.0		coast redwood	*Sequoia sempervirens*	50/12	60/60	60% fair	moderate									X		

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589				23.3						23.3		coast redwood	*Sequoia sempervirens*	60/12	65/65	65% fair	moderate									X		
590				25.5	5.0					30.5		coast redwood	*Sequoia sempervirens*	60/10	30/40	35% poor	poor									X		
591				21.2						21.2		coast redwood	*Sequoia sempervirens*	55/10	50/40	45% poor	poor									X		
592		X		25.0						25.0		coast redwood	*Sequoia sempervirens*	60/8	25/35	28% very poor	very poor									X		
593				14.4						14.4		coast redwood	*Sequoia sempervirens*	40/10	30/30	30% poor	poor to mod		S				0 to 5			X		
594				18.1						18.1		coast redwood	*Sequoia sempervirens*	50/13	65/55	50% fair	moderate									X		
595				19.2						19.2		coast redwood	*Sequoia sempervirens*	25/15	40/25	30% poor	moderate			25 (apical meristem)						X		
596				12.8						12.8		coast redwood	*Sequoia sempervirens*	55/8	50/40	45% poor	poor to mod		S							X		
597		X		12.7	8.3					21.0		coast redwood	*Sequoia sempervirens*	35/10	0/0	0% dead	dead							1		X		
598		X		19.5						19.5		coast redwood	*Sequoia sempervirens*	50/6	30/10	20% very poor	very poor									X	Shear crack through the mainstem longitudinally.	
599				27.0						27.0		coast redwood	*Sequoia sempervirens*	75/25	65/65	65% fair	moderate									X		
600				18.8						18.8		coast redwood	*Sequoia sempervirens*	65/8	50/40	45% poor	poor	W								X	Canker developing on trunk at 5 feet elevation.	
601				25.5						25.5		coast redwood	*Sequoia sempervirens*	70/14	40/40	40% poor	poor									X		
602				13.7	7.7					21.4		coast redwood	*Sequoia sempervirens*	40/9	40/30	35% poor						BRC				X		

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603		X		17.3						17.3		coast redwood	*Sequoia sempervirens*	50/15	25/25	25% very poor	very poor									X		
604		X		16.7						16.7		coast redwood	*Sequoia sempervirens*	50/12	25/25	25% very poor	very poor		W							X		
605		X		6.6						6.6		coast redwood	*Sequoia sempervirens*	35/7	25/25	25% very poor	very poor									X		
606		X		26.4						26.4		coast redwood	*Sequoia sempervirens*	60/18	20/30	25% very poor	poor									X	Codominant mainstem fork at 20 feet.	
607		X		15.4						15.4		coast redwood	*Sequoia sempervirens*	55/10	15/20	17% very poor	very poor									X		
608				22.4						22.4		coast redwood	*Sequoia sempervirens*	60/14	30/30	30% poor	poor	W								X		
609				27.1						27.1		coast redwood	*Sequoia sempervirens*	70/18	35/35	35% poor	poor									X		
610		X		13.0						13.0		coast redwood	*Sequoia sempervirens*	30/8	40/20	28% very poor	poor to mod									X		
611				39.4						39.4		coast redwood	*Sequoia sempervirens*	75/15	70/70	70% good	good									X	Cankers on trunk at 6 feet.	
612				8.0						8.0		coast redwood	*Sequoia sempervirens*	25/4	0/0	0% dead	dead									X		
613				26.5						26.5		coast redwood	*Sequoia sempervirens*	75/18	75/75	75% good	good									X		
614				32.3						32.3		coast redwood	*Sequoia sempervirens*	65/15	70/70	70% good	mod to good									X		
615				15.4						15.4		coast redwood	*Sequoia sempervirens*	50/10	50/50	50% fair	poor									X		
616				24.4						24.4		coast redwood	*Sequoia sempervirens*	65/11	55/50	53% fair	mod									X		

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617				10.1						10.1		coast redwood	*Sequoia sempervirens*	25/9	65/45	55% fair	mod									X		
618				26.7						26.7		coast redwood	*Sequoia sempervirens*	70/18	55/60	58% fair	poor to mod									X		
619				12.5						12.5		coast redwood	*Sequoia sempervirens*	45/10	50/40	50% fair	moderate									X		
620				15.3						15.3		coast redwood	*Sequoia sempervirens*	35/10	50/40	50% fair	moderate									X		
621				12.6						12.6		coast redwood	*Sequoia sempervirens*	45/11	60/50	55% fair	moderate									X		
622				23.4						23.4		coast redwood	*Sequoia sempervirens*	75/15	50/50	50% fair	poor									X		
623				25.1						25.1		coast redwood	*Sequoia sempervirens*	75/15	50/50	50% fair	poor									X		
624				15.9						15.9		coast redwood	*Sequoia sempervirens*	70/12	50/40	49% poor	poor									X		
625				19.7	6.4					26.1		coast redwood	*Sequoia sempervirens*	65/10	50/50	50% fair	poor									X		
626				19.6						19.6		coast redwood	*Sequoia sempervirens*	60/10	60/50	55% fair	poor to mod									X		
627				22.9						22.9		coast redwood	*Sequoia sempervirens*	75/12	60/50	53% fair	poor									X		
628		X		14.1						14.1		coast redwood	*Sequoia sempervirens*	45/8	20/30	25% very poor	very poor									X		
629		X		11.9						11.9		coast redwood	*Sequoia sempervirens*	45/7	10/10	10% very poor	very poor									X		
630				12.0						12.0		coast redwood	*Sequoia sempervirens*	35/10	35/35	35% poor	poor									X		

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631		X		16.2						16.2		coast redwood	*Sequoia sempervirens*	45/15	20/20	20% very poor	very poor							25		X		
632				15.5						15.5		coast redwood	*Sequoia sempervirens*	50/18	40/30	35% poor	poor to mod							30		X		
633				9.3						9.3		coast redwood	*Sequoia sempervirens*	40/10	35/35	35% poor	poor									X		
634		X		11.5						11.5		coast redwood	*Sequoia sempervirens*	50/12	20/20	20% very poor	very poor									X		
635		X		18.4						18.4		coast redwood	*Sequoia sempervirens*	50/12	10/10	10% very poor	very poor									X		
636		X		20.9						20.9		coast redwood	*Sequoia sempervirens*	70/18	25/25	25% very poor	very poor									X		
637		X		13.8						13.8		coast redwood	*Sequoia sempervirens*	50/15	25/25	25% very poor	very poor									X	One of two mainstems was removed at grade.	
638				27.9						27.9		coast redwood	*Sequoia sempervirens*	80/25	75/75	75% good	mod to good									X		
639		X		10.8						10.8		coast redwood	*Sequoia sempervirens*	35/8	25/25	25% very poor	very poor									X	Difficult to assess visually.	
640				21.1						21.1		coast redwood	*Sequoia sempervirens*	70/12	40/40	40% poor	poor	W								X		
641				19.6						19.6		coast redwood	*Sequoia sempervirens*	60/12	65/55	60% fair	moderate		N							X		
642				30.3						30.3		coast redwood	*Sequoia sempervirens*	75/20	50/50	50% fair	moderate									X		
643				24.3						24.3		coast redwood	*Sequoia sempervirens*	70/18	60/55	56% fair	moderate									X		
644				11.1						11.1		coast redwood	*Sequoia sempervirens*	55/12	50/50	50% fair	poor									X		

Tree Tag #	To be Removed Per Current Site Plan	Author Recommends Removal Due to Very Poor Condition or Elevated Risk of Failure	Project Team Desires to Transplant	Trunk 1 (in.)	Trunk 2 (in.)	Trunk 3 (in.)	Trunk 4 (in.)	Trunk 5 (in.)	Trunk 6 (in.)	Adjusted Trunk Diameter Inches @ 54" A.G. (1+2+3+4+5)	"Protected Tree" per City of Cupertino Ordinance (10.0" single stem, 20" multi, various specified native and non-native species)	Common Name	Scientific Name (*Genus, species*)	Height and Canopy Spread (ft.)	Health & Structural Ratings (0-100% each)	Overall Condition Rating (0-100%)	Live Twig Density (Very Poor, Poor, Mod, Good, Exc.)	Lopsided Canopy (Direction Noted)	Trunk Lean (Direction Noted)	Historical Stem Splitout Evidence (Note Elevation)	Topped or Severely Pruned in Past	Buried Root Crown (BRC) or Girdling Roots (GR)	Stem Decay (Note Elevation)	Codominant Mainstems with Severe Bark Inclusion(s) (Note Height)	Root Extension Restricted in Planter	Soil Moisture Deficit ("Drought Stress")	WLCA Notes from Spring 2015 Survey	Record Notes on Actual Status of Tree Over Time (removed, pruned, declining, irrigation regime, etc.)
645				22.8						22.8		coast redwood	*Sequoia sempervirens*	70/12	40/35	39% poor	poor									X		
646		X		14.8	7.5					22.3		coast redwood	*Sequoia sempervirens*	50/10	45/20	27% very poor	poor	W								X	S-trunk form at certain heights.	
647				31.5						31.5		coast redwood	*Sequoia sempervirens*	75/25	80/80	80% good	good									X		
648				4.9						4.9		coast redwood	*Sequoia sempervirens*	25/5	30/30	30% poor	poor		S							X		
649				25.7						25.7		coast redwood	*Sequoia sempervirens*	65/12	50/50	50% fair	moderate									X		
650				22.4						22.4		coast redwood	*Sequoia sempervirens*	65/16	50/50	50% fair	moderate									X		
651				29.6						29.6		coast redwood	*Sequoia sempervirens*	70/20	60/40	55% fair	moderate									X		
652				15.9						15.9		coast redwood	*Sequoia sempervirens*	65/16	40/40	40% poor	poor									X		
653		X		16.0						16.0		coast redwood	*Sequoia sempervirens*	60/10	20/20	20% very poor	very poor									X		
654		X		20.5						20.5		coast redwood	*Sequoia sempervirens*	55/6	30/15	20% very poor	very poor									X		
655				25.0	10.0					35.0		coast redwood	*Sequoia sempervirens*	70/15	50/50	50% fair	poor to mod							3		X		
656				27.3						27.3		coast redwood	*Sequoia sempervirens*	75/15	60/40	50% fair	poor to mod							6		X		
657				19.8						19.8		coast redwood	*Sequoia sempervirens*	70/15	45/45	45% poor	poor	W								X		
658				30.8						30.8		coast redwood	*Sequoia sempervirens*	70/18	30/35	30% poor	poor							4 to 8		X		

Tree Tag #	To be Removed Per Current Site Plan	Author Recommends Removal Due to Very Poor Condition or Elevated Risk of Failure	Project Team Desires to Transplant	Trunk 1 (in.)	Trunk 2 (in.)	Trunk 3 (in.)	Trunk 4 (in.)	Trunk 5 (in.)	Trunk 6 (in.)	Adjusted Trunk Diameter Inches @ 54" A.G. (1+2+3+4+5)	"Protected Tree" per City of Cupertino Ordinance (10.0" single stem, 20" multi, various specified native and non-native species)	Common Name	Scientific Name (*Genus, species*)	Height and Canopy Spread (ft.)	Health & Structural Ratings (0-100% each)	Overall Condition Rating (0-100%)	Live Twig Density (Very Poor, Poor, Mod, Good, Exc.)	Lopsided Canopy (Direction Noted)	Trunk Lean (Direction Noted)	Historical Stem Splitout Evidence (Note Elevation)	Topped or Severely Pruned in Past	Buried Root Crown (BRC) or Girdling Roots (GR)	Stem Decay (Note Elevation)	Codominant Mainstems with Severe Bark Inclusion(s) (Note Height)	Root Extension Restricted in Planter	Soil Moisture Deficit ("Drought Stress")	WLCA Notes from Spring 2015 Survey	Record Notes on Actual Status of Tree Over Time (removed, pruned, declining, irrigation regime, etc.)
659		X		10.0						10.0		coast redwood	*Sequoia sempervirens*	35/4	0/0	0% dead	dead									X		
660		X		23.0						23.0		coast redwood	*Sequoia sempervirens*	70/15	30/20	25% very poor	very poor									X	S-trunk form between 60 and 65 feet elevation.	
661				12.4						12.4		coast redwood	*Sequoia sempervirens*	30/8	50/30	35% poor	moderate							20		X		
662				17.7						17.7		coast redwood	*Sequoia sempervirens*	50/15	60/45	50% fair	moderate									X		
663				11.2						11.2		coast redwood	*Sequoia sempervirens*	50/10	55/50	50% fair	poor to mod									X		
664				11.0						11.0		coast redwood	*Sequoia sempervirens*	50/10	50/50	50% fair	poor									X		
665				20.4						20.4		coast redwood	*Sequoia sempervirens*	65/18	60/55	58% fair	moderate									X		
666				20.9						20.9		coast redwood	*Sequoia sempervirens*	70/25	40/50	45% poor	poor									X		
667				16.7						16.7		coast redwood	*Sequoia sempervirens*	65/18	40/50	45% poor	poor									X		
668				9.1						9.1		coast redwood	*Sequoia sempervirens*	40/7	30/35	35% poor	poor									X		
669				9.9						9.9		coast redwood	*Sequoia sempervirens*	40/7	30/30	30% poor	poor									X	This tree has a PG&E guy strap around its trunk which may eventually girdle the stem, possibly causing loss of stability within the stem cross section.	
670		X		10.7						10.7		coast redwood	*Sequoia sempervirens*	40/6	20/20	20% very poor	very poor									X		
671		X		7.1						7.1		coast redwood	*Sequoia sempervirens*	30/6	25/25	25% very poor	very poor									X		
672				14.9						14.9		coast redwood	*Sequoia sempervirens*	50/12	40/40	40% poor	poor									X		

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673				22.2						22.2		Shamel ash	*Fraxinus uhdei*	50/25	30/35	33% poor	poor									X		
674				24.2						24.2		Shamel ash	*Fraxinus uhdei*	55/25	35/40	36% poor	poor									X		
675		X		15.0						15.0		Shamel ash	*Fraxinus uhdei*	50/15	20/30	25% very poor	very poor						At all elevations.			X		
676				16.6						16.6		Shamel ash	*Fraxinus uhdei*	65/18	30/30	30% poor	very poor							Various elevations		X		
677		X		17.6						17.6		Shamel ash	*Fraxinus uhdei*	65/18	10/10	10% very poor	very poor						At all elevations.			X		
678				13.4						13.4		Shamel ash	*Fraxinus uhdei*	60/18	45/45	45% poor	poor to mod	E								X		
679				12.7						12.7		Shamel ash	*Fraxinus uhdei*	50/14	40/30	35% poor	poor	E					6			X		
680				15.6						15.6		Shamel ash	*Fraxinus uhdei*	60/25	50/35	40% poor	poor to mod	E								X		
681				17.3						17.3		Shamel ash	*Fraxinus uhdei*	65/25	45/45	45% poor	moderate	E								X		
682				14.2						14.2		Shamel ash	*Fraxinus uhdei*	50/25	45/30	35% poor	poor to mod	E						9		X		
683		X		18.7						18.7		Shamel ash	*Fraxinus uhdei*	65/30	25/10	15% very poor	very poor	E	E				5 to 6			X	Possible destabilized root plate. High risk tree. Remove.	
684		X		12.2						12.2		Shamel ash	*Fraxinus uhdei*	50/20	15/15	15% very poor	very poor									X		
685		X		10.5						10.5		Shamel ash	*Fraxinus uhdei*	45/20	15/15	15% very poor	very poor	E	E							X		
686				4.0						4.0		coast redwood	*Sequoia sempervirens*	15/6	50/50	50% fair	moderate									X		

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687				11.4						11.4		Shamel ash	*Fraxinus uhdei*	45/25	40/35	37% poor	poor to mod	E	E							X		
688				4.5						4.5		coast redwood	*Sequoia sempervirens*	20/8	70/70	70% good	moderate									X		
689		X		15.9						15.9		Shamel ash	*Fraxinus uhdei*	65/20	10/10	10% very poor	very poor	E	E							X		
690				4.9						4.9		coast redwood	*Sequoia sempervirens*	18/6	70/70	70% good	moderate									X		
691		X		10.8						10.8		Shamel ash	*Fraxinus uhdei*	35/25	15/15	15% very poor	very poor	E			X					X		
692				22.5						22.5		Shamel ash	*Fraxinus uhdei*	75/35	65/50	58% fair	mod to good	E	E							X		
693				28.0						28.0		Shamel ash	*Fraxinus uhdei*	70/40	65/50	57% fair	mod to good	E	E					9		X		
694				21.3						21.3		Shamel ash	*Fraxinus uhdei*	70/35	40/40	40% poor	poor							18		X		
695				28.3						28.3		Shamel ash	*Fraxinus uhdei*	70/35	60/50	55% fair	moderate	E	E							X	Roots severed with decay, on west side of root system.	
696				23.9						23.9		Shamel ash	*Fraxinus uhdei*	75/30	50/50	50% fair	poor to mod	E								X		
697				25.3						25.3		Shamel ash	*Fraxinus uhdei*	75/30	45/35	43% poor	poor to mod	E				GR		11		X		
698				8.2						8.2		coast redwood	*Sequoia sempervirens*	28/10	55/60	55% fair	poor to mod									X		
699		X		8.4						8.4		coast redwood	*Sequoia sempervirens*	28/10	0/0	0% dead	dead									X		
700		X		7.5						7.5		coast redwood	*Sequoia sempervirens*	28/10	0/0	0% dead	dead									X		

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701				8.2						8.2		coast redwood	*Sequoia sempervirens*	25/7	40/40	40% poor	poor									X		
702		X		8.1						8.1		coast redwood	*Sequoia sempervirens*	25/7	10/10	10% very poor	very poor									X		
703				20.3						20.3		coast redwood	*Sequoia sempervirens*	40/20	40/40	40% poor	poor to mod									X		
704		X		11.3						11.3		coast redwood	*Sequoia sempervirens*	30/8	0/0	0% dead	dead									X		
705		X		10.3						10.3		coast redwood	*Sequoia sempervirens*	30/4	5/5	5% very poor	very poor									X		
706		X		11.0						11.0		coast redwood	*Sequoia sempervirens*	30/8	10/10	10% very poor	very poor						1			X		
707		X		5.8						5.8		coast redwood	*Sequoia sempervirens*	25/6	10/10	10% very poor	very poor									X		
708				11.5						11.5		coast redwood	*Sequoia sempervirens*	30/8	40/40	40% poor	poor									X		
709		X		4.2						4.2		coast redwood	*Sequoia sempervirens*	20/4	0/0	0% dead	dead									X		
710				12.3						12.3		coast redwood	*Sequoia sempervirens*	35/8	40/40	40% poor										X		
711		X		11.3						11.3		coast redwood	*Sequoia sempervirens*	40/4	10/10	10% very poor	very poor									X		
712				8.4						8.4		coast redwood	*Sequoia sempervirens*	30/8	30/30	30% poor	poor									X		
713				11.4						11.4		coast redwood	*Sequoia sempervirens*	35/6	40/40	40% poor	poor									X		
714		X		7.3						7.3		coast redwood	*Sequoia sempervirens*	30/6	15/15	15% very poor	very poor									X		

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715				19.5						19.5		coast redwood	*Sequoia sempervirens*	50/15	45/45	45% poor	poor									X		
716		X		4.3						4.3		coast redwood	*Sequoia sempervirens*	17/5	0/0	0% dead	dead									X		
717		X		10.1						10.1		coast redwood	*Sequoia sempervirens*	30/7	20/20	20% very poor	very poor									X		
718		X		7.0						7.0		coast redwood	*Sequoia sempervirens*	20/4	0/0	0% dead	dead									X		
719		X		11.4						11.4		coast redwood	*Sequoia sempervirens*	40/15	0/0	0% dead	dead									X		
720		X		9.1						9.1		coast redwood	*Sequoia sempervirens*	50/7	0/0	0% dead	dead									X		
721		X		15.3						15.3		coast redwood	*Sequoia sempervirens*	50/12	10/10	10% very poor	very poor									X		
722		X		11.5						11.5		coast redwood	*Sequoia sempervirens*	50/10	20/20	20% very poor	very poor									X		
723				21.0						21.0		Monterey pine	*Pinus radiata*	55/20	50/40	48% poor	moderate	E	E							X		
724		X		13.9						13.9		coast redwood	*Sequoia sempervirens*	50/9	15/15	15% very poor	very poor									X		
725				22.0						22.0		Monterey pine	*Pinus radiata*	55/25	35/40	38% poor	poor									X		
726		X		20.9						20.9		Monterey pine	*Pinus radiata*	50/25	30/25	28% very poor	very poor	SE	SE							X		
727				13.5						13.5		coast redwood	*Sequoia sempervirens*	50/12	40/25	30% poor	poor									X		
728		X		12.8						12.8		coast redwood	*Sequoia sempervirens*	45/10	10/15	13% very poor	very poor	E								X		

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729				9.0						9.0		coast redwood	*Sequoia sempervirens*	40/5	60/30	45% poor	moderate									X		
730				14.0						14.0		coast redwood	*Sequoia sempervirens*	50/9	50/50	50% fair	moderate									X	Difficult to assess visually.	
731		X		14.7						14.7		Shamel ash	*Fraxinus uhdei*	55/25	25/25	25% very poor	very poor	E	E							X		
732		X		24.3						24.3		Shamel ash	*Fraxinus uhdei*	55/25	25/25	25% very poor	very poor	E				GR		7		X		
733				19.2						19.2		Shamel ash	*Fraxinus uhdei*	55/30	40/35	38% poor	poor	E					1 foot (car impact)			X		
734				17.1						17.1		Shamel ash	*Fraxinus uhdei*	45/30	35/35	35% poor	poor									X	Circling roots. Roots damaged on grade.	
735		X		17.5						17.5		Shamel ash	*Fraxinus uhdei*	55/25	20/20	20% very poor	very poor	E					1 foot (car impact)			X		
736		X		19.1						19.1		Shamel ash	*Fraxinus uhdei*	45/35	25/25	25% very poor	very poor						Various elevations.			X		
737				20.7						20.7		Shamel ash	*Fraxinus uhdei*	55/30	30/40	35% poor	poor	E						20		X	Roots severed and damaged on grade.	
738				21.7						21.7		Shamel ash	*Fraxinus uhdei*	50/30	40/40	40% poor	poor	S				GR				X		
739				23.7						23.7		Shamel ash	*Fraxinus uhdei*	65/30	25/25	25% very poor	very poor	E								X		
740				26.0						26.0		Shamel ash	*Fraxinus uhdei*	45/35	65/50	56% fair	good				X	GR			X	X		
741				24.5						24.5		Shamel ash	*Fraxinus uhdei*	50/30	40/40	40% poor	poor				X				X	X		
742				27.2						27.2		Shamel ash	*Fraxinus uhdei*	50/30	50/40	48% poor	moderate							Various elevations	X	X		

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743				30.1						30.1		Shamel ash	*Fraxinus uhdei*	50/40	60/45	50% fair	moderate								X	X		
744				25.2						25.2		Shamel ash	*Fraxinus uhdei*	55/30	50/40	45% poor	moderate				X				X	X	Roots pruned near mainstem.	
745				14.2						14.2		Shamel ash	*Fraxinus uhdei*	30/20	35/30	35% poor	poor				X		9		X	X		
746				24.1						24.1		Shamel ash	*Fraxinus uhdei*	50/25	60/50	55% fair	moderate	E			X					X		
747				18.6						18.6		Shamel ash	*Fraxinus uhdei*	60/25	60/30	38% poor	moderate	E				GR		various elevations		X		
748				21.7						21.7		Shamel ash	*Fraxinus uhdei*	55/30	50/45	49% poor	moderate	E				GR serious condition.				X		
749				16.0						16.0		Shamel ash	*Fraxinus uhdei*	50/20	30/30	30% poor	poor	E			X					X		
750				17.3						17.3		Shamel ash	*Fraxinus uhdei*	50/25	40/40	40% poor	poor	E								X		
751				15.8						15.8		Shamel ash	*Fraxinus uhdei*	55/25	25/25	25% very poor	poor	E	E							X	Circling roots.	
752				18.5						18.5		Shamel ash	*Fraxinus uhdei*	55/30	55/45	50% fair	moderate	E	E				8			X		
753				19.8						19.8		Shamel ash	*Fraxinus uhdei*	50/30	50/45	49% poor	poor	E	E							X		
754				21.8						21.8		Shamel ash	*Fraxinus uhdei*	65/25	55/40	45% poor	moderate	E	E		X	GR				X		
755				20.1						20.1		Shamel ash	*Fraxinus uhdei*	55/25	60/50	55% fair	moderate	E								X		
756				18.1						18.1		Shamel ash	*Fraxinus uhdei*	60/30	50/45	49% poor	poor to mod	E	E			GR	6			X		

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757				16.8						16.8		Shamel ash	*Fraxinus uhdei*	60/25	40/40	40% poor	poor							8		X		
758		X		19.3						19.3		Shamel ash	*Fraxinus uhdei*	55/30	25/25	25% very poor	very poor	E	E							X		
759				18.2						18.2		Shamel ash	*Fraxinus uhdei*	60/30	35/35	35% poor	poor	E	E							X		
760				20.8						20.8		Shamel ash	*Fraxinus uhdei*	60/35	40/30	35% poor	poor	E	E							X		
761				15.4						15.4		Shamel ash	*Fraxinus uhdei*	50/30	60/35	40% poor	moderate	E	E					8		X		
762				17.1						17.1		Shamel ash	*Fraxinus uhdei*	50/35	35/35	35% poor						GR				X		
763		X		23.5						23.5		Shamel ash	*Fraxinus uhdei*	65/35	15/15	15% very poor	very poor	E						9		X		
764		X		13.6						13.6		Shamel ash	*Fraxinus uhdei*	50/20	10/10	10% very poor	very poor	E								X		
765				16.0						16.0		Shamel ash	*Fraxinus uhdei*	50/25	30/30	30% poor	poor	E	E							X		
766				18.5						18.5		Shamel ash	*Fraxinus uhdei*	50/30	40/40	40% poor	poor	E	E			GR				X		
767				18.8						18.8		Shamel ash	*Fraxinus uhdei*	60/30	35/45	40% poor	poor	E	E							X		
768		X		14.5						14.5		Shamel ash	*Fraxinus uhdei*	55/30	20/20	20% very poor	very poor	E	E							X	Roots damaged on grade.	
769				23.8						23.8		Shamel ash	*Fraxinus uhdei*	65/35	55/35	40% poor	moderate	E	E			serious girdling root		15		X		
770				16.3						16.3		Shamel ash	*Fraxinus uhdei*	55/25	30/30	30% poor	poor	E						10		X		

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771				16.1						16.1		Shamel ash	*Fraxinus uhdei*	55/30	60/45	55% fair	moderate	E								X		
772				33.6						33.6		coast redwood	*Sequoia sempervirens*	75/20	70/70	70% good	moderate									X		
773				16.4						16.4		coast redwood	*Sequoia sempervirens*	60/13	60/60	60% fair	moderate									X		
774				18.5						18.5		coast redwood	*Sequoia sempervirens*	60/15	75/60	67% fair	moderate									X		
775				10.7						10.7		coast redwood	*Sequoia sempervirens*	30/6	60/50	55% fair	moderate									X		
776				34.2						34.2		coast redwood	*Sequoia sempervirens*	75/25	70/70	70% good	moderate									X		
777				7.8						7.8		coast redwood	*Sequoia sempervirens*	25/6	55/35	40% poor	moderate	W	W							X		
778				28.8						28.8		coast redwood	*Sequoia sempervirens*	75/25	70/70	70% good	moderate									X		
779				16.8						16.8		coast redwood	*Sequoia sempervirens*	50/13	65/55	60% fair	moderate									X		
780				7.0						7.0		coast redwood	*Sequoia sempervirens*	35/6	55/35	45% poor	moderate									X		
781				21.6						21.6		coast redwood	*Sequoia sempervirens*	65/15	60/40	47% poor	moderate							15		X		
782				32.1						32.1		coast redwood	*Sequoia sempervirens*	35/20	70/70	70% good	moderate									X		
783				26.0						26.0		coast redwood	*Sequoia sempervirens*	85/20	70/70	70% good	moderate									X		
784				16.1						16.1		coast redwood	*Sequoia sempervirens*	75/15	70/65	70% good	moderate									X		

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785				21.9						21.9		coast redwood	*Sequoia sempervirens*	75/15	70/70	70% good	moderate									X		
786				13.0						13.0		coast redwood	*Sequoia sempervirens*	50/8	50/35	40% poor	poor	W								X		
787				17.8						17.8		coast redwood	*Sequoia sempervirens*	65/10	60/35	40% poor	poor	W								X		
788				20.1						20.1		coast redwood	*Sequoia sempervirens*	90/15	60/60	60% fair	poor to mod									X		
789				23.4						23.4		coast redwood	*Sequoia sempervirens*	80/15	75/70	73% good	moderate		E							X		
790				19.5						19.5		coast redwood	*Sequoia sempervirens*	80/18	75/75	75% good	moderate									X		
791				17.1	15.1					32.2		coast redwood	*Sequoia sempervirens*	70/20	70/60	65% fair								2		X		
792				28.2						28.2		coast redwood	*Sequoia sempervirens*	90/20	70/70	70% good	moderate									X		
793				21.9						21.9		coast redwood	*Sequoia sempervirens*	70/15	65/60	62% fair	moderate									X		
794				22.0						22.0		coast redwood	*Sequoia sempervirens*	50/15	60/40	47% poor	moderate						0 to 2			X	Apical stem splitout	
795				24.0						24.0		coast redwood	*Sequoia sempervirens*	85/20	70/70	70% good	moderate									X		
796				45.5						45.5		coast redwood	*Sequoia sempervirens*	90/30	75/75	75% good	good									X		
797				14.8						14.8		coast redwood	*Sequoia sempervirens*	50/8	50/40	47% poor	moderate									X	Supressed in shade	
798				12.6						12.6		coast redwood	*Sequoia sempervirens*	60/12	60/40	48% poor	poor		E					20		X		

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799				22.6						22.6		coast redwood	*Sequoia sempervirens*	80/13	70/70	70% good	moderate									X		
800				21.8						21.8		coast redwood	*Sequoia sempervirens*	65/13	65/65	65% fair	moderate									X		
801				17.3						17.3		coast redwood	*Sequoia sempervirens*	55/9	50/50	50% fair	poor	W	W							X		
802				32.5						32.5		coast redwood	*Sequoia sempervirens*	90/25	50/50	50% fair	poor									X	Difficult to assess visually.	
803				15.0						15.0		coast redwood	*Sequoia sempervirens*	60/9	30/30	30% poor	poor									X		
804				32.4						32.4		coast redwood	*Sequoia sempervirens*	90/18	60/60	60% fair	poor to mod									X		
805				13.0						13.0		coast redwood	*Sequoia sempervirens*	50/5	40/40	40% poor	poor									X	S-trunk form	
806				16.8						16.8		coast redwood	*Sequoia sempervirens*	50/10	60/55	58% fair	moderate									X		
807				12.1						12.1		coast redwood	*Sequoia sempervirens*	60/12	50/55	53% fair	poor to mod									X		
808				24.5						24.5		coast redwood	*Sequoia sempervirens*	90/20	40/30	33% poor	poor							55		X		
809				11.0						11.0		coast redwood	*Sequoia sempervirens*	55/15	60/50	55% fair	poor to mod									X		
810		X		15.0						15.0		coast redwood	*Sequoia sempervirens*	75/8	10/10	10% very poor	very poor									X		
811				5.6						5.6		coast redwood	*Sequoia sempervirens*	30/6	40/30	35% poor	poor									X		
812		X		23.2						23.2		coast redwood	*Sequoia sempervirens*	80/20	0/0	0% dead	dead									X	S - trunk form.	

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813		X		13.3						13.3		coast redwood	*Sequoia sempervirens*	70/16	10/10	10% very poor	very poor									X		
814		X		24.4						24.4		coast redwood	*Sequoia sempervirens*	85/20	0/0	0% dead	dead									X		
815		X		9.0						9.0		coast redwood	*Sequoia sempervirens*	40/5	0/0	0% dead	dead									X		
816				16.5						16.5		coast redwood	*Sequoia sempervirens*	80/12	50/50	50% fair	poor									X		
817				11.9						11.9		coast redwood	*Sequoia sempervirens*	35/6	50/40	43% poor	poor									X		
818				25.4						25.4		coast redwood	*Sequoia sempervirens*	80/18	60/60	60% fair	moderate									X		
819				12.4						12.4		coast redwood	*Sequoia sempervirens*	55/13	50/40	45% poor	poor									X		
820				26.3						26.3		coast redwood	*Sequoia sempervirens*	90/25	55/60	58% fair	poor to mod									X		
821		X		4.6						4.6		coast redwood	*Sequoia sempervirens*	30/3	0/0	0% dead	dead									X		
822				23.4						23.4		coast redwood	*Sequoia sempervirens*	90/20	50/50	50% fair	poor							18		X		
823				17.9						17.9		coast redwood	*Sequoia sempervirens*	100/15	50/35	40% poor	poor							70		X		
824				29.3						29.3		coast redwood	*Sequoia sempervirens*	100/20	40/40	40% poor	poor to mod							25		X		
825				7.8						7.8		coast redwood	*Sequoia sempervirens*	30/8	40/20	29% very poor	poor									X		
826				11.1						11.1		coast redwood	*Sequoia sempervirens*	35/12	60/50	50% fair	poor to mod	E								X	Bow form trunk.	

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827		X		10.7						10.7		coast redwood	*Sequoia sempervirens*	35/10	0/0	0% dead	dead									X	Bow form trunk.	
828				11.7						11.7		coast redwood	*Sequoia sempervirens*	50/8	30/30	30% poor	poor							20		X		
829				27.2						27.2		coast redwood	*Sequoia sempervirens*	95/25	70/70	70% good	moderate									X		
830				15.2						15.2		coast redwood	*Sequoia sempervirens*	40/16	45/30	37% poor	poor to mod							20		X		
831				11.0						11.0		coast redwood	*Sequoia sempervirens*	40/8	30/40	37% poor	poor		SW							X		
832				13.0						13.0		coast redwood	*Sequoia sempervirens*	45/11	60/55	59% fair	moderate									X		
833				26.6						26.6		coast redwood	*Sequoia sempervirens*	70/30	70/65	69% fair	moderate							30		X		
834		X		5.8						5.8		coast redwood	*Sequoia sempervirens*	30/5	20/20	20% very poor	very poor		SE							X		
835				15.8	11.0					26.8		coast redwood	*Sequoia sempervirens*	85/18	60/50	55% fair	poor to mod							2		X		
836		X		9.8						9.8		coast redwood	*Sequoia sempervirens*	30/12	25/25	25% very poor	very poor		S							X		
837				15.2						15.2		coast redwood	*Sequoia sempervirens*	45/10	50/40	45% poor	poor to mod	W	NW							X		
838				23.9						23.9		coast redwood	*Sequoia sempervirens*	85/20	45/45	45% poor	poor									X		
839				26.1						26.1		coast redwood	*Sequoia sempervirens*	90/25	60/60	60% fair	moderate									X		
840				10.8	9.0					19.8		coast redwood	*Sequoia sempervirens*	60/8	35/35	35% poor	poor							20		X		

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841				21.2						21.2		coast redwood	*Sequoia sempervirens*	80/13	60/50	53% fair	poor to mod									X	Sweep form trunk. Apical meristem appears gone.	
842				27.2	8.5					35.7		coast redwood	*Sequoia sempervirens*	90/15	70/70	70% good	moderate									X		
843	X	X		10.8						10.8		coast redwood	*Sequoia sempervirens*	55/4	10/10	10% very poor	very poor							15		X		
844				16.4						16.4		coast redwood	*Sequoia sempervirens*	80/20	60/40	50% fair	poor to mod									X		
845				28.2						28.2		coast redwood	*Sequoia sempervirens*	90/25	70/70	70% good	moderate									X		
846				14.7						14.7		coast redwood	*Sequoia sempervirens*	45/6	50/45	48% poor	poor to mod									X		
847				11.5	9.5					21.0		coast redwood	*Sequoia sempervirens*	45/10	50/50	50% fair	poor to mod									X		
848				23.9						23.9		coast redwood	*Sequoia sempervirens*	90/20	50/50	50% fair	poor to mod									X		
849				20.5						20.5		coast redwood	*Sequoia sempervirens*	80/18	60/50	55% fair	poor to mod									X		
850				18.3						18.3		coast redwood	*Sequoia sempervirens*	80/15	55/50	54% fair	poor to mod		E							X		
851				24.5						24.5		coast redwood	*Sequoia sempervirens*	95/25	65/50	60% fair	moderate									X	Sweep form trunk.	
852				12.5	6.9					19.4		coast redwood	*Sequoia sempervirens*	55/18	60/50	50% fair	poor to mod							1		X		
853		X		11.8	7.8					19.6		coast redwood	*Sequoia sempervirens*	35/18	15/15	15% very poor	very poor							2		X		
854				18.5						18.5		coast redwood	*Sequoia sempervirens*	70/18	40/35	38% poor	poor							30		X		

Tree Tag #	To be Removed Per Current Site Plan	Author Recommends Removal Due to Very Poor Condition or Elevated Risk of Failure	Project Team Desires to Transplant	Trunk 1 (in.)	Trunk 2 (in.)	Trunk 3 (in.)	Trunk 4 (in.)	Trunk 5 (in.)	Trunk 6 (in.)	Adjusted Trunk Diameter Inches @ 54" A.G. (1+2+3+4+5)	"Protected Tree" per City of Cupertino Ordinance (10.0" single stem, 20" multi, various specified native and non-native species)	Common Name	Scientific Name (*Genus, species*)	Height and Canopy Spread (ft.)	Health & Structural Ratings (0-100% each)	Overall Condition Rating (0-100%)	Live Twig Density (Very Poor, Poor, Mod, Good, Exc.)	Lopsided Canopy (Direction Noted)	Trunk Lean (Direction Noted)	Historical Stem Splitout Evidence (Note Elevation)	Topped or Severely Pruned in Past	Buried Root Crown (BRC) or Girdling Roots (GR)	Stem Decay (Note Elevation)	Codominant Mainstems with Severe Bark Inclusion(s) (Note Height)	Root Extension Restricted in Planter	Soil Moisture Deficit ("Drought Stress")	WLCA Notes from Spring 2015 Survey	Record Notes on Actual Status of Tree Over Time (removed, pruned, declining, irrigation regime, etc.)
855				15.1						15.1		coast redwood	*Sequoia sempervirens*	70/18	55/50	53% fair	poor to mod									X		
856				10.1						10.1		coast redwood	*Sequoia sempervirens*	45/9	40/35	40% poor	poor									X		
857				21.1						21.1		coast redwood	*Sequoia sempervirens*	85/25	55/50	50% fair	poor to mod									X		
858				19.5						19.5		coast redwood	*Sequoia sempervirens*	85/20	60/50	55% fair	moderate									X		
859				9.8						9.8		coast redwood	*Sequoia sempervirens*	50/10	40/35	38% poor	poor									X	Supressed in shade	
860				22.2						22.2		coast redwood	*Sequoia sempervirens*	85/20	60/60	60% fair	moderate									X		
861				25.0						25.0		coast redwood	*Sequoia sempervirens*	90/30	60/60	60% fair	moderate									X		
862				20.6						20.6		coast redwood	*Sequoia sempervirens*	80/25	60/60	60% fair	moderate									X		
863				31.5						31.5		coast redwood	*Sequoia sempervirens*	90/20	75/75	75% good	good									X		
864				23.8						23.8		coast redwood	*Sequoia sempervirens*	95/15	70/65	68% fair	moderate									X		
865				24.0						24.0		coast redwood	*Sequoia sempervirens*	90/15	60/40	47% poor	moderate	W								X	S-trunk form. Abnormal trunk cross section that is cankered.	
866				31.0	13.3					44.3		coast redwood	*Sequoia sempervirens*	95/28	60/50	55% fair	moderate	W						3		X		
867				6.5						6.5		coast redwood	*Sequoia sempervirens*	30/6	65/45	55% fair	moderate									X	Supressed in shade	
868				16.3						16.3		coast redwood	*Sequoia sempervirens*	50/18	70/70	70% good	moderate									X		

Tree Tag #	To be Removed Per Current Site Plan	Author Recommends Removal Due to Very Poor Condition or Elevated Risk of Failure	Project Team Desires to Transplant	Trunk 1 (in.)	Trunk 2 (in.)	Trunk 3 (in.)	Trunk 4 (in.)	Trunk 5 (in.)	Trunk 6 (in.)	Adjusted Trunk Diameter Inches @ 54" A.G. (1+2+3+4+5)	"Protected Tree" per City of Cupertino Ordinance (10.0" single stem, 20" multi, various specified native and non-native species)	Common Name	Scientific Name (*Genus, species*)	Height and Canopy Spread (ft.)	Health & Structural Ratings (0-100% each)	Overall Condition Rating (0-100%)	Live Twig Density (Very Poor, Poor, Mod, Good, Exc.)	Lopsided Canopy (Direction Noted)	Trunk Lean (Direction Noted)	Historical Stem Splitout Evidence (Note Elevation)	Topped or Severely Pruned in Past	Buried Root Crown (BRC) or Girdling Roots (GR)	Stem Decay (Note Elevation)	Codominant Mainstems with Severe Bark Inclusion(s) (Note Height)	Root Extension Restricted in Planter	Soil Moisture Deficit ("Drought Stress")	WLCA Notes from Spring 2015 Survey	Record Notes on Actual Status of Tree Over Time (removed, pruned, declining, irrigation regime, etc.)
869				16.0						16.0		coast redwood	*Sequoia sempervirens*	75/15	70/60	68% fair	moderate									X		
870				27.6						27.6		coast redwood	*Sequoia sempervirens*	85/20	75/75	75% good	good									X		
871				25.8						25.8		coast redwood	*Sequoia sempervirens*	95/25	75/75	75% good	good									X		
872				23.7	15.6					39.3		coast redwood	*Sequoia sempervirens*	50/20	65/55	60% fair	moderate	E						2				
873		X		13.9						13.9		coast redwood	*Sequoia sempervirens*	65/12	25/25	25% very poor	poor											
874				10.5						10.5		coast redwood	*Sequoia sempervirens*	30/9	35/30	30% poor	poor											
875				14.1						14.1		coast redwood	*Sequoia sempervirens*	45/10	40/40	40% poor	poor											
876	Alt. Lot "West"	**(START OF "ALTERNATE LOT WEST" SURVEY)**		31.0						31.0		coast redwood	*Sequoia sempervirens*	75/18	70/70	70% good	moderate											
877	Alt. Lot "West"			23.7						23.7		coast redwood	*Sequoia sempervirens*	65/18	65/60	63% fair	poor to mod									X		
878	Alt. Lot "West"			19.2						19.2		coast redwood	*Sequoia sempervirens*	75/15	65/60	63% fair	poor to mod									X		
879	Alt. Lot "West"			22.8						22.8		coast redwood	*Sequoia sempervirens*	75/18	65/65	65% fair	moderate									X		
880	Alt. Lot "West"			20.5						20.5		coast redwood	*Sequoia sempervirens*	75/18	65/55	60% fair	moderate									X		
881	Alt. Lot "West"			20.8	11.9					32.7		coast redwood	*Sequoia sempervirens*	75/18	60/50	58% fair	moderate							3		X		
882	Alt. Lot "West"			33.3						33.3		coast redwood	*Sequoia sempervirens*	65/20	60/60	60% fair	moderate									X		

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883	Alt. Lot "West"			11.4						11.4		coast redwood	*Sequoia sempervirens*	30/8	30/35	33% poor	poor									X		
884	Alt. Lot "West"			31.5						31.5		coast redwood	*Sequoia sempervirens*	90/18	60/60	60% fair	poor to mod	W								X		
885	Alt. Lot "West"			32.1						32.1		coast redwood	*Sequoia sempervirens*	95/25	75/75	75% good	moderate									X		
886	Alt. Lot "West"			9.8						9.8		coast redwood	*Sequoia sempervirens*	45/6	30/30	30% poor	poor									X		
887	Alt. Lot "West"			25.5						25.5		coast redwood	*Sequoia sempervirens*	75/18	65/65	65% fair	poor to mod									X		
888	Alt. Lot "West"			29.0						29.0		coast redwood	*Sequoia sempervirens*	85/25	60/55	59% fair	poor to mod									X		
889	Alt. Lot "West"	?		15.3						15.3		coast redwood	*Sequoia sempervirens*	45/9	25/25	25% very poor	poor									X		
890	Alt. Lot "West"	X		16.9						16.9		coast redwood	*Sequoia sempervirens*	50/12	0/0	0% dead										X		
891	Alt. Lot "West"	X		29.5						29.5		coast redwood	*Sequoia sempervirens*	65/25	0/0	0% dead										X		
892	Alt. Lot "West"	X		8.6						8.6		coast redwood	*Sequoia sempervirens*	30/6	0/0	0% dead										X		
893	Alt. Lot "West"			26.4						26.4		coast redwood	*Sequoia sempervirens*	75/20	70/70	70% good	moderate									X		
894	Alt. Lot "West"			18.3						18.3		coast redwood	*Sequoia sempervirens*	65/12	40/30	35% poor	moderate									X	*Botryspheria* fungal infection noted as canker progression along trunk. Monitor progression over time.	
895	Alt. Lot "West"			29.4						29.4		Italian stone pine	*Pinus pinea*	45/30	85/75	79% good	good	E	E									
896	Alt. Lot "West"			26.2						26.2		Italian stone pine	*Pinus pinea*	45/25	80/30	50% fair	good	E	E					18				

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897	Alt. Lot "West"			9.6						9.6		coast redwood	*Sequoia sempervirens*	25/12	65/60	64% fair	moderate									X		
898	Alt. Lot "West"			17.8						17.8		coast redwood	*Sequoia sempervirens*	45/15	60/60	60% fair	poor to mod									X		
899	Alt. Lot "West"			11.4						11.4		coast redwood	*Sequoia sempervirens*	45/15	60/40	50% fair	moderate									X	Sweep-form trunk.	
900	Alt. Lot "West"			19.7						19.7		coast redwood	*Sequoia sempervirens*	60/16	35/35	35% poor	poor									X		
901	Alt. Lot "West"			4.1						4.1		coast redwood	*Sequoia sempervirens*	30/6	35/35	35% poor	moderate									X		
902	Alt. Lot "West"			9.5						9.5		coast redwood	*Sequoia sempervirens*	35/12	65/45	50% fair	moderate									X	Mainstem splitout.	
903	Alt. Lot "West"			14.7						14.7		coast redwood	*Sequoia sempervirens*	45/15	65/65	65% fair	moderate									X		
904	Alt. Lot "West"			12.9						12.9		coast redwood	*Sequoia sempervirens*	65/15	70/70	70% good	moderate									X		
905	Alt. Lot "West"			14.7						14.7		coast redwood	*Sequoia sempervirens*	55/20	65/70	68% fair	moderate									X		
906	Alt. Lot "West"			19.3						19.3		coast redwood	*Sequoia sempervirens*	70/20	70/70	70% good	moderate									X		
907	Alt. Lot "West"			16.0						16.0		coast redwood	*Sequoia sempervirens*	60/12	60/45	50% fair	poor	E								X		
908	Alt. Lot "West"			6.4						6.4		coast redwood	*Sequoia sempervirens*	25/10	70/40	50% fair	moderate	E								X		
909	Alt. Lot "West"			27.0						27.0		coast redwood	*Sequoia sempervirens*	75/20	50/50	50% fair	poor									X		
910	Alt. Lot "West"			22.9						22.9		coast redwood	*Sequoia sempervirens*	75/18	65/65	65% fair	poor to mod									X		

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911	Alt. Lot "West"			20.4						20.4		coast redwood	*Sequoia sempervirens*	75/20	70/70	70% good	moderate									X		
912	Alt. Lot "West"			25.5						25.5		coast redwood	*Sequoia sempervirens*	75/18	60/50	55% fair	poor to mod									X	S-form trunk.	
913	Alt. Lot "West"			20.2						20.2		coast redwood	*Sequoia sempervirens*	7/18	70/70	70% good	moderate									X		
914	Alt. Lot "West"			23.5						23.5		coast redwood	*Sequoia sempervirens*	70/18	50/60	54% fair	poor									X		
915	Alt. Lot "West"			14.8						14.8		coast redwood	*Sequoia sempervirens*	75/16	55/55	55% fair	poor									X		
916	Alt. Lot "West"			16.2	10.0					26.2		coast redwood	*Sequoia sempervirens*	55/16	75/70	70% good	moderate									X		
917	Alt. Lot "West"			14.5						14.5		coast redwood	*Sequoia sempervirens*	45/10	40/40	40% poor	poor									X		
918	Alt. Lot "West"			28.9						28.9		coast redwood	*Sequoia sempervirens*	80/15	40/40	40% poor	poor									X		
919	Alt. Lot "West"	X		17.2						17.2		coast redwood	*Sequoia sempervirens*	50/4	0/0	0% dead										X		
920	Alt. Lot "West"			24.4						24.4		coast redwood	*Sequoia sempervirens*	80/12	70/70	70% good	moderate	N								X		
921	Alt. Lot "West"			21.5						21.5		Italian stone pine	*Pinus pinea*	45/20	85/45	55% fair	good	E	E									
922	Alt. Lot "West"			17.8						17.8		Italian stone pine	*Pinus pinea*	45/18	70/35	40% poor	good	E	E									
923	Alt. Lot "West"	X		12.2	9.1					21.3		coast redwood	*Sequoia sempervirens*	50/4	0/0	0% dead										X		
924	Alt. Lot "West"			12.1						12.1		coast redwood	*Sequoia sempervirens*	70/10	60/50	55% fair	moderate	N								X		

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925	Alt. Lot "West"			20.8						20.8		coast redwood	*Sequoia sempervirens*	65/14	65/65	65% fair	moderate									X		
926	Alt. Lot "West"			7.5						7.5		coast redwood	*Sequoia sempervirens*	35/6	60/40	50% fair	moderate	S								X		
927	Alt. Lot "West"			11.2						11.2		coast redwood	*Sequoia sempervirens*	45/8	50/40	47% poor	poor to mod	S								X		
928	Alt. Lot "West"			18.7						18.7		coast redwood	*Sequoia sempervirens*	60/10	70/65	68% fair	moderate	S								X		
929	Alt. Lot "West"			25.4						25.4		coast redwood	*Sequoia sempervirens*	75/20	70/70	70% good	moderate									X		
930	Alt. Lot "West"			19.9						19.9		coast redwood	*Sequoia sempervirens*	75/18	70/70	70% good	moderate	E								X		
931	Alt. Lot "West"			15.2						15.2		coast redwood	*Sequoia sempervirens*	65/18	60/60	60% fair	poor to mod	E								X		
932	Alt. Lot "West"	X		14.2						14.2		coast redwood	*Sequoia sempervirens*	55/8	5/5	5% very poor	very poor									X		
933	Alt. Lot "West"	X		8.5						8.5		coast redwood	*Sequoia sempervirens*	30/5	0/0	0% dead										X		
934	Alt. Lot "West"			23.5						23.5		Monterey pine	*Pinus radiata*	55/25	60/45	50% fair	moderate	SW	SW							X		
935	Alt. Lot "West"	X		13.2						13.2		coast redwood	*Sequoia sempervirens*	45/7	5/5	5% very poor	very poor		E							X		
936	Alt. Lot "West"			29.2						29.2		coast redwood	*Sequoia sempervirens*	70/20	70/70	70% good	moderate									X		
937	Alt. Lot "West"	X		6.0						6.0		coast redwood	*Sequoia sempervirens*	30/5	0/0	0% dead										X		
938	Alt. Lot "West"	X		15.3						15.3		coast redwood	*Sequoia sempervirens*	60/10	20/20	20% very poor	very poor									X		

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939	Alt. Lot "West"			4.3						4.3		Shamel ash	*Fraxinus uhdei*	25/9	85/85	85% good	good									X		
940	Alt. Lot "West"			20.1						20.1		coast redwood	*Sequoia sempervirens*	65/12	40/50	45% poor	poor									X		
941	Alt. Lot "West"			20.0						20.0		coast redwood	*Sequoia sempervirens*	75/15	70/70	70% good	moderate									X		
942	Alt. Lot "West"	X		5.0						5.0		coast redwood	*Sequoia sempervirens*	65/13	0/0	0% dead										X		
943	Alt. Lot "West"			22.6						22.6		coast redwood	*Sequoia sempervirens*	65/15	60/50	55% fair	poor to mod									X		
944	Alt. Lot "West"			17.1						17.1		coast redwood	*Sequoia sempervirens*	60/13	70/70	70% good	moderate									X		
945	Alt. Lot "West"			19.4						19.4		coast redwood	*Sequoia sempervirens*	65/15	70/65	68% fair	moderate									X	Sweep-form trunk.	
946	Alt. Lot "West"			17.0						17.0		coast redwood	*Sequoia sempervirens*	65/12	30/30	30% poor	poor									X		
947	Alt. Lot "West"			7.8						7.8		coast redwood	*Sequoia sempervirens*	30/5	30/30	30% poor	poor									X		
948	Alt. Lot "West"			23.0						23.0		Monterey pine	*Pinus radiata*	15/2	0/0	0% dead (STUMP)										X		
949	Alt. Lot "West"	X		12.2						12.2		coast redwood	*Sequoia sempervirens*	50/5	0/0	0% dead										X		
950	Alt. Lot "West"			16.6						16.6		coast redwood	*Sequoia sempervirens*	60/18	75/75	75% good	moderate									X		
951	Alt. Lot "West"			24.5						24.5		Italian stone pine	*Pinus pinea*	15/2	0/0	0% dead										X		
952	Alt. Lot "West"			19.5						19.5		Italian stone pine	*Pinus pinea*	30/20	60/30	40% poor	good	E	E								Severe lean.	

Tree Tag #	To be Removed Per Current Site Plan	Author Recommends Removal Due to Very Poor Condition or Elevated Risk of Failure	Project Team Desires to Transplant	Trunk 1 (in.)	Trunk 2 (in.)	Trunk 3 (in.)	Trunk 4 (in.)	Trunk 5 (in.)	Trunk 6 (in.)	Adjusted Trunk Diameter Inches @ 54" A.G. (1+2+3+4+5)	"Protected Tree" per City of Cupertino Ordinance (10.0" single stem, 20" multi, various specified native and non-native species)	Common Name	Scientific Name (*Genus, species*)	Height and Canopy Spread (ft.)	Health & Structural Ratings (0-100% each)	Overall Condition Rating (0-100%)	Live Twig Density (Very Poor, Poor, Mod, Good, Exc.)	Lopsided Canopy (Direction Noted)	Trunk Lean (Direction Noted)	Historical Stem Splitout Evidence (Note Elevation)	Topped or Severely Pruned in Past	Buried Root Crown (BRC) or Girdling Roots (GR)	Stem Decay (Note Elevation)	Codominant Mainstems with Severe Bark Inclusion(s) (Note Height)	Root Extension Restricted in Planter	Soil Moisture Deficit ("Drought Stress")	WLCA Notes from Spring 2015 Survey	Record Notes on Actual Status of Tree Over Time (removed, pruned, declining, irrigation regime, etc.)
953	Alt. Lot "West"			22.7						22.7		coast redwood	*Sequoia sempervirens*	50/15	50/45	47% poor	poor to mod									X		
954	Alt. Lot "West"	X		8.7						8.7		coast redwood	*Sequoia sempervirens*	25/5	5/5	5% very poor	very poor									X		
955	Alt. Lot "West"	?		17.7						17.7		coast redwood	*Sequoia sempervirens*	40/18	25/25	25% very poor	very poor									X		
956	Alt. Lot "West"			25.9						25.9		coast redwood	*Sequoia sempervirens*	65/20	50/50	50% fair	poor to mod									X		
957	Alt. Lot "West"			14.0	13.8					27.8		coast redwood	*Sequoia sempervirens*	55/13	30/30	30% poor	poor							2		X		
958	Alt. Lot "West"	?		6.4						6.4		coast redwood	*Sequoia sempervirens*	40/4	5/5	5% very poor	very poor									X		
959	Alt. Lot "West"			21.4						21.4		coast redwood	*Sequoia sempervirens*	65/18	45/45	45% poor	poor									X		
960	Alt. Lot "West"			5.5						5.5		Shamel ash	*Fraxinus uhdei*	25/10	85/60	65% fair	good	S	S							X		
961	Alt. Lot "West"			21.5						21.5		coast redwood	*Sequoia sempervirens*	60/18	30/30	30% poor										X		
962	Alt. Lot "West"			14.3						14.3		coast redwood	*Sequoia sempervirens*	35/14	30/30	30% poor										X		
963	Alt. Lot "West"			4.0						4.0		California pepper tree	*Schinus molle*	17/7	75/75	75% good	good											
964	Alt. Lot "West"	X		17.9						17.9		coast redwood	*Sequoia sempervirens*	40/6	0/0	0% dead										X		
965	Alt. Lot "West"			16.5						16.5		coast redwood	*Sequoia sempervirens*	55/15	30/30	30% poor										X		
966	Alt. Lot "West"	?		18.8						18.8		coast redwood	*Sequoia sempervirens*	50/5	25/25	25% very poor	poor									X		

Tree Tag #	To be Removed Per Current Site Plan	Author Recommends Removal Due to Very Poor Condition or Elevated Risk of Failure	Project Team Desires to Transplant	Trunk 1 (in.)	Trunk 2 (in.)	Trunk 3 (in.)	Trunk 4 (in.)	Trunk 5 (in.)	Trunk 6 (in.)	Adjusted Trunk Diameter Inches @ 54" A.G. (1+2+3+4+5)	"Protected Tree" per City of Cupertino Ordinance (10.0" single stem, 20" multi, various specified native and non-native species)	Common Name	Scientific Name (*Genus, species*)	Height and Canopy Spread (ft.)	Health & Structural Ratings (0-100% each)	Overall Condition Rating (0-100%)	Live Twig Density (Very Poor, Poor, Mod, Good, Exc.)	Lopsided Canopy (Direction Noted)	Trunk Lean (Direction Noted)	Historical Stem Splitout Evidence (Note Elevation)	Topped or Severely Pruned in Past	Buried Root Crown (BRC) or Girdling Roots (GR)	Stem Decay (Note Elevation)	Codominant Mainstems with Severe Bark Inclusion(s) (Note Height)	Root Extension Restricted in Planter	Soil Moisture Deficit ("Drought Stress")	WLCA Notes from Spring 2015 Survey	Record Notes on Actual Status of Tree Over Time (removed, pruned, declining, irrigation regime, etc.)
967	Alt. Lot "West"			6.8	3.7					10.5		Shamel ash	*Fraxinus uhdei*	35/14	85/70	75% good	good									X		
968	Alt. Lot "West"	?		15.1						15.1		coast redwood	*Sequoia sempervirens*	35/4	0/0	0% dead										X		
969	Alt. Lot "West"			5.6						5.6		Shamel ash	*Fraxinus uhdei*	35/12	75/75	75% good	good									X		
970	Alt. Lot "West"	?		9.2						9.2		coast redwood	*Sequoia sempervirens*	40/8	5/5	5% very poor	very poor									X		
971	Alt. Lot "West"	?		7.7						7.7		coast redwood	*Sequoia sempervirens*	55/18	20/20	20% very poor	very poor									X		
972	Alt. Lot "West"			22.2						22.2		coast redwood	*Sequoia sempervirens*	65/20	65/65	65% fair	moderate									X		
973	Alt. Lot "West"			18.5						18.5		coast redwood	*Sequoia sempervirens*	65/20	40/40	40% poor	poor									X	Apical meristem has been split out.	
974	Alt. Lot "West"			19.4						19.4		coast redwood	*Sequoia sempervirens*	65/20	75/75	75% good	moderate									X		
975	Alt. Lot "West"			23.2						23.2		coast redwood	*Sequoia sempervirens*	65/16	65/65	65% fair	moderate	N								X		
976	Alt. Lot "West"			10.6						10.6		coast redwood	*Sequoia sempervirens*	55/12	70/65	68% fair	moderate									X		
977	Alt. Lot "West"			10.3						10.3		coast redwood	*Sequoia sempervirens*	55/12	65/65	65% fair	moderate									X		
978	Alt. Lot "West"			28.6						28.6		coast redwood	*Sequoia sempervirens*	70/15	70/70	70% good	moderate									X		
979	Alt. Lot "West"			23.8						23.8		coast redwood	*Sequoia sempervirens*	80/18	60/60	60% fair	poor to mod									X		
980	Alt. Lot "West"			20.5						20.5		coast redwood	*Sequoia sempervirens*	70/18	60/60	60% fair	poor to mod									X		

Tree Tag #	To be Removed Per Current Site Plan	Author Recommends Removal Due to Very Poor Condition or Elevated Risk of Failure	Project Team Desires to Transplant	Trunk 1 (in.)	Trunk 2 (in.)	Trunk 3 (in.)	Trunk 4 (in.)	Trunk 5 (in.)	Trunk 6 (in.)	Adjusted Trunk Diameter Inches @ 54" A.G. (1+2+3+4+5)	"Protected Tree" per City of Cupertino Ordinance (10.0" single stem, 20" multi, various specified native and non-native species)	Common Name	Scientific Name (*Genus, species*)	Height and Canopy Spread (ft.)	Health & Structural Ratings (0-100% each)	Overall Condition Rating (0-100%)	Live Twig Density (Very Poor, Poor, Mod, Good, Exc.)	Lopsided Canopy (Direction Noted)	Trunk Lean (Direction Noted)	Historical Stem Splitout Evidence (Note Elevation)	Topped or Severely Pruned in Past	Buried Root Crown (BRC) or Girdling Roots (GR)	Stem Decay (Note Elevation)	Codominant Mainstems with Severe Bark Inclusion(s) (Note Height)	Root Extension Restricted in Planter	Soil Moisture Deficit ("Drought Stress")	WLCA Notes from Spring 2015 Survey	Record Notes on Actual Status of Tree Over Time (removed, pruned, declining, irrigation regime, etc.)
981	Alt. Lot "West"			20.9						20.9		coast redwood	*Sequoia sempervirens*	80/18	75/75	75% good	moderate									X		
982	Alt. Lot "West"			20.0						20.0		coast redwood	*Sequoia sempervirens*	70/15	45/40	43% poor	poor									X		
983	Alt. Lot "West"			16.2						16.2		coast redwood	*Sequoia sempervirens*	80/15	60/60	60% fair	poor to mod									X		
984	Alt. Lot "West"			23.0						23.0		coast redwood	*Sequoia sempervirens*	70/18	65/65	65% fair	moderate		NW							X	Sweep-form trunk.	
985	Alt. Lot "West"			28.8						28.8		coast redwood	*Sequoia sempervirens*	70/18	45/45	45% poor	poor									X		
986	Alt. Lot "West"			22.0	16.7					38.7		coast redwood	*Sequoia sempervirens*	70/18	45/45	45% poor	poor									X		
987	Alt. Lot "West"			19.2						19.2		coast redwood	*Sequoia sempervirens*	55/12	60/50	55% fair	poor to mod									X		
988	Alt. Lot "West"			26.7						26.7		coast redwood	*Sequoia sempervirens*	70/15	45/45	45% poor	poor									X		
989	Alt. Lot "West"			10.2						10.2		coast redwood	*Sequoia sempervirens*	35/12	60/50	55% fair	moderate									X		
990	Alt. Lot "West"			27.3						27.3		coast redwood	*Sequoia sempervirens*	80/16	60/60	60% fair	poor to mod									X		
991	Alt. Lot "West"			25.0						25.0		coast redwood	*Sequoia sempervirens*	80/17	45/45	45% poor	poor									X		
992	Alt. Lot "West"			29.5						29.5		coast redwood	*Sequoia sempervirens*	80/18	45/50	48% poor	poor to mod									X		
993	Alt. Lot "West"			20.7						20.7		coast redwood	*Sequoia sempervirens*	75/12	30/30	30% poor	poor									X		
994	Alt. Lot "West"			33.3						33.3		coast redwood	*Sequoia sempervirens*	60/18	45/55	50% fair	poor to mod									X		

Tree Tag #	To be Removed Per Current Site Plan	Author Recommends Removal Due to Very Poor Condition or Elevated Risk of Failure	Project Team Desires to Transplant	Trunk 1 (in.)	Trunk 2 (in.)	Trunk 3 (in.)	Trunk 4 (in.)	Trunk 5 (in.)	Trunk 6 (in.)	Adjusted Trunk Diameter Inches @ 54" A.G. (1+2+3+4+5)	"Protected Tree" per City of Cupertino Ordinance (10.0" single stem, 20" multi, various specified native and non-native species)	Common Name	Scientific Name (*Genus, species*)	Height and Canopy Spread (ft.)	Health & Structural Ratings (0-100% each)	Overall Condition Rating (0-100%)	Live Twig Density (Very Poor, Poor, Mod, Good, Exc.)	Lopsided Canopy (Direction Noted)	Trunk Lean (Direction Noted)	Historical Stem Splitout Evidence (Note Elevation)	Topped or Severely Pruned in Past	Buried Root Crown (BRC) or Girdling Roots (GR)	Stem Decay (Note Elevation)	Codominant Mainstems with Severe Bark Inclusion(s) (Note Height)	Root Extension Restricted in Planter	Soil Moisture Deficit ("Drought Stress")	WLCA Notes from Spring 2015 Survey	Record Notes on Actual Status of Tree Over Time (removed, pruned, declining, irrigation regime, etc.)
995	Alt. Lot "West"			16.1						16.1		coast redwood	*Sequoia sempervirens*	60/12	35/35	35% poor	poor									X	S-trunk form.	
996	Alt. Lot "West"			16.8						16.8		coast redwood	*Sequoia sempervirens*	65/16	55/55	55% fair	poor to mod									X		
997	Alt. Lot "West"			17.9						17.9		coast redwood	*Sequoia sempervirens*	65/14	60/60	60% fair	moderate							45		X		
998	Alt. Lot "West"			21.1						21.1		coast redwood	*Sequoia sempervirens*	65/15	65/65	65% fair	moderate									X	S-trunk form.	
999	Alt. Lot "West"			23.3						23.3		coast redwood	*Sequoia sempervirens*	65/18	60/60	60% fair	poor to mod									X		
1000	Alt. Lot "West"			12.0						12.0		coast redwood	*Sequoia sempervirens*	60/16	65/65	65% fair	moderate									X		
1001	Alt. Lot "West"			12.7						12.7		coast redwood	*Sequoia sempervirens*	50/13	55/50	54% fair	poor to mod									X		
1002	Alt. Lot "West"			16.8						16.8		coast redwood	*Sequoia sempervirens*	60/15	45/50	48% poor	poor									X		
1003	Alt. Lot "West"			12.4	12.0	11.5				35.9		coast redwood	*Sequoia sempervirens*	65/15	65/60	65% fair	moderate									X		
1004	Alt. Lot "West"			20.7						20.7		coast redwood	*Sequoia sempervirens*	70/16	40/40	40% poor	poor							15		X		
1005	Alt. Lot "West"			13.0						13.0		coast redwood	*Sequoia sempervirens*	35/14	50/45	48% poor	moderate									X		
1006	Alt. Lot "West"			26.7						26.7		coast redwood	*Sequoia sempervirens*	75/18	30/30	30% poor	poor									X		
1007	Alt. Lot "West"			16.8						16.8		coast redwood	*Sequoia sempervirens*	65/18	30/30	30% poor	poor									X		
1008	Alt. Lot "West"			18.9						18.9		coast redwood	*Sequoia sempervirens*	70/18	60/60	60% fair	poor to mod									X		
1009	Alt. Lot "West"	?		16.6						16.6		coast redwood	*Sequoia sempervirens*	55/18	10/10	10% very poor	very poor									X	Apical meristem is gone.	
1010	Alt. Lot "West"	?		17.7						17.7		coast redwood	*Sequoia sempervirens*	65/15	15/15	15% very poor	very poor									X		

Tree Tag #	To be Removed Per Current Site Plan	Author Recommends Removal Due to Very Poor Condition or Elevated Risk of Failure	Project Team Desires to Transplant	Trunk 1 (in.)	Trunk 2 (in.)	Trunk 3 (in.)	Trunk 4 (in.)	Trunk 5 (in.)	Trunk 6 (in.)	Adjusted Trunk Diameter Inches @ 54" A.G. (1+2+3+4+5)	"Protected Tree" per City of Cupertino Ordinance (10.0" single stem, 20" multi, various specified native and non-native species)	Common Name	Scientific Name (*Genus, species*)	Height and Canopy Spread (ft.)	Health & Structural Ratings (0-100% each)	Overall Condition Rating (0-100%)	Live Twig Density (Very Poor, Poor, Mod, Good, Exc.)	Lopsided Canopy (Direction Noted)	Trunk Lean (Direction Noted)	Historical Stem Splitout Evidence (Note Elevation)	Topped or Severely Pruned in Past	Buried Root Crown (BRC) or Girdling Roots (GR)	Stem Decay (Note Elevation)	Codominant Mainstems with Severe Bark Inclusion(s) (Note Height)	Root Extension Restricted in Planter	Soil Moisture Deficit ("Drought Stress")	WLCA Notes from Spring 2015 Survey	Record Notes on Actual Status of Tree Over Time (removed, pruned, declining, irrigation regime, etc.)
1011	Alt. Lot "West"	?		13.8						13.8		coast redwood	*Sequoia sempervirens*	65/15	25/25	25% very poor	very poor									X	Chain around trunk is girdling the tree, and must be removed ASAP in order to avoid the tree being structurally compromised.	
1012	Alt. Lot "West"			21.7						21.7		coast redwood	*Sequoia sempervirens*	70/18	60/60	60% fair	poor to mod									X		
1013	Alt. Lot "West"			26.4						26.4		coast redwood	*Sequoia sempervirens*	75/18	30/30	30% poor	poor									X		
1014	Alt. Lot "West"	?		15.1						15.1		coast redwood	*Sequoia sempervirens*	70/13	20/20	20% very poor	very poor									X		
1015	Alt. Lot "West"	?		18.4						18.4		coast redwood	*Sequoia sempervirens*	65/14	25/25	25% very poor	very poor									X		
1016	Alt. Lot "West"			16.6						16.6		coast redwood	*Sequoia sempervirens*	70/16	40/35	38% poor	poor									X	Apical meristem deflected off from vertical.	
1017	Alt. Lot "West"	?		13.1						13.1		coast redwood	*Sequoia sempervirens*	55/13	30/20	25% very poor	very poor									X		
1018	Alt. Lot "West"			16.9						16.9		coast redwood	*Sequoia sempervirens*	55/16	30/20	25% very poor	poor									X		
1019	Alt. Lot "West"			26.5						26.5		coast redwood	*Sequoia sempervirens*	75/18	65/75	70% good	moderate									X		
1020	Alt. Lot "West"	?		6.8						6.8		coast redwood	*Sequoia sempervirens*	20/4	30/20	25% very poor	poor									X		
1021	Alt. Lot "West"			9.7						9.7		coast redwood	*Sequoia sempervirens*	35/12	75/55	65% fair	moderate									X		
1022	Alt. Lot "West"			21.0						21.0		coast redwood	*Sequoia sempervirens*	55/13	35/40	38% poor	poor									X		
1023	Alt. Lot "West"			24.9						24.9		coast redwood	*Sequoia sempervirens*	75/20	55/65	60% fair	poor to mod									X		
1024	Alt. Lot "West"			17.7						17.7		coast redwood	*Sequoia sempervirens*	60/14	60/65	65% fair	moderate									X		
1025	Alt. Lot "West"			8.8						8.8		coast redwood	*Sequoia sempervirens*	35/10	60/45	53% fair	moderate									X		
1026	Alt. Lot "West"			16.5						16.5		coast redwood	*Sequoia sempervirens*	40/10	60/60	60% fair	moderate									X		
1027	Alt. Lot "West"			20.6						20.6		coast redwood	*Sequoia sempervirens*	65/14	70/70	70% good	moderate									X		

Tree Tag #	To be Removed Per Current Site Plan	Author Recommends Removal Due to Very Poor Condition or Elevated Risk of Failure	Project Team Desires to Transplant	Trunk 1 (in.)	Trunk 2 (in.)	Trunk 3 (in.)	Trunk 4 (in.)	Trunk 5 (in.)	Trunk 6 (in.)	Adjusted Trunk Diameter Inches @ 54" A.G. (1+2+3+4+5)	"Protected Tree" per City of Cupertino Ordinance (10.0" single stem, 20" multi, various specified native and non-native species)	Common Name	Scientific Name (*Genus, species*)	Height and Canopy Spread (ft.)	Health & Structural Ratings (0-100% each)	Overall Condition Rating (0-100%)	Live Twig Density (Very Poor, Poor, Mod, Good, Exc.)	Lopsided Canopy (Direction Noted)	Trunk Lean (Direction Noted)	Historical Stem Splitout Evidence (Note Elevation)	Topped or Severely Pruned in Past	Buried Root Crown (BRC) or Girdling Roots (GR)	Stem Decay (Note Elevation)	Codominant Mainstems with Severe Bark Inclusion(s) (Note Height)	Root Extension Restricted in Planter	Soil Moisture Deficit ("Drought Stress")	WLCA Notes from Spring 2015 Survey	Record Notes on Actual Status of Tree Over Time (removed, pruned, declining, irrigation regime, etc.)
1028	Alt. Lot "West"			18.8						18.8		coast redwood	*Sequoia sempervirens*	60/14	55/45	50% fair	poor to mod									X		
1029	Alt. Lot "West"	?		16.4						16.4		coast redwood	*Sequoia sempervirens*	60/10	20/20	20% very poor	very poor									X	Apical stem is dead.	
1030	Alt. Lot "West"	?		17.5						17.5		coast redwood	*Sequoia sempervirens*	65/10	5/5	5% very poor	very poor									X		
1031	Alt. Lot "West"	?		21.0						21.0		coast redwood	*Sequoia sempervirens*	65/10	5/5	5% very poor	very poor									X		
1032	Alt. Lot "West"			29.7						29.7		coast redwood	*Sequoia sempervirens*	70/18	55/40	47% poor	poor to mod							40		X		
1033	Alt. Lot "West"			18.5						18.5		coast redwood	*Sequoia sempervirens*	55/13	65/65	65% fair	moderate									X		
1034	Alt. Lot "West"			24.8						24.8		coast redwood	*Sequoia sempervirens*	70/15	70/70	70% good	moderate									X		
1035	Alt. Lot "West"			17.0						17.0		coast redwood	*Sequoia sempervirens*	75/14	70/35	50% fair	moderate							9		X		
1036	Alt. Lot "West"			30.4						30.4		coast redwood	*Sequoia sempervirens*	85/25	75/75	75% good	good									X		
1037	Alt. Lot "West"			23.3						23.3		coast redwood	*Sequoia sempervirens*	80/15	70/60	66% fair	moderate									X		
1038	Alt. Lot "West"			22.0						22.0		coast redwood	*Sequoia sempervirens*	70/15	60/50	55% fair	poor to mod									X	Apical stem missing (blown out).	
1039	Alt. Lot "West"			25.9						25.9		coast redwood	*Sequoia sempervirens*	90/20	70/70	70% good	moderate									X		
1040	Alt. Lot "West"			45.4						45.4		coast redwood	*Sequoia sempervirens*	80/20	70/67	70% good	moderate		S							X		
1041	Alt. Lot "West"			29.1						29.1		coast redwood	*Sequoia sempervirens*	80/15	70/70	70% good	moderate									X		
1042	Alt. Lot "West"			17.5						17.5		coast redwood	*Sequoia sempervirens*	80/10	70/60	65% fair	moderate									X		
1043	Alt. Lot "West"			36.5						36.5		coast redwood	*Sequoia sempervirens*	85/18	75/70	73% good	good									X		
1044	Alt. Lot "West"	?		11.5						11.5		coast redwood	*Sequoia sempervirens*	60/7	20/20	20% very poor	very poor									X		

Tree Tag #	To be Removed Per Current Site Plan	Author Recommends Removal Due to Very Poor Condition or Elevated Risk of Failure	Project Team Desires to Transplant	Trunk 1 (in.)	Trunk 2 (in.)	Trunk 3 (in.)	Trunk 4 (in.)	Trunk 5 (in.)	Trunk 6 (in.)	Adjusted Trunk Diameter Inches @ 54" A.G. (1+2+3+4+5)	"Protected Tree" per City of Cupertino Ordinance (10.0" single stem, 20" multi, various specified native and non-native species)	Common Name	Scientific Name (*Genus, species*)	Height and Canopy Spread (ft.)	Health & Structural Ratings (0-100% each)	Overall Condition Rating (0-100%)	Live Twig Density (Very Poor, Poor, Mod, Good, Exc.)	Lopsided Canopy (Direction Noted)	Trunk Lean (Direction Noted)	Historical Stem Splitout Evidence (Note Elevation)	Topped or Severely Pruned in Past	Buried Root Crown (BRC) or Girdling Roots (GR)	Stem Decay (Note Elevation)	Codominant Mainstems with Severe Bark Inclusion(s) (Note Height)	Root Extension Restricted in Planter	Soil Moisture Deficit ("Drought Stress")	WLCA Notes from Spring 2015 Survey	Record Notes on Actual Status of Tree Over Time (removed, pruned, declining, irrigation regime, etc.)
1045	Alt. Lot "West"			33.7						33.7		coast redwood	*Sequoia sempervirens*	90/13	70/60	63% fair	moderate	E								X		
1046	Alt. Lot "West"			27.8						27.8		coast redwood	*Sequoia sempervirens*	90/12	65/50	57% fair	moderate	E						70		X		
1047	Alt. Lot "West"			21.0						21.0		coast redwood	*Sequoia sempervirens*	80/12	70/60	68% fair	moderate	E								X		
1048	Alt. Lot "West"			17.2						17.2		coast redwood	*Sequoia sempervirens*	60/12	70/60	67% fair	moderate	E								X		
1049	Alt. Lot "West"			43.9						43.9		coast redwood	*Sequoia sempervirens*	90/18	70/70	70% good	good	E								X		
1050	Alt. Lot "West"			26.8						26.8		coast redwood	*Sequoia sempervirens*	80/12	70/60	68% fair	good	W								X		
1051	Alt. Lot "West"			27.4						27.4		coast redwood	*Sequoia sempervirens*	90/12	70/60	70% good	good	W								X		
1052	Alt. Lot "West"			23.6						23.6		coast redwood	*Sequoia sempervirens*	80/12	70/60	64% fair	good	W								X		
1053	Alt. Lot "West"			23.2						23.2		coast redwood	*Sequoia sempervirens*	80/12	70/50	64% fair	good	S								X	Located on steep slope. Possible stability issues?	
1054	Alt. Lot "West"			24.6						24.6		coast redwood	*Sequoia sempervirens*	80/10	70/50	65% fair	good	S								X	Located on steep slope. Possible stability issues?	
1055	Alt. Lot "West"			27.8						27.8		coast redwood	*Sequoia sempervirens*	80/13	70/50	67% fair	good	S								X	Located on steep slope. Possible stability issues?	
1056	Alt. Lot "West"			25.9						25.9		coast redwood	*Sequoia sempervirens*	80/12	55/60	57% fair	poor to mod									X		
1057	Alt. Lot "West"			27.0						27.0		coast redwood	*Sequoia sempervirens*	75/15	70/70	70% good	good									X		
1058	Alt. Lot "West"			28.7						28.7		coast redwood	*Sequoia sempervirens*	75/18	70/70	70% good	good									X	S-trunk at 4-feet elevation.	
1059	Alt. Lot "West"			29.3	22.0					51.3		coast redwood	*Sequoia sempervirens*	80/18	70/60	68% fair	moderate to good							2		X		
1060	Alt. Lot "West"	X		7.6						7.6		white alder	*Alnus rhombifolia*	18/7	30/10	20% very poor	poor				X		lower trunk			X		
1061	Alt. Lot "West"			19.6						19.6		coast redwood	*Sequoia sempervirens*	60/12	70/55	63% fair	good	W								X	S-trunk form between zero and 15 feet.	

Tree Tag #	To be Removed Per Current Site Plan	Author Recommends Removal Due to Very Poor Condition or Elevated Risk of Failure	Project Team Desires to Transplant	Trunk 1 (in.)	Trunk 2 (in.)	Trunk 3 (in.)	Trunk 4 (in.)	Trunk 5 (in.)	Trunk 6 (in.)	Adjusted Trunk Diameter Inches @ 54" A.G. (1+2+3+4+5)	"Protected Tree" per City of Cupertino Ordinance (10.0" single stem, 20" multi, various specified native and non-native species)	Common Name	Scientific Name (*Genus, species*)	Height and Canopy Spread (ft.)	Health & Structural Ratings (0-100% each)	Overall Condition Rating (0-100%)	Live Twig Density (Very Poor, Poor, Mod, Good, Exc.)	Lopsided Canopy (Direction Noted)	Trunk Lean (Direction Noted)	Historical Stem Splitout Evidence (Note Elevation)	Topped or Severely Pruned in Past	Buried Root Crown (BRC) or Girdling Roots (GR)	Stem Decay (Note Elevation)	Codominant Mainstems with Severe Bark Inclusion(s) (Note Height)	Root Extension Restricted in Planter	Soil Moisture Deficit ("Drought Stress")	WLCA Notes from Spring 2015 Survey	Record Notes on Actual Status of Tree Over Time (removed, pruned, declining, irrigation regime, etc.)
1062	Alt. Lot "West"			9.9						9.9		coast redwood	*Sequoia sempervirens*	45/9	70/65	70% good	good	S								X		
1063	Alt. Lot "West"			19.4						19.4		coast redwood	*Sequoia sempervirens*	60/12	70/65	68% fair	moderate to good									X		
1064	Alt. Lot "West"			12.2						12.2		Shamel ash	*Fraxinus uhdei*	35/30	50/50	50% fair	poor to mod	W								X		
1065	Alt. Lot "West"			12.0						12.0		Shamel ash	*Fraxinus uhdei*	35/25	80/60	67% fair	good	SW	SW							X		
1066	Alt. Lot "West"			32.2						32.2		Italian stone pine	*Pinus pinea*	30/40	75/45	58% fair	good	S						4			Requires endweight reduction pruning. Note trunk measured at narrow point below standard height.	
1067	Alt. Lot "West"			25.7						25.7		Italian stone pine	*Pinus pinea*	25/35	65/40	52% fair	moderate	S	S					6			Requires endweight reduction pruning. Note trunk measured at narrow point below standard height.	
1068	Alt. Lot "West"			24.6						24.6		Italian stone pine	*Pinus pinea*	30/35	75/60	66% fair	good			12							Requires endweight reduction pruning. Note trunk measured at narrow point below standard height.	
1069	Alt. Lot "West"			24.2						24.2		Italian stone pine	*Pinus pinea*	30/35	75/60	68% fair	good	N		18							Requires endweight reduction pruning. Note trunk measured at narrow point below standard height.	
1070	Alt. Lot "West"	X		15.4						15.4		Monterey pine	*Pinus radiata*	20/20	30/20	25% very poor	poor	S					1			X		
1071	Alt. Lot "West"			9.0						9.0		honey locust	*Gleditsia triacanthos*	25/18	35/40	37% poor	poor									X		
1072	Alt. Lot "West"			8.3						8.3		honey locust	*Gleditsia triacanthos*	25/15	40/25	33% poor	poor	W								X		
1073	Alt. Lot "West"			8.9						8.9		honey locust	*Gleditsia triacanthos*	25/20	40/40	40% poor	poor									X		
1074	Alt. Lot "West"			8.2						8.2		honey locust	*Gleditsia triacanthos*	25/20	40/40	40% poor	poor									X		
1075	Alt. Lot "West"	X		7.6						7.6		evergreen pear	*Pyrus kawakamii*	16/13	25/25	25% very poor	very poor	W								X	Fireblight infection	
1076	Alt. Lot "West"	X		8.8						8.8		evergreen pear	*Pyrus kawakamii*	20/20	25/25	25% very poor	very poor		S							X	Fireblight infection	
1077	Alt. Lot "West"			12.9						12.9		evergreen pear	*Pyrus kawakamii*	30/30	30/40	35% poor	moderate									X	Fireblight infection	
1078	Alt. Lot "West"			9.2						9.2		honey locust	*Gleditsia triacanthos*	22/25	65/60	63% fair	moderate									X		

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1079	Alt. Lot "West"			6.7						6.7		honey locust	*Gleditsia triacanthos*	18/15	65/55	60% fair	moderate									X		
1080	Alt. Lot "West"			8.5						8.5		honey locust	*Gleditsia triacanthos*	25/20	65/60	63% fair	moderate									X		
1081	Alt. Lot "West"			19.8						19.8		Italian stone pine	*Pinus pinea*	30/40	80/70	75% good	good		E								Will need endweight reduction pruning if retained.	
1082	Alt. Lot "West"			32.8						32.8		Italian stone pine	*Pinus pinea*	35/30	80/60	67% fair	good	S						15			Will need endweight reduction pruning if retained. Note: measured at 2 feet elevation.	
1083	Alt. Lot "West"			22.1						22.1		Italian stone pine	*Pinus pinea*	30/30	80/65	69% fair	good	N	N								Will need endweight reduction pruning if retained.	
1084	Alt. Lot "West"			23.9						23.9		Italian stone pine	*Pinus pinea*	25/25	75/45	55% fair	good	S						4			Note: measured at 3 feet elevation.	
1085	Alt. Lot "West"			18.4						18.4		Italian stone pine	*Pinus pinea*	28/30	80/50	65% fair	good	S						4			Note: measured at 3 feet elevation.	
1086	Alt. Lot "West"			17.6						17.6		Italian stone pine	*Pinus pinea*	30/25	80/65	75% good	good										S-trunk form.	
1087	Alt. Lot "West"			4.4						4.4		(dead standing tree)	*(dead standing tree)*	13/4	0/0	0% dead										X		
1088	Alt. Lot "West"			7.0	7.0	6.5				20.5		coast redwood	*Sequoia sempervirens*	25/10	80/80	80% good	good									X		
1089	Alt. Lot "West"			7.5						7.5		coast redwood	*Sequoia sempervirens*	25/10	80/80	80% good	good									X		
1090	Alt. Lot "West"			4.5						4.5		coast redwood	*Sequoia sempervirens*	18/8	80/80	80% good	good									X		
1091	Alt. Lot "West"			12.5						12.5		coast redwood	*Sequoia sempervirens*	30/10	70/70	70% good	good									X		
1092	Alt. Lot "West"			4.7	4.1					8.8		coast redwood	*Sequoia sempervirens*	20/13	80/80	80% good	good									X		
1093	Alt. Lot "West"			5.7	5.3					11.0		coast redwood	*Sequoia sempervirens*	25/12	80/80	80% good	good									X		
1094	Alt. Lot "West"			13.4						13.4		coast redwood	*Sequoia sempervirens*	30/11	70/60	66% fair	moderate									X		
1095	Alt. Lot "West"	X		42.0						42.0		Italian stone pine	*Pinus pinea*	25/30	80/0	20% very poor	good										Trunk diameter estimated. Tree has failed structurally, and is lying on the ground.	

Tree Tag #	To be Removed Per Current Site Plan	Author Recommends Removal Due to Very Poor Condition or Elevated Risk of Failure	Project Team Desires to Transplant	Trunk 1 (in.)	Trunk 2 (in.)	Trunk 3 (in.)	Trunk 4 (in.)	Trunk 5 (in.)	Trunk 6 (in.)	Adjusted Trunk Diameter Inches @ 54" A.G. (1+2+3+4+5)	"Protected Tree" per City of Cupertino Ordinance (10.0" single stem, 20" multi, various specified native and non-native species)	Common Name	Scientific Name (*Genus, species*)	Height and Canopy Spread (ft.)	Health & Structural Ratings (0-100% each)	Overall Condition Rating (0-100%)	Live Twig Density (Very Poor, Poor, Mod, Good, Exc.)	Lopsided Canopy (Direction Noted)	Trunk Lean (Direction Noted)	Historical Stem Splitout Evidence (Note Elevation)	Topped or Severely Pruned in Past	Buried Root Crown (BRC) or Girdling Roots (GR)	Stem Decay (Note Elevation)	Codominant Mainstems with Severe Bark Inclusion(s) (Note Height)	Root Extension Restricted in Planter	Soil Moisture Deficit ("Drought Stress")	WLCA Notes from Spring 2015 Survey	Record Notes on Actual Status of Tree Over Time (removed, pruned, declining, irrigation regime, etc.)
1096	Alt. Lot "West"			31.8						31.8		Italian stone pine	*Pinus pinea*	25/25	80/55	64% fair	good	N	N								Trunk measured at 2 feet elevation.	
1097	Alt. Lot "West"	X		13.2						13.2		tulip tree	*Liriodendron tulipifera*	30/12	25/25	25% very poor	very poor									X		
1098	Alt. Lot "West"	?		12.6						12.6		tulip tree	*Liriodendron tulipifera*	25/10	40/30	30% poor	poor									X		
1099	Alt. Lot "West"			27.9						27.9		Italian stone pine	*Pinus pinea*	35/45	85/55	70% good	good	SW	SW	20							Needs endweight reduction pruning.	
1100	Alt. Lot "West"			26.0						26.0		Italian stone pine	*Pinus pinea*	20/35	0/0	0% dead											Trunk diameter estimated. Tree has failed structurally, and is lying on the ground as dead wood.	
1101	Alt. Lot "West"	?		18.9						18.9		Italian stone pine	*Pinus pinea*	40/30	80/50	50% fair	good	NW	NW								Note: Italian stone pines appear to be failing in small diameter planter areas, due to their root development having been severely restricted in terms of lateral extension. The root plates of many of these trees appear to be failing. There is visible girdling root formation directly resulting from the lack of open soil planting area width, which has now resulted in the root plates remaining very limited in extension. Once the trees' canopies become extended with heavy endweight, those load forces act on the small diameter root plates, which then causes the trees' root plates to rotate and push up out of the ground, allowing the trees to fail. Many of these trees may be of	
1102	Alt. Lot "West"	?		38.3						38.3		Italian stone pine	*Pinus pinea*	40/28	80/47	50% fair	good	SW	SW								Same as 'notes' for tree #1101. Trunk diameter measured at 1 foot elevation.	
1103	Alt. Lot "West"	X		24.7						24.7		Italian stone pine	*Pinus pinea*	30/25	60/0	10% very poor	good	S	S								Same as 'notes' for tree #1101. Trunk diameter measured at 2 feet elevation.	
1104	Alt. Lot "West"	X		28.0						28.0		Italian stone pine	*Pinus pinea*	20/20	0/0	0% dead											Same as 'notes' for tree #1101. Trunk diameter measured at 2 feet elevation.	
1105	Alt. Lot "West"			5.0	4.5					9.5		river red gum	*Eucalyptus camaldulensis*	30/10	90/45	60% fair	good							1		X	Recommend remove one of two codominant mainstems at the fork at 1 foot elevation.	
1106				8.0						8.0		southern magnolia	*Magnolia grandiflora*	20/16	50/50	50% fair	poor to mod									X	Roots damaged on grade from mowing activities.	
1107				6.8						6.8		southern magnolia	*Magnolia grandiflora*	20/16	50/50	50% fair	poor to mod									X	Roots damaged on grade from mowing activities.	
1108				9.0						9.0		southern magnolia	*Magnolia grandiflora*	23/20	55/55	55% fair	poor to mod									X	Roots damaged on grade from mowing activities.	
1109	X			41.8						41.8		Shamel ash	*Fraxinus uhdei*	65/60	80/60	73% good	good		E							X	Roots damaged from recent curb replacement activities.	
1110	X			10.5						10.5		Shamel ash	*Fraxinus uhdei*	35/20	30/30	30% poor	poor	W			X	gr		6		X	Roots damaged from recent curb replacement activities.	
1111	X			14.7						14.7		Shamel ash	*Fraxinus uhdei*	40/20	30/30	30% poor	poor	E			X	gr		10		X	Roots damaged from recent curb replacement activities.	
1112	X			26.6						26.6		Shamel ash	*Fraxinus uhdei*	65/35	60/60	60% fair	moderate	SW				gr				X	Roots damaged from recent curb replacement activities.	

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1113	X			33.5						33.5		Shamel ash	*Fraxinus uhdei*	70/70	65/55	60% fair	moderate			35		gr				X	High risk situation: Split "hanger" limb noted at 35 feet elevation on north side of canopy needs to be removed. High risk!	
1114				19.2						19.2		Shamel ash	*Fraxinus uhdei*	35/35	85/65	75% good	good	S	S		X					X		
1115		(monitor the girdling root situation)		22.9						22.9		Shamel ash	*Fraxinus uhdei*	35/35	80/30	45% poor	good	E	E			serious girdling root				X	Roots damaged on grade. Note severe girdling root situation.	
1116				24.2						24.2		Shamel ash	*Fraxinus uhdei*	40/40	80/55	65% fair	good				X	gr				X	Roots damaged on grade from mowing activities.	
1117				24.7						24.7		Shamel ash	*Fraxinus uhdei*	45/40	40/30	35% poor	poor		E				throughout canopy			X	Roots damaged on grade from mowing activities.	
1118				23.0						23.0		Shamel ash	*Fraxinus uhdei*	55/40	60/50	55% fair	moderate	W	W		X					X	Roots damaged on grade from mowing activities.	
1119		X		18.6						18.6		Shamel ash	*Fraxinus uhdei*	45/20	15/15	15% very poor	very poor				X	gr					Roots damaged on grade from mowing activities. Recommend remove tree due to very poor overall condition.	
1120				26.7						26.7		Shamel ash	*Fraxinus uhdei*	50/40	75/65	70% good	good	N	E		X					X	Roots damaged on grade from mowing activities.	
1121				19.7						19.7		Shamel ash	*Fraxinus uhdei*	50/35	80/65	76% good	good	W	W		X					X	Roots damaged on grade from mowing activities.	
1122				21.4						21.4		Shamel ash	*Fraxinus uhdei*	60/35	40/40	40% poor	poor	W			X		0 to 2			X	Roots damaged on grade from mowing activities. Vehicle collision caused damage to trunk between zero and 2 feet elevation.	
1123				18.5						18.5		Shamel ash	*Fraxinus uhdei*	55/30	65/55	58% fair	moderate	W			X	gr				X	Roots damaged on grade from mowing activities. Root plate upper surfaces are exposed.	
1124				15.5						15.5		Shamel ash	*Fraxinus uhdei*	30/18	40/30	35% poor	poor	W			X	gr				X	Roots damaged on grade from mowing activities. Root plate upper surfaces are exposed.	
1125				13.8						13.8		Shamel ash	*Fraxinus uhdei*	40/20	50/30	40% poor	moderate	W	S		X	serious girdling root				X	Roots damaged on grade from mowing. Note severe girdling root situation.	

Notes:

1. On-site survey trees include all existing specimens of tree species with at least one (1) mainstem measuring greater than or equal to 4 inches diameter at 4.5 feet above grade.

2. Trees were tagged with professional grade round-shaped aluminum tags numbering "1" through "999". For alternate lot west, and for N. Wolfe Road median trees, the tag run went over #999, which is the cutoff point for round tags. Tags numbering #1,000 and above are racetrack-shaped.

3. Heights of some trees were measured using a Nikon 550 Forestry Pro hypsometer. Diameters of all trees were measured at 4.5 feet or at a narrow point, using a forestry D-tape that converts circumference to an average diameter.

Protection and Maintenance Specifications:

RPZ: Root protection zone fence, chain link, with 2" diameter iron posts driven 24" into the ground, 6 to 8 feet on center max. spacing.
RB: Root buffer consisting of wood chip mulch lain over existing soil as a 12 inch thick layer, overlain with 1 inch or greater plywood strapped together with metal plates. This root buffer or soil buffer should be placed over the entire width of the construction corridor between tree trunks and construction.
RP: Root pruning. Prune woody roots measuring greater than or equal to 1 inch diameter by carefully back-digging into the soil around each root using small hand tools until an area is reached where the root is undamaged. Cleanly cut through the root at right angle to the root growth direction, using professional grade pruning equipment and/or a Sawzall with wood pruning blade. Backfill around the cut root immediately (same day), and thoroughly irrigate the area to saturate the uppermost 24 inches of the soil profile.
TB: Trunk buffer consists of 20-40 wraps of orange plastic snow fencing to create a 2 inch thick buffer over the lowest 8 feet of tree trunk (usually takes at least an entire roll of orange fencing). Lay 2X4 wood boards vertically, side by side, around the entire circumference of the trunk. Secure buffer using duct tape (not wires).
F: Fertilization with Greenbelt 22-14-14 tree formula.
M: 4-inch thick layer of wood chip mulch (Lyngso, self pickup). Do not use bark chips or shredded redwood bark.
W: Irrigate using various methods to be determined through discussion with General Contractor. Irrigation frequency and duration to be determined through discussion.
P: Pruning per specifications noted elsewhere. All pruning must be performed only under direct site supervision of an ISA Certified Arborist, or performed directly by an ISA Certified Arborist, and shall conform to all ANSI A300 standards.
MON: Project Arborist must be present to monitor specific work as noted in the notes box for each tree.

Source: Walter Levison Consulting, 2016

Figure 7-1: Existing Trees Map

Vallco Town Center Specific Plan

Environmental Assessment

Not to scale

Kimley»Horn

Expect More. Experience Better.

Fact Sheet ST-589
October 1994

Sequoia sempervirens
Coast Redwood[1]

Edward F. Gilman and Dennis G. Watson[2]

INTRODUCTION

Sequoia sempervirens, the Coast Redwoods of California, are the tallest trees in the world (Fig. 1). They can vary greatly when grown from seed, but varieties are available now which have been vegetatively propagated and they retain true characteristics. Redwoods grow three to five feet per year and are remarkably pest-free. They live to be many hundreds of years old; some live to several thousand years. Bark is particularly beautiful, turning a bright orange on older trees. It may grow poorly in zones 9 and 10 in Florida.

GENERAL INFORMATION

Scientific name: *Sequoia sempervirens*
Pronunciation: see-KWOY-uh sem-per-VYE-renz
Common name(s): Coast Redwood
Family: *Taxodiaceae*
USDA hardiness zones: 7 through 10A (Fig. 2)
Origin: native to North America
Uses: screen; specimen; no proven urban tolerance
Availability: grown in small quantities by a small number of nurseries

DESCRIPTION

Height: 60 to 120 feet
Spread: 25 to 35 feet
Crown uniformity: symmetrical canopy with a regular (or smooth) outline, and individuals have more or less identical crown forms
Crown shape: pyramidal
Crown density: moderate

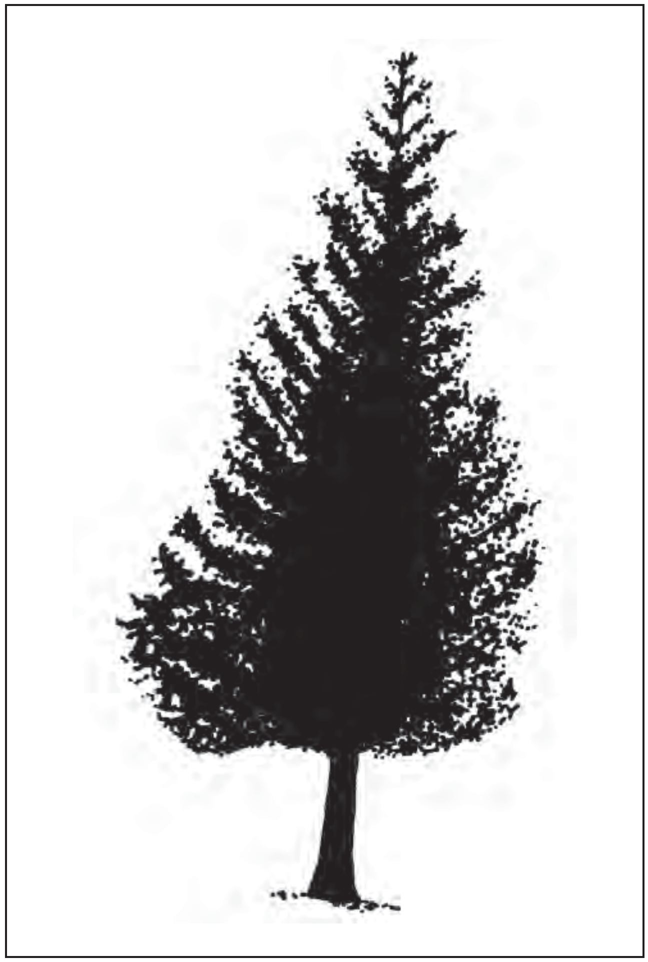

Figure 1. Mature Coast Redwood.

Growth rate: medium
Texture: fine

1. This document is adapted from Fact Sheet ST-589, a series of the Environmental Horticulture Department, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida. Publication date: October 1994.

2. Edward F. Gilman, associate professor, Environmental Horticulture Department; Dennis G. Watson, associate professor, Agricultural Engineering Department, Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida, Gainesville FL 32611.

Figure 2. Shaded area represents potential planting range.

Foliage

Leaf arrangement: alternate; spiral
Leaf type: simple
Leaf margin: entire
Leaf shape: needle-like (filiform)
Leaf venation: none, or difficult to see; parallel
Leaf type and persistence: evergreen; needle leaf evergreen
Leaf blade length: less than 2 inches
Leaf color: green
Fall color: no fall color change
Fall characteristic: not showy

Flower

Flower characteristics: inconspicuous and not showy

Fruit

Fruit shape: oval; round
Fruit length: .5 to 1 inch
Fruit covering: dry or hard
Fruit color: brown
Fruit characteristics: does not attract wildlife; inconspicuous and not showy; no significant litter problem

Trunk and Branches

Trunk/bark/branches: droop as the tree grows, and will require pruning for vehicular or pedestrian clearance beneath the canopy; should be grown with a single leader; very showy trunk; no thorns
Pruning requirement: needs little pruning to develop a strong structure
Breakage: resistant
Current year twig color: brown; green
Current year twig thickness: medium; thin
Wood specific gravity: 0.35

Culture

Light requirement: tree grows in part shade/part sun; tree grows in full sun
Soil tolerances: clay; loam; sand; slightly alkaline; acidic; occasionally wet; well-drained
Drought tolerance: moderate

Other

Roots: surface roots are usually not a problem
Winter interest: tree has winter interest due to unusual form, nice persistent fruits, showy winter trunk, or winter flowers
Outstanding tree: not particularly outstanding
Invasive potential: little, if any, potential at this time
Ozone sensitivity: tolerant
Verticillium wilt susceptibility: not known to be susceptible
Pest resistance: long-term health usually not affected by pests

USE AND MANAGEMENT

Redwood maintains a pyramidal form and dark green foliage throughout the year. Planted in a row 15 to 20 feet apart they make a nice screen. In areas outside California and the Northwest, it is probably best used occasionally as a novelty specimen.

Redwood is tolerant of flooding, making best growth along stream banks and flood plains. Irrigation helps maintain a vigorous tree in other sites. Allow plenty of soil space for proper development.

Propagation is possible from seed and through vegetative propagation.

Pests

Few insects were noted for *Sequoia* species.

Diseases

No diseases are of major concern.

Sequoia sempervirens is resistant to oak root fungus.

Appendix GEO

Preliminary Geotechnical Investigation

Preliminary Geotechnical Investigation

Town Center/Community Park

Cupertino, California

Report No. 228550

November 19, 2015

Scott M. Leck for

Alberto Cortez, E.I.T.
Senior Staff Engineer

Scott M. Leck for

Wilson Wong, P.E.
Project Engineer

Scott M. Leck

Scott M. Leck, P.E., G.E.
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PRELIMINARY GEOTECHNICAL INVESTIGATION
TOWN CENTER/COMMUNITY PARK
CUPERTINO, CALIFORNIA

1.0 INTRODUCTION

This report presents the results of our preliminary geotechnical investigation for the Town Center/Community Park ("The Project") to be constructed in Cupertino, California. The site location is shown on the Vicinity Map, Figure 1. The purpose of our investigation was to evaluate the geologic and subsurface conditions and to provide preliminary geotechnical recommendations for design of the proposed project.

Our predecessor Lowney Associates prepared several geotechnical reports for the site. The previously prepared reports are listed below. The previous borings and laboratory test data were used to prepare this preliminary geotechnical report.

- A report titled, "Soil Investigation for Wolfe Road Tunnel, Vallco Park Regional Shopping Center, Cupertino, California," dated August 19, 1974, prepared by Lowney/Kaldveer Associates.
- A report titled "Geotechnical Investigation for Vallco Parking Structure, Vallco Park, Cupertino, California," dated April 11, 1984, prepared by J.V. Lowney & Associates.
- A report titled "Geotechnical Investigation for Vallco Parking Structure and Tunnel, Vallco Fashion Park, Cupertino, California," dated December 11, 1986, prepared by J.V. Lowney & Associates.
- A report titled "Geotechnical Investigation for Vallco Fashion Park Expansion, Cupertino, California," prepard by Lowney Associates, dated June 20, 1999.
- A report titled "Geotechnical Investigation, Vallco Fashion Park Mixed-Use Expansion, Cupertino, California," prepared by TRC/Lowney Associates, dated June 7, 2005.

For our use, we received architectural site plans that were submitted to the City on September 8, 2015.

1.1 Project Description

Based on the site plans provided, we understand the project consists of redeveloping the existing Vallco mall with a multi-use development consisting of buildings for office, commercial, and residential use. The current shopping center encompasses approximately 50 acres on both sides of Wolfe Road between Stevens Creek Boulevard on the south and Interstate Highway 280 on the north. Based on the site plans, the redevelopment on the west side of Wolfe Road may consist of 6-story buildings over one-level of below-grade parking. The redevelopment on the east side of Wolfe Road may consist of 7-story buildings over two-levels of below-grade, a partial third-level of below-grade parking for the northern half of the site. The street-level layout of the proposed development is shown on the Site Plan, Figure 2. We understand that the structures of the west side of Wolfe Road will consist of either wood-framed or concrete/steel construction over a concrete podium. The structures on the east side of Wolfe Road will consist of concrete/steel construction over a concrete podium. Additional improvements will include a 30-acre green roof structure, underground utilities and other landscaping.

Based on the planned improvements, excavations on the order of approximately 15, 25, and 35 feet are anticipated for the one-level, two-level, and three-level below-grade parking garages, respectively. Structural loads have not been provided to us; therefore we assumed that structural loads will be representative for this type of construction.

1.2 Scope of Services

Our scope of services was presented in our agreement with you dated November 9, 2015. To accomplish this work, we provided the following services:

- Review of previous exploration of subsurface conditions and laboratory testing in the area of the proposed development.

- Engineering analysis to evaluate structure foundations, and site earthwork.

- Preparation of this report to summarize our findings and to present our preliminary conclusions and recommendations.

2.0 SITE CONDITIONS

2.1 Previous Exploration Program

Subsurface exploration was previously performed on September 15, 1972, and between June 4 and June 10, 1974 using conventional, truck-mounted continuous flight auger drilling equipment to investigate, sample, and log subsurface soils. Additional subsurface exploration was also performed between May 17 and May 19, 1999, and August 3 and August 4, 2004 using conventional, truck-mounted hollow-stem auger drilling equipment. The continuous flight auger exploratory borings were drilled to depths ranging from approximately 5 to 47 feet. The hollow-stem auger borings were drilled to depths ranging from approximately 10 to 84½ feet.

The approximate locations of the borings are shown on the Site Plan, Figure 2. The logs of the borings and details regarding our previous field investigation are included in Appendix A; previous laboratory test data are discussed in Appendix B.

2.2 Subsurface Conditions

For the portion of the site on the west side of Wolfe Road, exploratory borings EB-1 to EB-5 and EB-9 to EB-14 drilled in 1974, and borings EB-5 to EB-10 and EB-15 to EB-18 drilled in 2004, generally encountered very stiff to hard lean clay, stiff to hard silty clay, and stiff to hard sandy lean clay to a depth of approximately 35 feet with some interbedded granular layers ranging in thickness from 1 to 9½ feet. The interbedded layers consisted of medium dense to very dense silty gravel, medium dense to dense clayey gravel, dense well graded gravel, loose to very dense clayey sand, loose to very dense silty sand, medium dense to very dense well graded sand, and medium dense to very dense poorly graded sand. Fill was encountered in the 2004 exploration in borings EB-6 and EB-8 consisting of stiff lean clay to depths of approximately 2 and 5 feet, respectively, below the surface. Below the depth of 35 feet, the exploratory borings generally encountered granular soils consisting of dense to very dense clayey sand and dense poorly graded sand with some interbedded layers consisting of very stiff to hard lean clay to a depth of 84½ feet, the maximum depth explored.

For the portion of the site on the east side of Wolfe Road, exploratory borings EB-A to EB-E drilled in 1972, borings EB-20 to EB-25 drilled in 1974, and borings EB-1 to EB-14 drilled in 1999, generally encountered interbedded layers consisting of stiff to hard sandy clay, stiff to hard silty clay, very stiff gravelly clay, very stiff silt, medium dense to very dense poorly graded gravel, medium dense to very dense clayey gravel, medium dense to dense silty gravel, loose to very dense clayey sand, loose to very dense silty sand, and dense to very dense poorly graded sand to a depth of 50 feet.

2.3 Ground Water

Free ground water was encountered in boring EB-9 of the 2004 exploration at a depth of 68 feet. Based on the depth to historically high ground water map prepared by the California Geological Survey for the Cupertino Quadrangle (CGS, 2002), the depth to historically high ground water levels in the site vicinity is estimated to be greater than 50 feet below the ground surface. Based on the above information, we judge a ground water depth of 50 feet to be appropriate for design. Our borings were backfilled immediately after drilling. Fluctuations in the level of the ground water may occur due to variations in rainfall, underground drainage patterns, and other factors not evident at the time measurements were made.

3.0 GEOLOGIC HAZARDS

A brief qualitative evaluation of geologic hazards was made during this investigation. Our comments concerning these hazards are presented below.

3.1 Fault Rupture

The San Francisco Bay Area is one of the most seismically active regions in the United States. The significant earthquakes that occur in the Bay Area are generally associated with crustal movement along well-defined active fault zones of the San Andreas Fault system, which regionally trend in a northwesterly direction. The site is not located within a currently designated Alquist-Priolo Earthquake Fault Zone (known formerly as a Special Studies Zone), or a Santa Clara County Fault Rupture Hazard Zone (SCC, 2002). As shown on Figure 3, no known surface expression of active faults is believed to cross the site. Fault rupture through the site, therefore, is not anticipated.

3.2 Maximum Estimated Ground Shaking

Based on Equation 11.8-1 of ASCE 7-10, a maximum considered earthquake geometric mean peak ground acceleration (PGA_M) of 0.62g can be expected at the site.

3.3 Future Earthquake Probabilities

Although research on earthquake prediction has greatly increased in recent years, seismologists cannot predict when or where an earthquake will occur. The U.S. Geological Survey's Working Group on California Earthquake Probabilities (WGCEP, 2014) estimates there is a 72 percent chance of at least one magnitude 6.7 earthquake occurring in the San Francisco Bay region between 2014 and 2044. This result is an important outcome of WGCEP's work because any major earthquake can cause damage throughout the region. The 1989 Loma Prieta earthquake demonstrated this potential by causing severe damage in Oakland and San Francisco, more than 50 miles from the fault epicenter.

Although earthquakes can cause damage at a considerable distance, shaking will be very intense near the fault rupture. Therefore, earthquakes located in urbanized areas of the region have the potential to cause much more damage than the 1989 Loma Prieta earthquake.

3.4 Liquefaction

The site is located within an area mapped by the State of California and the Santa Clara County as not having the potential for seismically induced liquefaction. During cyclic ground shaking, such as earthquakes, cyclically-induced stresses may cause increased pore water pressures within the soil matrix, which results in liquefaction. Liquefied soil may lose shear strength that may lead to large shear deformations and/or flow failure (Youd et al., 2001). Liquefied soil can also settle as pore pressures dissipate following an earthquake. Limited field data is available on this subject; however, settlement on the order of 2 to 3 percent of the thickness of the liquefied zone has been measured in some cases.

Soils most susceptible to liquefaction are loose to moderately dense, saturated, non-cohesive soils with poor drainage, such as sands and silts with interbedded or capping layers of relatively low permeability soil.

Groundwater was encountered in our 2004 exploration at a depth of 68 feet and CGS estimates depth to historically high ground water levels in the site vicinity to be greater than 50 feet below the ground surface. Therefore, we judge the risk of liquefaction at the project site to be low.

3.5 Dry Seismic Settlement

If near-surface soils vary in composition both vertically and laterally, strong earthquake shaking can cause non-uniform densification of loose to medium dense cohesionless soil strata. This results in movement of the near-surface soils. Our explorations encountered some loose to medium dense clayey sand, silty sand, silty gravel, and medium dense poorly graded sand and poorly graded gravel layers at various depths.

We understand that the entire site will have one-level of below-grade vehicle parking. In addition, the portion of the site east of Wolfe Road will have two-levels of below-grade parking with a partial third-level of below-grade parking. Therefore, we estimated dry seismic settlements based on the anticipated excavation depths for the construction of the below-grade parking. We estimate dry seismic settlement of the loose to medium dense stratum for the one-level, two-levels, and three-levels of below-grade parking portion of the site to be approximately ½-inch, ¼-inch, and ¼-inch, respectively.

3.6 Lateral Spreading

Lateral spreading typically occurs as a form of horizontal displacement of relatively flat-lying alluvial material toward an open or “free” face such as an open body of water, channel, or excavation. In soils this movement is generally due to failure along a weak plane, and may often be associated with liquefaction. As cracks develop within the weakened material, blocks of soil displace laterally towards the open face. Cracking and lateral movement may gradually propagate away from the face as blocks continue to break free.

Calabazas Creek is located approximately 700 feet southeast of the site boundary. Because of the low potential for liquefaction, we judge the risk of lateral spreading at the site to be low.

3.7 Seismically Induced Waves

The site varies in elevation from approximately 172 to 195 feet msl. It is situated about 6 miles south of the San Francisco Bay mud flats which are essentially at sea level; beyond the mud flats to the north are a series of salt evaporators. These evaporators consist of dikes and levees that extend northward into the shallows/mud flats for approximately one mile. The site is also not located near any major drainage areas or reservoir that would be affected by or generate a seismically induced wave. Therefore, this potential hazard is not anticipated at the site.

3.8 Flooding and Reservoir Inundation

The nearest stream shown on the USGS Topographic Map (2015) of the area is Calabazas Creek, which are currently located approximately 700 feet southeast of the site boundary. Calabazas Creek flows to the northeast. The Flood Insurance Rate Map (FEMA, 2009) shows that the proposed project area is located in an area depicted as Flood Areas- Zone X, which is defined as “areas of 0.2 percent annual chance flood, areas of 1 percent annual chance flood with average depths of less than 1 foot or drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.”

The project area is located in a gently sloping urban area therefore most of the surface waters at the site are the result of rainfall or import water for irrigation. While either of these sources is capable of producing minor local flooding caused by plugged drains, adequate grading and drainage system maintenance should reduce this hazard to a minor problem.

The Association of Bay Area Governments prepared a regional map showing dam failure inundation areas. The proposed project area is shown as an “Urbanized Area”. The nearest flood area shown is from potential failure of the Stevens Creek Dam, which is located approximately 3½ miles southwest of the project area. Flooding is expected to remain in close proximity to Stevens Creek and into the area north of Interstate 280. Therefore, a catastrophic failure of the Stevens Creek Dam is not expected to inundate the campus (ABAG, 2011).

3.9 Soil Erosion

Due to the presence of near surface clay and silty clay soils and the relatively flat site topography, soil erosion is not anticipated to be an issue for the site.

3.10 Subsidence

Ground-water removal from the aquifers beneath Santa Clara Valley has caused subsidence of the ground surface over broad areas by compaction of the dewatered sediments. The rate of subsidence was greatest in the first half of the 20th century when pumping for agriculture was at its peak. Poland (1971) shows the area of the Town Center/Community Park project subsided about 4 feet in the period from 1915 to 1967. Subsidence has stopped or greatly slowed now because of improved ground-water management. In our judgment regional subsidence will not pose a hazard at the project site.

3.11 Soil Expansion

Plasticity Index (PI) tests of near surface soils collected during our previous investigations resulted in PIs ranging from 12 to 25, indicating low to moderate expansion potential due to changes in soil moisture content. Therefore, we judge that, if typical recommendations for this condition are followed during design and construction, soil expansion will not pose a threat to the proposed improvements.

4.0 CONCLUSIONS AND PRELIMINARY DEVELOPMENT RECOMMENDATIONS

From a geotechnical engineering viewpoint, it is our opinion that the site is suitable for the proposed development. The preliminary recommendations that follow are intended to be used for conceptual planning and preliminary design of the project. A design-level geotechnical investigation should be performed once a conceptual design has been finalized. Results from a design-level investigation would be used to supplement the preliminary findings and develop specific geotechnical recommendations for the project.

4.1 Primary Geotechnical Concerns

The primary geotechnical and geologic concerns at the site are as follows:

- Strong seismic shaking
- Demolition of the existing buildings prior to site development
- Basement excavation support
- Seismic Lateral Earth Pressures

We have prepared a brief description of the issues and present typical approaches to manage potential concerns associated with the long-term performance of the development.

4.1.1 Strong Seismic Shaking

We recommend that, at a minimum, the proposed project be designed in accordance with the seismic design criteria as discussed in the Maximum Estimated Ground Shaking section above, and the site seismic coefficients presented in Table 1.

4.1.2 Demolition Debris

Construction debris both above and below grade is anticipated as a result of the site demolition required prior to site grading. The debris should be either: 1) collected and off-hauled to an appropriate facility prior to beginning the earthwork for the project, or 2) the concrete crushed and re-used as fill at the site. If generated, recycled materials containing asphalt concrete (AC) should not be used below interior floor slabs, therefore if recycled materials are proposed to be re-used beneath interior floor slabs, AC pavements should be segregated from the debris. It has been our experience that some debris will remain in the soil on-site after the demolition contractor has completed their work. Therefore, it should be anticipated that some debris would be encountered in excavations for underground utilities and foundations. Some coordination between the demolition contractor, grading contractor and geotechnical engineer is needed to identify the scope of the excavation backfill and other similar work items. Recommendations for re-use of recycled materials are presented in the Earthwork section of this report.

4.1.3 Basement Excavation Support

The walls of the basement excavation may be supported by several methods including tiebacks, soldier beams and wood lagging or temporary slopes if space is adequate. The choice should be left to the contractor's judgment since economic considerations and/or the individual contractor's construction experience may determine which method is more economical and/or appropriate. Support of any adjacent existing structures without distress should also be the contractor's responsibility. We recommend that the contractor forward his plan for the support system to the structural engineer and geotechnical engineer for pre-construction review. In addition, it should be the contractor's responsibility to undertake a pre-construction survey with benchmarks and photographs of the adjacent properties as well as to conduct periodic monitoring.

4.1.4 Seismic Lateral Earth Pressures

The basement walls should consider seismic lateral loads. The seismic increment of lateral earth pressure would be added to the static lateral earth pressures and will be provided in the design-level report.

4.2 Design-Level Geotechnical Investigation

Our preliminary geotechnical investigation was based on historical information regarding site development. In addition, because subsurface conditions may vary considerably from those predicted by the widely-spaced borings, and in order to confirm that our report recommendations have been properly implemented, we recommend that we be retained to 1) perform a design-level geotechnical investigation once site development plans are completed, 2) review the final construction plans and specifications, and 3) observe the earthwork and foundation installation.

5.0 PRELIMINARY FOUNDATIONS RECOMMENDATIONS

Based on our investigation, we anticipate the proposed structures may be supported on shallow foundations consisting of footings or conventionally reinforced concrete mats as discussed below.

5.1 2013 CBC Site Coefficients and Site Seismic Coefficients

Chapter 16 of the 2013 California Building Code (CBC) outlines the procedure for seismic design of structures. Based on the previous explorations, the site is generally underlain by stiff to hard clays and loose to very dense sands and gravels, which corresponds to a soil profile type D. Based on the above information and local seismic sources, the site may be characterized for design using the information in Table 1 below.

Table 1. 2013 CBC Site Class and Site Seismic Coefficients

Latitude: 37.3269 N Longitude: 122.0144 W	CBC Reference	Factor/ Coefficient	Value
Soil Profile Type	Section 1613.3.2	Site Class	D
Mapped Spectral Response Acceleration for MCE at 0.2 second Period	Figure 1613.3.1(1)	S_s	1.62
Mapped Spectral Response Acceleration for MCE at 1 Second Period	Figure 1613.3.1(2)	S_1	0.64
Site Coefficient	Table 1613.3.3(1)	F_a	1.0
Site Coefficient	Table 1613.3.3(2)	F_v	1.5
Adjusted MCE Spectral Response Parameter	Equation 16-37	S_{MS}	1.62
Adjusted MCE Spectral Response Parameter	Equation 16-38	S_{M1}	0.97
Design Spectral Response Acceleration Parameter	Equation 16-39	S_{DS}	1.08
Design Spectral Response Acceleration Parameter	Equation 16-40	S_{D1}	0.64

5.2 Footings

On a preliminary basis, the proposed project may be supported on conventional continuous and/or isolated spread footings bearing on natural, undisturbed soil or compacted fill. All footings should have a minimum width of 36 inches and footing bottoms should extend at least 18 inches below lowest adjacent finished grade. Footing depths are taken from lowest adjacent finished grade, considered as the bottom of interior slab-on-grade or the finished exterior grade, excluding landscape topsoil, whichever is lower.

On a preliminary basis, we anticipate that footings constructed in accordance with the above recommendations would be capable of supporting maximum allowable bearing pressures of 2,000 pounds per square foot (psf) for dead loads, 3,000 psf for combined dead and live loads, and 4,000 psf for all loads including wind or seismic. These allowable bearing pressures are based upon factors of safety of 3.0, 2.0, and 1.5 for dead, dead plus live, and seismic loads, respectively. The allowable bearing pressures may be increased by 100 psf for each foot of embedment below the minimum depth of 18 inches below exterior grade.

7.1 Reinforced Mat Foundations

The proposed improvements may be supported on conventionally reinforced mat foundations at least 12 inches thick, bearing at least 12 inches below the lowest adjacent finished grade. Based on the subsurface conditions, the mat may be designed for an average allowable bearing pressure of 1,000 pounds per square foot (psf) for dead plus live loads with maximum localized allowable bearing pressures of 3,000 psf at column or wall loads. Allowable bearing pressures may be increased by one-third for all loads including wind or seismic. The allowable bearing pressures may be increased by 100 psf for each foot of embedment below the minimum depth of 12 inches below exterior grade. These allowable bearing pressures are net values; the weight of the mat can be neglected for design purposes.

The mat should be reinforced with top and bottom steel, as appropriate, to provide structural continuity and to permit spanning of local irregularities. These recommendations may be revised depending on the particular design method selected by the structural engineer. It is essential that we observe the subgrade of the mat foundation prior to placement of reinforcing steel.

6.0 LIMITATIONS

This report has been prepared the proposed project in Cupertino, California. The opinions, conclusions, and recommendations presented in this report have been formulated in accordance with accepted geotechnical engineering practices that exist in the San Francisco Bay Area at the time this report was written. No other warranty, expressed or implied, is made or should be inferred.

The opinions, conclusions and recommendations contained in this report are based upon the information obtained from our investigation, which includes data from widely separated discrete locations, visual observations from our site reconnaissance, and review of other geotechnical data provided to us, along with local experience and engineering judgment. The recommendations presented in this report are based on the assumption that soil and geologic conditions at or between the borings do not deviate substantially from those encountered or extrapolated from the information collected during our investigation. We are not responsible for the data presented by others.

A Geotechnical consultant should be retained to review the geotechnical aspects of the final plans and specifications for conformance with our recommendations. The recommendations provided in this report are based on the assumption that a qualified Geotechnical consultant will retained to provide observation and testing services during construction to confirm that conditions are similar to that assumed for design and to form an opinion as to whether the work has been performed in accordance with the project plans and specifications. If TRC is not retained for these services, TRC cannot assume any responsibility for any potential claims that may arise during or after construction as a result of misuse or misinterpretation of TRC's report by others, and TRC will cease to be the Geotechnical-Engineer-of-Record.

The opinions presented in this report are valid as of the present date for the property evaluated. Changes in the condition of the property will likely occur with the passage of time due to natural processes and/or the works of man. In addition, changes in applicable standards of practice can occur as a result of legislation and/or the broadening of knowledge. Furthermore, geotechnical issues may arise that were not apparent at the time of our investigation. Accordingly, the opinions presented in this report may be invalidated, wholly or partially, by changes outside of our control. Therefore, this report is subject to review and should not be relied upon after a period of three years, nor should it be used, or is it applicable, for any other properties.

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AERIAL PHOTO SOURCE: Google Earth, March 2015.

N

APPROXIMATE SCALE (FEET)

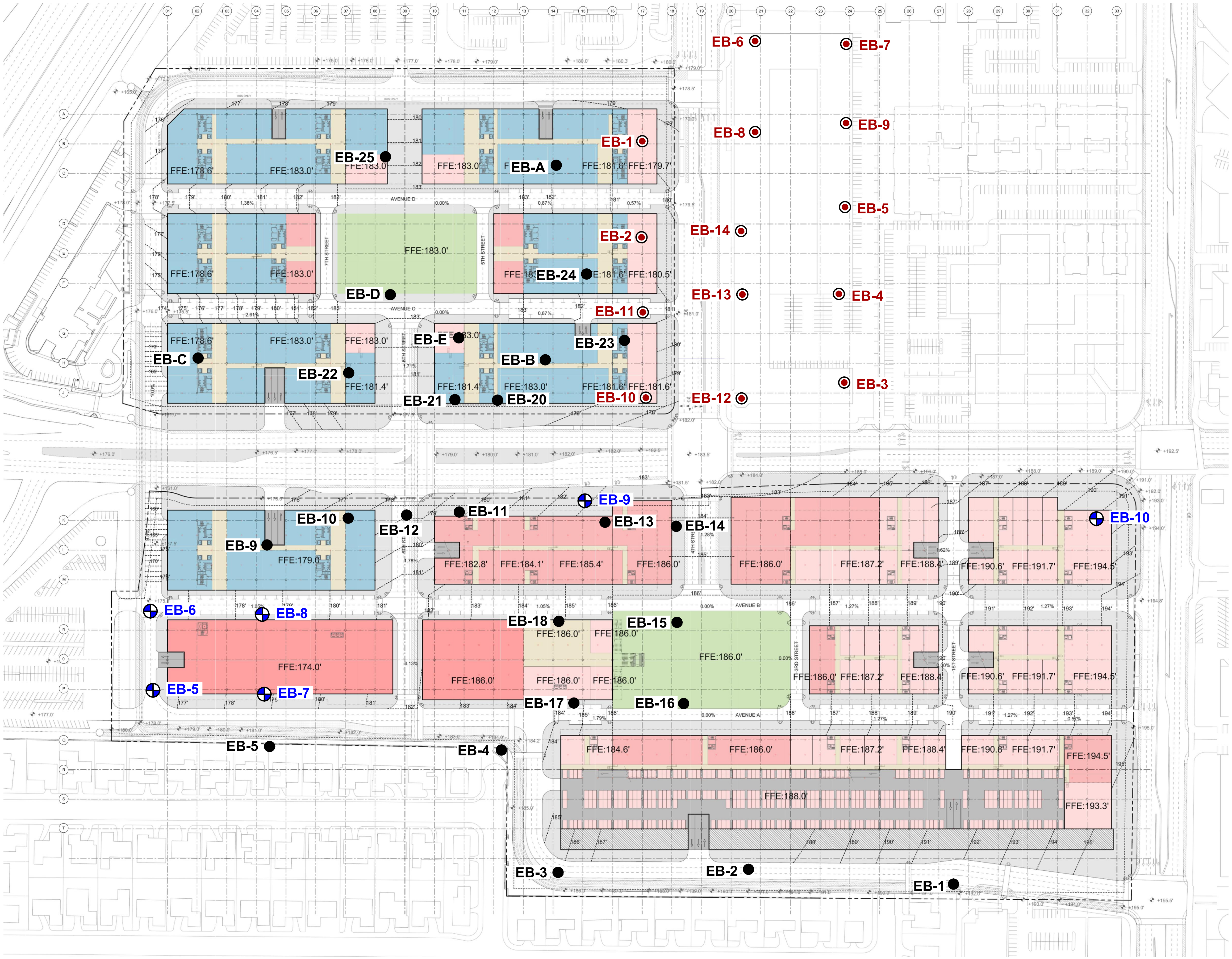
0 2,000 4,000

VICINITY MAP

Town Center / Community Park
Wolfe Road and Vallco Parkway
Cupertino, California

TRC 228550 **FIGURE 1**

FILE NAME: N:\PROJECTS\CAD\Town Center_Comm Park_Cupertino\Fig1_Vicinity Map.dwg | Layout Tab: 8x11



LEGEND

Approximate locations of historical exploratory borings:

- Lowney, 1974
- Lowney, 1999
- TRC/Lowney, 2005

N

APPROXIMATE SCALE (FEET)

0 200 400

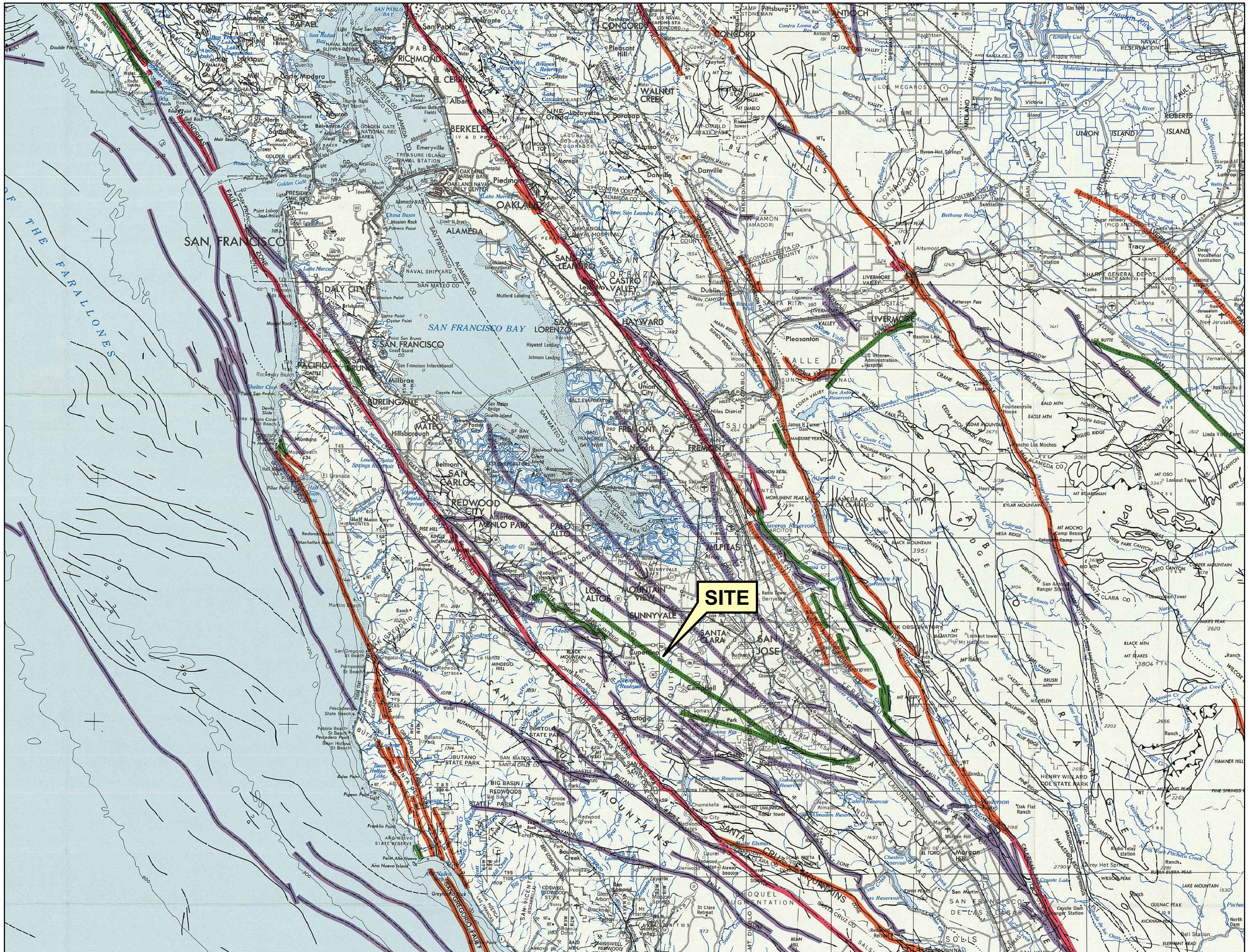
SOURCE: Base Plan by Rafael Viñoly Architects, November 2015.

SITE PLAN

Town Center / Community Park
Wolfe Road and Vallco Parkway
Cupertino, California

TRC 228550 **FIGURE 2**

FILE NAME: N:\PROJECTS\CAD\Town Center_Comm Park_Cupertino\Fig2_Site Plan.dwg | Layout Tab: 11x17



SCALE: 1:500,000

APPROXIMATE GRAPHICAL SCALE (MILES)

0 10 20

Geologic Time Scale			Years Before Present (Approx.)	Fault Symbol	Recency of Movement on Land Offshore[1]	DESCRIPTION
Quaternary	Late Quaternary	Historic				Displacement during historic time (e.g. San Andreas fault 1906). Includes areas of known fault creep.
			200			
		Holocene				Displacement during Holocene time.[2]
			10,000			
		Pleistocene				Faults showing evidence of displacement during late Quaternary time.[3,4]
			700,000			
	Early Quaternary					Quaternary (undifferentiated) faults — most faults in this category show evidence of displacement during the last 2,000,000 years; possible exceptions are faults which displace rocks of undifferentiated Plio-Pleistocene age.
			2,000,000			
Pre-Quaternary	Pliocene					
			5,000,000			Fault showing evidence of no displacement during Quaternary time or faults without recognized Quaternary displacement.
	Miocene					

NOTES:

Base map is a composite of part the San Francisco 1:250,000 scale map (reference code 37 122-A1-TF-250-00, 1980) and the San Jose 1:250,000 scale map (reference code 37 120-A1-TF-250-00, 1969). For cartographic details, refer to these maps. Bathymetric information is not intended for navigational purposes.

Transverse Mercator Projection 10,000-meter Universal Transverse Mercator grid, zone 10.

Minor corrections and additions to culture by California Division of Mines and Geology 1987.

From: Bortugno & others (1991)

Some faults highlighted in purple are not considered active (Holocene Movement) by the State of California.

REGIONAL FAULT MAP

Town Center / Community Park
Wolfe Road and Vallco Parkway
Cupertino, California

TRC | 228550 | **FIGURE 3**

FILE NAME: N:\PROJECTS\CAD\Town Center_Comm Park_Cupertino\Fig3_Regional Fault Map.dwg | Layout Tab: 11x17

APPENDIX A
BORING LOGS FROM PREVIOUS INVESTIGATIONS

PRIMARY DIVISIONS				SOIL TYPE	SECONDARY DIVISIONS
COARSE GRAINED SOILS (MORE THAN HALF OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE)	GRAVELS (MORE THAN HALF OF COARSE FRACTION IS LARGER THAN NO. 4 SIEVE)	CLEAN GRAVELS (Less than 5% Fines)		GW	Well graded gravels, gravel-sand mixtures, little or no fines
				GP	Poorly graded gravels or gravel-sand mixtures, little or no fines
		GRAVEL WITH FINES		GM	Silty gravels, gravel-sand-silt mixtures, plastic fines
				GC	Clayey gravels, gravel-sand-clay mixtures, plastic fines
	SANDS (MORE THAN HALF OF COARSE FRACTION IS SMALLER THAN NO. 4 SIEVE)	CLEAN SANDS (Less than 5% Fines)		SW	Well graded sands, gravelly sands, little or no fines
				SP	Poorly graded sands or gravelly sands, little or no fines
		SANDS WITH FINES		SM	Silty sands, sand-silt-mixtures, non-plastic fines
				SC	Clayey sands, sand-clay mixtures, plastic fines
FINE GRAINED SOILS (MORE THAN HALF OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE)	SILTS AND CLAYS (LIQUID LIMIT IS LESS THAN 50 %)			ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity
				CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
				OL	Organic silts and organic silty clays of low plasticity
	SILTS AND CLAYS (LIQUID LIMIT IS GREATER THAN 50 %)			MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
				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

DEFINITION OF TERMS

U.S. STANDARD SIEVE SIZE: 200, 40, 10, 4 — CLEAR SQUARE SIEVE OPENINGS: 3/4", 3", 12"

SILTS AND CLAY	SAND			GRAVEL		COBBLES	BOULDERS
	FINE	MEDIUM	COARSE	FINE	COARSE		

0.08 · 0.4 · 2 · 5 · 19 · 76mm

GRAIN SIZES

TERZAGHI SPLIT SPOON STANDARD PENETRATION

MODIFIED CALIFORNIA

D&M UNDERWATER SAMPLER

SHELBY TUBE

NO RECOVERY

SAMPLERS

SAND AND GRAVEL	BLOWS/FOOT*
VERY LOOSE	0-4
LOOSE	4-10
MEDIUM DENSE	10-30
DENSE	30-50
VERY DENSE	OVER 50

RELATIVE DENSITY

SILTS AND CLAYS	STRENGTH+	BLOWS/FOOT*
VERY SOFT	0-1/4	0-2
SOFT	1/4-1/2	2-4
MEDIUM STIFF	1/2-1	4-8
STIFF	1-2	8-16
VERY STIFF	2-4	16-32
HARD	OVER 4	OVER 32

CONSISTENCY

*Number of blows of 140 pound hammer falling 30 inches to drive a 2-inch O.D. (1-3/8 inch I.D.) split spoon (ASTM D-1586).
+Unconfined compressive strength in tons/sq.ft. as determined by laboratory testing or approximated by the standard penetration test (ASTM D-1586), pocket penetrometer, torvane, or visual observation.

KEY TO EXPLORATORY BORING LOGS
Unified Soil Classification System (ASTM D-2487)

EXPLORATORY BORING: EB-5

DRILL RIG: MOBILE B-53	PROJECT NO: 259-5E
BORING TYPE: 8 INCH HOLLOW-STEM AUGER	PROJECT: VALLCO
LOGGED BY: BM	LOCATION: CUPERTINO, CA
START DATE: 8-3-04 FINISH DATE: 8-3-04	COMPLETION DEPTH: 25.0 FT.

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Undrained Shear Strength (ksf): ○ Pocket Penetrometer; △ Torvane; ● Unconfined Compression; ▲ U-U Triaxial Compression (scale 1.0, 2.0, 3.0, 4.0)

MATERIAL DESCRIPTION AND REMARKS

SURFACE ELEVATION: 178 FT. (+/-)

ELEVATION (FT)	DEPTH (FT)	MATERIAL DESCRIPTION AND REMARKS	SOIL TYPE	PENETRATION RESISTANCE (BLOWS/FT.)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	PERCENT PASSING NO. 200 SIEVE
178.0	0	6 inches asphalt concrete					
177.5		**SANDY LEAN CLAY (CL)** hard, moist, brown, fine sand, some fine gravel, low plasticity	CL	54	9	117	
				30	8	113	
	5			52	14	115	
				31	11	109	
	10						
				42			
	15						
160.0		**CLAYEY SAND (SC)** dense, moist, brown, fine to coarse sand	SC				
158.8		**LEAN CLAY (CL)** hard, moist, brown, some fine sand, low plasticity	CL	61	10	117	
	20						
156.0		**POORLY GRADED SAND WITH CLAY (SP-SC)** very dense, moist, brown, fine sand, some medium to coarse sand, some fine gravel	SP-SC	59	3		
153.0	25	Bottom of Boring at 25 feet					
	30						

GROUND WATER OBSERVATIONS:

NO FREE GROUND WATER ENCOUNTERED

Northing: 1,945,612

Easting: 6,120,917

LA CORP.GDT 2/11/05 MV' FLL

LOWNEYASSOCIATES
Environmental/Geotechnical/Engineering Services

EXPLORATORY BORING: EB-6

DRILL RIG: MOBILE B-53	PROJECT NO: 259-5E
BORING TYPE: 8 INCH HOLLOW-STEM AUGER	PROJECT: VALLCO
LOGGED BY: BM	LOCATION: CUPERTINO, CA
START DATE: 8-3-04 FINISH DATE: 8-3-04	COMPLETION DEPTH: 34.5 FT.

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Undrained Shear Strength (ksf): ○ Pocket Penetrometer; △ Torvane; ● Unconfined Compression; ▲ U-U Triaxial Compression (scale 1.0, 2.0, 3.0, 4.0)

SURFACE ELEVATION: 176 FT. (+/-)

ELEVATION (FT)	DEPTH (FT)	MATERIAL DESCRIPTION AND REMARKS	SOIL TYPE	PENETRATION RESISTANCE (BLOWS/FT.)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	PERCENT PASSING NO. 200 SIEVE
176.0	0						
175.9 / 175.5		1½ inches asphalt concrete over 3½ inches aggregate base					
174.0		**LEAN CLAY WITH SAND (CL) [FILL]** stiff, moist, olive green, fine sand, moderate to high plasticity	CL, FILL	16	12	120	
		LEAN CLAY WITH SAND (CL) hard, moist, brown, fine sand, some fine gravel, low plasticity	CL	15	15	118	
	5			40	14	114	
167.0	10	**CLAYEY SAND (SC)** loose, moist, brown, fine to medium sand, some coarse sand	SC	7	12	94	42
		medium dense		26	9		
161.0	15	**SANDY LEAN CLAY (CL)** very stiff, moist, brown, fine to coarse sand, low plasticity	CL	19	14		
156.8	20	**LEAN CLAY WITH SAND (CL)** very stiff, moist, brown, fine sand, low plasticity	CL	25	18	106	
153.5	25	**CLAYEY SAND (SC)** medium dense, moist, brown, fine to coarse sand, some fine gravel	SC	65	7	122	
149.0		**LEAN CLAY (CL)** very stiff, moist, brown, some fine sand, low plasticity	CL				
146.8			SP-SM	35	23	98	
146.0	30						

Continued Next Page

GROUND WATER OBSERVATIONS:
NO FREE GROUND WATER ENCOUNTERED

Northing: 1,945,590
Easting: 6,121,038

LA CORP.GDT 2/11/05 MV* FLL

LOWNEYASSOCIATES
Environmental/Geotechnical/Engineering Services

EXPLORATORY BORING: EB-6 Cont'd

DRILL RIG: MOBILE B-53	PROJECT NO: 259-5E
BORING TYPE: 8 INCH HOLLOW-STEM AUGER	PROJECT: VALLCO
LOGGED BY: BM	LOCATION: CUPERTINO, CA
START DATE: 8-3-04 FINISH DATE: 8-3-04	COMPLETION DEPTH: 34.5 FT.

This log is a part of a report by Lowney Associates, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

Undrained Shear Strength (ksf): ○ Pocket Penetrometer; △ Torvane; ● Unconfined Compression; ▲ U-U Triaxial Compression; 1.0 2.0 3.0 4.0

ELEVATION (FT)	DEPTH (FT)	SOIL LEGEND	MATERIAL DESCRIPTION AND REMARKS	SOIL TYPE	PENETRATION RESISTANCE (BLOWS/FT.)	SAMPLER	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	PERCENT PASSING NO. 200 SIEVE
146.0	30		**POORLY GRADED SAND WITH SILT (SP-SM)** medium dense, moist, brown, fine to medium sand, some fine gravel	SP-SM					
143.0			**CLAYEY SAND WITH GRAVEL (SC)** very dense, moist, brown, fine to coarse sand, fine to coarse gravel	SC	50/6"	X			
141.5	35		Bottom of Boring at 34½ feet						
	40								
	45								
	50								
	55								
	60								

GROUND WATER OBSERVATIONS:
NO FREE GROUND WATER ENCOUNTERED

Northing: 1,945,590
Easting: 6,121,038

LA CORP.GDT 2/11/05 MV* FLL

LOWNEYASSOCIATES
Environmental/Geotechnical/Engineering Services

EXPLORATORY BORING: EB-7

DRILL RIG: MOBILE B-53	PROJECT NO: 259-5E
BORING TYPE: 8 INCH HOLLOW-STEM AUGER	PROJECT: VALLCO
LOGGED BY: BM	LOCATION: CUPERTINO, CA
START DATE: 8-3-04 FINISH DATE: 8-3-04	COMPLETION DEPTH: 35.0 FT.

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SURFACE ELEVATION: 182 FT. (+/-)

Undrained Shear Strength (ksf): ○ Pocket Penetrometer; △ Torvane; ● Unconfined Compression; ▲ U-U Triaxial Compression (scale 1.0, 2.0, 3.0, 4.0)

ELEVATION (FT)	DEPTH (FT)	MATERIAL DESCRIPTION AND REMARKS	SOIL TYPE	PENETRATION RESISTANCE (BLOWS/FT.)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	PERCENT PASSING NO. 200 SIEVE
182.0 / 181.9 / 181.5	0	1½ inches asphalt concrete over 3½ inches aggregate base					
		SANDY LEAN CLAY (CL) hard, moist, brown, fine to coarse sand, some fine gravel, low plasticity	CL	40	9	125	
				42	7	111	
	5			24	6	107	
	10			19	9	96	
	15			34	7	106	
165.0		**CLAYEY SAND (SC)** medium dense, moist, light brown, fine sand, some fine gravel	SC				
162.8		**SANDY LEAN CLAY (CL)** hard, moist, brown, fine sand, some medium to coarse sand, some fine and coarse gravel, low plasticity	CL	40	10	112	
160.0	20	**LEAN CLAY WITH SAND (CL)** hard, moist, brown, fine to medium sand, low plasticity	CL	40	15	112	
155.0	25	**LEAN CLAY (CL)** hard, moist, brown, some fine sand, low plasticity	CL	46	23	106	
152.0	30						

Continued Next Page

GROUND WATER OBSERVATIONS:
NO FREE GROUND WATER ENCOUNTERED

Northing: 1,945,434
Easting: 6,120,918

LA CORP.GDT 2/11/05 MV* FLL

LOWNEYASSOCIATES
Environmental/Geotechnical/Engineering Services

EXPLORATORY BORING: EB-7 Cont'd

DRILL RIG: MOBILE B-53	PROJECT NO: 259-5E
BORING TYPE: 8 INCH HOLLOW-STEM AUGER	PROJECT: VALLCO
LOGGED BY: BM	LOCATION: CUPERTINO, CA
START DATE: 8-3-04 FINISH DATE: 8-3-04	COMPLETION DEPTH: 35.0 FT.

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Undrained Shear Strength (ksf): ○ Pocket Penetrometer; △ Torvane; ● Unconfined Compression; ▲ U-U Triaxial Compression (scale 1.0, 2.0, 3.0, 4.0)

ELEVATION (FT)	DEPTH (FT)	MATERIAL DESCRIPTION AND REMARKS	SOIL TYPE	PENETRATION RESISTANCE (BLOWS/FT.)	SAMPLER	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	PERCENT PASSING NO. 200 SIEVE	Undrained Shear Strength (ksf)
152.0	30	**LEAN CLAY (CL)** hard, moist, brown, some fine sand, low plasticity	CL						
150.5		**CLAYEY SAND (SC)** medium dense, moist, brown, fine sand	SC						
148.0		**LEAN CLAY (CL)** very stiff, moist, brown, some fine sand, low plasticity	CL	29		25	98		○ (approx. 2.8)
147.0	35	Bottom of Boring at 35 feet							
	40								
	45								
	50								
	55								
	60								

GROUND WATER OBSERVATIONS:
NO FREE GROUND WATER ENCOUNTERED

Northing: 1,945,434
Easting: 6,120,918

EXPLORATORY BORING: EB-8

Sheet 1 of 1

DRILL RIG: MOBILE B-53
BORING TYPE: 8 INCH HOLLOW-STEM AUGER
LOGGED BY: BM
START DATE: 8-3-04 FINISH DATE: 8-3-04

PROJECT NO: 259-5E
PROJECT: VALLCO
LOCATION: CUPERTINO, CA
COMPLETION DEPTH: 16.5 FT.

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MATERIAL DESCRIPTION AND REMARKS

SURFACE ELEVATION: 182 FT. (+/-)

Undrained Shear Strength (ksf): ○ Pocket Penetrometer; △ Torvane; ● Unconfined Compression; ▲ U-U Triaxial Compression (scale 1.0, 2.0, 3.0, 4.0)

ELEVATION (FT)	DEPTH (FT)	MATERIAL DESCRIPTION AND REMARKS	SOIL TYPE	PENETRATION RESISTANCE (BLOWS/FT.)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	PERCENT PASSING NO. 200 SIEVE
182.0 / 181.8 / 181.5	0	2 inches asphalt concrete over 3½ inches aggregate base					
		LEAN CLAY (CL) [FILL] stiff, moist, olive green, trace fine sand, some organics, moderate to high plasticity	CL, FILL	15	17	98	
				16	22	104	
177.3	5	**LEAN CLAY WITH SAND (CL)** very stiff, moist, dark brown to bown, fine to medium sand, trace fine gravel, low plasticity	CL	21	14	113	
	10	hard		20	14	117	
169.5		**SANDY LEAN CLAY (CL)** very stiff, moist, brown, fine sand, low plasticity	CL	16	11	103	55
	15			15			
165.5		Bottom of Borinng at 16½ feet					
	20						
	25						
	30						

GROUND WATER OBSERVATIONS:
NO FREE GROUND WATER ENCOUNTERED

Northing: 1,945,431
Easting: 6,121,039

LA CORP.GDT 2/17/05 MV' FLL

LOWNEYASSOCIATES
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EXPLORATORY BORING: EB-9

DRILL RIG: MOBILE B-61	PROJECT NO: 259-5E
BORING TYPE: 8 INCH HOLLOW-STEM AUGER	PROJECT: VALLCO
LOGGED BY: BM	LOCATION: CUPERTINO, CA
START DATE: 8-4-04 FINISH DATE: 8-4-04	COMPLETION DEPTH: 84.5 FT.

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Undrained Shear Strength (ksf): ○ Pocket Penetrometer; △ Torvane; ● Unconfined Compression; ▲ U-U Triaxial Compression (scale 1.0, 2.0, 3.0, 4.0)

SURFACE ELEVATION: 177 FT. (+/-)

ELEVATION (FT)	DEPTH (FT)	MATERIAL DESCRIPTION AND REMARKS	SOIL TYPE	PENETRATION RESISTANCE (BLOWS/FT.)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	PERCENT PASSING NO. 200 SIEVE
177.0	0	3 inches asphalt concrete over 4 inches aggregate base					
176.7 / 176.4		**LEAN CLAY WITH SAND (CL)** hard, moist, brown, fine to medium sand, some fine gravel, low to moderate plasticity	CL	41	12	101	
				51	14	111	
172.0	5	**LEAN CLAY (CL)** hard, moist, brown, some fine sand, trace fine gravel, low plasticity	CL	52	19	109	
				36	19	99	
	10						
				32	21	102	
	15	sandier					
				39	17	105	
	20	very stiff					
				34	15	115	
	25						
150.0		**CLAYEY SAND WITH GRAVEL (SC)** medium dense, moist, brown, fine to medium sand, some fine gravel	SC	36	10		
147.0	30						

Continued Next Page

GROUND WATER OBSERVATIONS:
▽: FREE GROUND WATER MEASURED DURING DRILLING AT 68.0 FEET

LOWNEYASSOCIATES
Environmental/Geotechnical/Engineering Services

DRILL RIG: MOBILE B-61	PROJECT NO: 259-5E
BORING TYPE: 8 INCH HOLLOW-STEM AUGER	PROJECT: VALLCO
LOGGED BY: BM	LOCATION: CUPERTINO, CA
START DATE: 8-4-04 FINISH DATE: 8-4-04	COMPLETION DEPTH: 84.5 FT.

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Undrained Shear Strength (ksf): ○ Pocket Penetrometer; △ Torvane; ● Unconfined Compression; ▲ U-U Triaxial Compression (scale 1.0, 2.0, 3.0, 4.0)

ELEVATION (FT)	DEPTH (FT)	MATERIAL DESCRIPTION AND REMARKS	SOIL TYPE	PENETRATION RESISTANCE (BLOWS/FT.)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	PERCENT PASSING NO. 200 SIEVE	Undrained Shear Strength (ksf)
147.0	30	**CLAYEY SAND WITH GRAVEL (SC)** medium dense, moist, brown, fine to medium sand, some fine gravel	SC					
145.0		**POORLY GRADED SAND WITH CLAY AND GRAVEL (SP-SC)** dense, moist, brown, medium to coarse sand, some fine sand, fine to coarse gravel	SP-SC	42	4		9	
	35							
139.0		**CLAYEY SAND WITH GRAVEL (SC)** dense to very dense, moist, brown, fine to coarse sand, fine gravel, some coarse gravel	SC	75	5			
	40							
				39	7			
	45							
				62	7		14	
	50							
				36	8			
	55							
118.0			CL	18	22			○ (approx. 4.5)
117.0	60							

Continued Next Page

GROUND WATER OBSERVATIONS:

∇ : FREE GROUND WATER MEASURED DURING DRILLING AT 68.0 FEET

LA CORP.GDT 2/17/05 MV* FLL

EXPLORATORY BORING: EB-9 Cont'd

DRILL RIG: MOBILE B-61	PROJECT NO: 259-5E
BORING TYPE: 8 INCH HOLLOW-STEM AUGER	PROJECT: VALLCO
LOGGED BY: BM	LOCATION: CUPERTINO, CA
START DATE: 8-4-04 FINISH DATE: 8-4-04	COMPLETION DEPTH: 84.5 FT.

Undrained Shear Strength (ksf): ○ Pocket Penetrometer; △ Torvane; ● Unconfined Compression; ▲ U-U Triaxial Compression (scale 1.0, 2.0, 3.0, 4.0)

ELEVATION (FT)	DEPTH (FT)	MATERIAL DESCRIPTION AND REMARKS	SOIL TYPE	PENETRATION RESISTANCE (BLOWS/FT.)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	PERCENT PASSING NO. 200 SIEVE	Undrained Shear Strength (ksf)
117.0	60	**LEAN CLAY (CL)** hard, moist, brown, some fine sand, low plasticity	CL					
116.0		**CLAYEY SAND WITH GRAVEL (SC)** very dense, moist, brown, fine to coarse sand, fine gravel	SC					
				54	11		16	
	65							
		▽ (68.0)		27	25			○ ~2.8
107.5	70	**LEAN CLAY (CL)** very stiff to hard, moist, brown, some fine sand, low plasticity	CL					
				50	17	116		○ ~4.5
102.3	75	**CLAYEY SAND WITH GRAVEL (SC)** dense to very dense, moist, brown, fine to coarse sand, fine to coarse gravel	SC					
				50/6"	8	125		
	80							
				50/6"				
92.5	85	Bottom of Boring at 84½						
	90							

GROUND WATER OBSERVATIONS:

▽: FREE GROUND WATER MEASURED DURING DRILLING AT 68.0 FEET

EXPLORATORY BORING: EB-10

DRILL RIG: MOBILE B-61	PROJECT NO: 259-5E
BORING TYPE: 8 INCH HOLLOW-STEM AUGER	PROJECT: VALLCO
LOGGED BY: BM	LOCATION: CUPERTINO, CA
START DATE: 8-4-04 FINISH DATE: 8-4-04	COMPLETION DEPTH: 20.0 FT.

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Undrained Shear Strength (ksf): ○ Pocket Penetrometer; △ Torvane; ● Unconfined Compression; ▲ U-U Triaxial Compression (scale 1.0, 2.0, 3.0, 4.0)

ELEVATION (FT)	DEPTH (FT)	MATERIAL DESCRIPTION AND REMARKS SURFACE ELEVATION: 189 FT. (+/-)	SOIL TYPE	PENETRATION RESISTANCE (BLOWS/FT.)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	PERCENT PASSING NO. 200 SIEVE	Undrained Shear Strength (ksf)
189.0	0							
188.8 188.6		1½ inches asphalt concrete over 3 inches aggregate base						
		CLAYEY SAND WITH GRAVEL (SC) loose, moist, brown, fine to medium sand, fine gravel		8	14	98		
				6	9	100	23	
	5	medium dense	SC	15				
179.5				17				○ (>4.0)
	10	**LEAN CLAY WITH SAND (CL)** hard, moist, brown, fine sand, trace fine gravel, low plasticity						
	15		CL	73	16	113		○ (>4.0)
169.0	20			51	11	113		○ (>4.0)
		Bottom of Boring at 20 feet						
	25							
	30							

GROUND WATER OBSERVATIONS:
NO FREE GROUND WATER ENCOUNTERED

LA CORP.GDT 2/11/05 MV' FLL

LOWNEYASSOCIATES
Environmental/Geotechnical/Engineering Services

EXPLORATORY BORING: EB-1

DRILL RIG: MOBILE B-40	PROJECT NO: 259-5D
BORING TYPE: 8-INCH HOLLOW STEM	PROJECT: VALLCO EXPANSION
LOGGED BY: LML	LOCATION: CUPERTINO, CALIFORNIA
START DATE: 5-17-99 FINISH DATE: 5-17-99	COMPLETION DEPTH: 30.0 FT.

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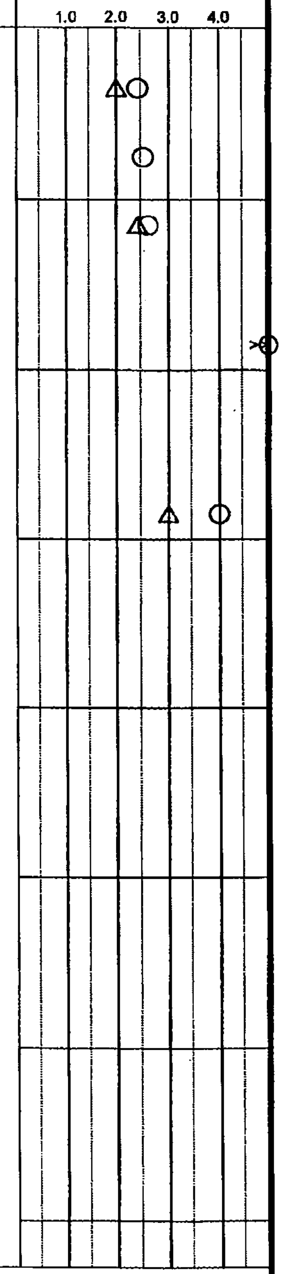
MATERIAL DESCRIPTION AND REMARKS

SURFACE ELEVATION: 179.0 FT. (+/-)

ELEVATION (FT)	DEPTH (FT)	MATERIAL DESCRIPTION AND REMARKS	SOIL TYPE	PENETRATION RESISTANCE (BLOWS/FT.)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	PERCENT PASSING NO. 200 SIEVE
179.0	0						
178.7		3 inches asphaltic concrete over 10 inches aggregate base					
177.9		SILTY CLAY (CL) very stiff, moist, brown, trace subrounded gravel to 3/4 inch, mottled gray, trace rootlets	CL	27	23	106	
				22	26	98	
	5	trace fine to medium sand		31	24	102	
				44	15	113	
	10						
167.0		SILTY SAND (SM) medium dense, moist, fine to coarse grained, occasional fine to medium subrounded gravel Estimated angle of interior friction: 37°-42°	SM	41	11		
164.0	15	SILTY CLAY (CL) very stiff, moist, brown, low plasticity	CL	18	21		
	20						
155.5		SILTY SAND (SM) very dense, moist, fine to medium grained, some coarse sand to fine sand, occasional subrounded sandstone fragments to 3/4 inch Estimated angle of internal friction: >42°	SM	50/4"	4		
152.5	25	SILTY CLAY (CL) very stiff, moist, orange-brown, low plasticity	CL	22	21		
149.0	30	Bottom of Boring at 30 feet					
	35						

Undrained Shear Strength (ksf)

○ Pocket Penetrometer
△ Torvane
● Unconfined Compression
▲ U-U Triaxial Compression



GROUND WATER OBSERVATIONS:
NO FREE GROUND WATER ENCOUNTERED

LA CORP.GDT 7/1/99 MV*

LOWNEYASSOCIATES
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EXPLORATORY BORING: EB-2

DRILL RIG: MOBILE B-40	PROJECT NO: 259-5D
BORING TYPE: 8-INCH HOLLOW STEM	PROJECT: VALLCO EXPANSION
LOGGED BY: LML	LOCATION: CUPERTINO, CALIFORNIA
START DATE: 5-17-99 FINISH DATE: 5-17-99	COMPLETION DEPTH: 29.5 FT.

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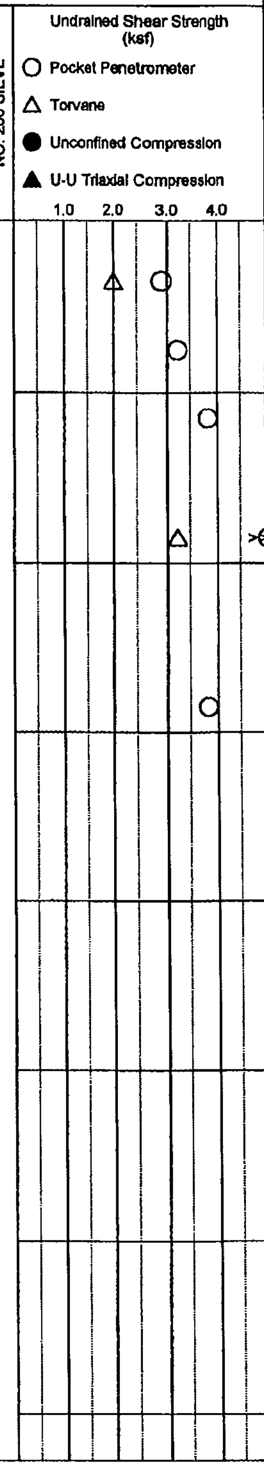
SURFACE ELEVATION: 180.0 FT. (+/-)

ELEVATION (FT)	DEPTH (FT)	MATERIAL DESCRIPTION AND REMARKS	SOIL TYPE	PENETRATION RESISTANCE (BLOWS/FT.)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	PERCENT PASSING NO. 200 SIEVE
180.0	0						
179.7		3 inches asphaltic concrete over 10 inches aggregate base					
178.9		SILTY CLAY (CL) very stiff to hard, moist, brown, low to moderate plasticity, trace rootlets, mottled black	CL	22	21	107	
				35	23	106	
	5			24	19	115	
				60	19	113	
	10						
				52	21	105	
	15						
164.5		SILTY SAND (SM) medium dense, moist, orange brown, with some gravel, occasional subrounded to subangular sandstone fragments up to 3/4 inch. Estimated angle of internal friction: 33°-38°	SM	14	6		
	20						
157.0		GRAVELLY SAND (SP-SM) dense, moist, brown, some silt, trace clayey sand seams, gravel to 1 1/2 inch. Estimated angle of internal friction: >42°	SP-SM	48	3		7
	25						
150.5		very dense		50/6"	4		
	30	Bottom of Boring at 29 1/2 feet					
	35						



GROUND WATER OBSERVATIONS:

NO FREE GROUND WATER ENCOUNTERED

LA CORP.GDT 7/1/99 MV

EXPLORATORY BORING: EB-3

DRILL RIG: MOBILE B-40	PROJECT NO: 259-5D
BORING TYPE: 8-INCH HOLLOW STEM	PROJECT: VALLCO EXPANSION
LOGGED BY: LML	LOCATION: CUPERTINO, CALIFORNIA
START DATE: 5-17-99 FINISH DATE: 5-17-99	COMPLETION DEPTH: 29.5 FT.

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Undrained Shear Strength (ksf): ○ Pocket Penetrometer; △ Torvane; ● Unconfined Compression; ▲ U-U Triaxial Compression (scale 1.0, 2.0, 3.0, 4.0)

ELEVATION (FT)	DEPTH (FT)	MATERIAL DESCRIPTION AND REMARKS	SOIL TYPE	PENETRATION RESISTANCE (BLOWS/FT.)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	PERCENT PASSING NO. 200 SIEVE	Undrained Shear Strength (ksf)
173.5	0	SURFACE ELEVATION: 173.5 FT. (+/-)						
173.2		3 inches asphaltic concrete over 10 inches aggregate base						
172.4		SANDY CLAY (CL) hard, moist, orange brown, subrounded gravel, low plasticity, occasional thin clayey sand lense	CL	53	11	115		>○
				48	10	114	17	>○
	5			33	11	109		>○
				42	7			
161.0		SILTY CLAY (CL) hard, moist, orange brown, trace to some fine sand, low plasticity	CL	30	19			
156.5		CLAYEY SAND (SC) dense, moist, orange-brown, fine to coarse grained, trace silt, occasional subangular gravel	SC	53	10	125		○
151.5		SILTY SAND (SM) very dense, moist, gray brown, fine to coarse grained, occasional subrounded to subangular gravel to 1 1/4 inch	SM	54	8			
148.5	25	Estimated angle of internal friction: >40° Bottom of Boring at 25 feet						

GROUND WATER OBSERVATIONS:

NO FREE GROUND WATER ENCOUNTERED

LA CORP.GDT 7/1/99 MV*

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EXPLORATORY BORING: EB-4

Sheet 1 of 1

DRILL RIG: MOBILE B-40	PROJECT NO: 259-5D
BORING TYPE: 8-INCH HOLLOW STEM	PROJECT: VALLCO EXPANSION
LOGGED BY: LML	LOCATION: CUPERTINO, CALIFORNIA
START DATE: 5-17-99 FINISH DATE: 5-17-99	COMPLETION DEPTH: 35.0 FT.

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Undrained Shear Strength (ksf): ○ Pocket Penetrometer; △ Torvane; ● Unconfined Compression; ▲ U-U Triaxial Compression (scale 1.0, 2.0, 3.0, 4.0)

ELEVATION (FT)	DEPTH (FT)	MATERIAL DESCRIPTION AND REMARKS	SOIL TYPE	PENETRATION RESISTANCE (BLOWS/FT.)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	PERCENT PASSING NO. 200 SIEVE
173.0	0	SURFACE ELEVATION: 173.0 FT. (+/-)					
172.7		3 inches asphaltic concrete over 10 inches aggregate base					
171.9		SANDY CLAY (CL) very stiff to stiff, moist, orange brown, fine sand, some silt, trace subangular gravel, low plasticity	CL	24	19		53
				27	27		
	5	increase fine sand		13	25		
165.5		SILTY SAND (SM) dense, moist, brown, subrounded gravel to 1 inch, trace to some clay	SM	43	8		
	10	Estimated angle of internal friction: 37°-44°					
	15			50/5"	6		
	20			31	5		10
	25			46	7		
	30			43	5		
140.0		SILTY CLAY (CL) very stiff, moist, orange-brown, some fine sand, low plasticity	CL	28	21	105	
138.0	35	Bottom of Boring at 35 feet					

GROUND WATER OBSERVATIONS:

NO FREE GROUND WATER ENCOUNTERED

LA CORP.GDT 7/1/99 MV*

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Environmental/Geotechnical/Engineering Services

EXPLORATORY BORING: EB-5

DRILL RIG: MOBILE B-40	PROJECT NO: 259-5D
BORING TYPE: 8-INCH HOLLOW STEM	PROJECT: VALLCO EXPANSION
LOGGED BY: LML	LOCATION: CUPERTINO, CALIFORNIA
START DATE: 5-17-99 FINISH DATE: 5-17-99	COMPLETION DEPTH: 24.5 FT.

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Undrained Shear Strength (ksf): ○ Pocket Penetrometer; △ Torvane; ● Unconfined Compression; ▲ U-U Triaxial Compression (scale 1.0, 2.0, 3.0, 4.0)

ELEVATION (FT)	DEPTH (FT)	MATERIAL DESCRIPTION AND REMARKS — SURFACE ELEVATION: 173.0 FT. (+/-)	SOIL TYPE	PENETRATION RESISTANCE (BLOWS/FT.)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	PERCENT PASSING NO. 200 SIEVE	Undrained Shear Strength (ksf)
173.0 / 172.7 / 172.2	0	3 inches asphaltic concrete over 5 inches aggregate base						
		SILTY CLAY (CL) very stiff to hard, moist, brown, trace subrounded gravel to 1/2 inch, trace sand, occasional competely weathered sandstone fragments and fine sandy pocket	CL	39	21	108		△; >○
				52	19	111		>○
	5			51	19	108		>○
165.5		SILTY SAND (SM) dense, moist, orange-brown, uniform fine grained, trace clay Estimated angle of internal friction: >40°	SM	49	12			△
161.5	10	SILTY SAND (SM) dense, moist, fine to coarse grained, some subrounded to angular fractured gravel to 1 1/4 inch, some iron oxide coatings on fractures, occasional clayey sand to sandy clay seam Estimated angle of internal friction: 38°- >42°	SM	32	9		12	
	15			50/6"	5			
	20	very dense		50/5"	7			
148.5	25	Bottom of Boring at 24 1/2 feet						
	30							
	35							

GROUND WATER OBSERVATIONS:

NO FREE GROUND WATER ENCOUNTERED

LA CORP.GDT 7/1/99 MV*

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EXPLORATORY BORING: EB-6

DRILL RIG: MOBILE B-40	PROJECT NO: 259-5D
BORING TYPE: 8-INCH HOLLOW STEM	PROJECT: VALLCO EXPANSION
LOGGED BY: LML	LOCATION: CUPERTINO, CALIFORNIA
START DATE: 5-18-99 FINISH DATE: 5-18-99	COMPLETION DEPTH: 26.5 FT.

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Undrained Shear Strength (ksf): ○ Pocket Penetrometer; △ Torvane; ● Unconfined Compression; ▲ U-U Triaxial Compression (scale 1.0, 2.0, 3.0, 4.0)

SURFACE ELEVATION: 173.5 FT. (+/-)

ELEVATION (FT)	DEPTH (FT)	MATERIAL DESCRIPTION AND REMARKS	SOIL TYPE	PENETRATION RESISTANCE (BLOWS/FT.)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	PERCENT PASSING NO. 200 SIEVE	Undrained Shear Strength (ksf)
173.5	0							
173.2 / 172.7		3 inches asphaltic concrete over 5 inches aggregate base						
		SILTY CLAY (CL) very stiff to hard, moist, orange brown, trace subrounded gravel, some fine sand, occasional completely weathered sandstone fragments and fine sand, pockets up to 1/2 inch	CL	35	17	116		△ ~2.5; >4.0
				34	16			○ ~3.5
167.5	5	SILTY SAND (SM) dense, moist, orange brown, uniform fine grained , trace clay	SM	48	19	113		
165.0		SILTY SAND (SM) very dense, moist, orange brown, some gravel to 3/4 inch, some clay and sandy clay seams Estimated angle of internal friction: >42°	SM	53	7		14	
	15			78	9			
156.0		SILTY CLAY (CL) very stiff, moist, orange-brown, mottled black, trace fine sand, low plasticity, becomes dense	CL	35	20			○ ~3.5
152.0	20	SILTY SAND (SM) medium dense, moist, orange-brown, uniform fine grained, trace fine gravel, low plasticity, trace fine gravel Estimated angle of internal friction: 33°-39°	SM	25	16			○ ~3.0
148.5	25	SILTY CLAY (CL) very stiff, moist, orange brown, trace fine sand, low plasticity	CL	24	23			
147.0		Bottom of Boring at 26 1/2 feet						
	30							
	35							

GROUND WATER OBSERVATIONS:

NO FREE GROUND WATER ENCOUNTERED

LA CORP.GDT 7/1/99 MV*

LOWNEYASSOCIATES
Environmental/Geotechnical/Engineering Services

EXPLORATORY BORING: EB-7

DRILL RIG: MOBILE B-40	PROJECT NO: 259-5D
BORING TYPE: 8-INCH HOLLOW STEM	PROJECT: VALLCO EXPANSION
LOGGED BY: LML	LOCATION: CUPERTINO, CALIFORNIA
START DATE: 5-18-99 FINISH DATE: 5-18-99	COMPLETION DEPTH: 25.0 FT.

Undrained Shear Strength (ksf): ○ Pocket Penetrometer; △ Torvane; ● Unconfined Compression; ▲ U-U Triaxial Compression (scale 1.0, 2.0, 3.0, 4.0)

ELEVATION (FT)	DEPTH (FT)	MATERIAL DESCRIPTION AND REMARKS	SOIL TYPE	PENETRATION RESISTANCE (BLOWS/FT.)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	PERCENT PASSING NO. 200 SIEVE	Undrained Shear Strength (ksf)
174.5	0	SURFACE ELEVATION: 174.5 FT. (+/-)						
174.2 / 173.7		3 inches asphaltic concrete over 5 inches aggregate base						
		SILTY CLAY (CL) hard, moist, brown to orange-brown, occasional completely weathered, sandstone fragments, trace coarse sand and fine subrounded gravel, low plasticity, trace rootlets	CL	19	19	108		△ ~3.6; >○
				31	24	105	84	○ ~3.5
	5	increase in fine sand		63	16	119		△ ~3.9; >○
166.5		CLAYEY SAND (SC) dense, moist, orange-brown, subangular to subrounded gravel to 1 inch	SC	39	8			
	10	Estimated angle of internal friction: 37°-42°						
		increase in clay content		30	11		17	
160.0	15	SILTY SAND (SM) dense, moist, orange-brown, fine uniform grained	SM					
158.5		SILTY CLAY (CL) hard to very stiff, moist, orange brown, low plasticity, occasional thin fine grained silty sand lense	CL	56	21	109		>○
	20							
		very stiff		29	20			○ ~2.9
149.5	25	Bottom of Boring at 25 feet						
	30							
	35							

GROUND WATER OBSERVATIONS:

NO FREE GROUND WATER ENCOUNTERED

LA CORP.GDT 7/1/99 MV*

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Environmental/Geotechnical/Engineering Services

EXPLORATORY BORING: EB-8

DRILL RIG: MOBILE B-40	PROJECT NO: 259-5D
BORING TYPE: 8-INCH HOLLOW STEM	PROJECT: VALLCO EXPANSION
LOGGED BY: LML	LOCATION: CUPERTINO, CALIFORNIA
START DATE: 5-18-99 FINISH DATE: 5-18-99	COMPLETION DEPTH: 30.0 FT.

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Undrained Shear Strength (ksf): ○ Pocket Penetrometer; △ Torvane; ● Unconfined Compression; ▲ U-U Triaxial Compression (scale 1.0, 2.0, 3.0, 4.0)

SURFACE ELEVATION: 173.5 FT. (+/-)

ELEVATION (FT)	DEPTH (FT)	MATERIAL DESCRIPTION AND REMARKS	SOIL TYPE
173.5 / 173.2 / 172.7	0	3 inches asphaltic concrete over 5 inches aggregate base	
163.5	10	SANDY CLAY (CL) very stiff, moist, orange brown, with some silt, fine sand	CL
157.0		SILTY SAND (SM) very dense, moist, orange brown, subangular gravel to 1 inch, trace clay, fine to coarse grained sand; increase sand; Estimated angle of internal friction: >40°	SM
155.0		SILTY CLAY (CL) hard, moist, orange brown, low plasticity	CL
150.5		SILTY SAND (SM) very dense, moist, yellowish to olive brown, fine to coarse grained, some subangular to subrounded gravel up to 1 1/2 inch; increase gravel; Estimated angle of internal friction: >40°	SM
144.5		SILTY CLAY (CL) very stiff, moist, brown, low plasticity, trace coarse sand, fine gravel, some fine to medium sand; increase gravel, increase medium to fine sand	CL
143.5	30	CLAYEY SAND with gravel (SC) dense, moist, orange brown to brown, subrounded gravel to 1 1/4 inch	SC
		Bottom of Boring at 30 feet	

PENETRATION RESISTANCE (BLOWS/FT.)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	PERCENT PASSING NO. 200 SIEVE	Undrained Shear Strength (ksf)
41	15	112		>4.0 (pocket penetrometer)
42	18	112	61	
37	19	111		>4.0 (pocket penetrometer)
48	14	121		
51	5			
50/6"	14			>4.0 (pocket penetrometer)
27	18			
38	7			

GROUND WATER OBSERVATIONS:
NO FREE GROUND WATER ENCOUNTERED

LA CORP.GDT 7/1/99 MV*

EXPLORATORY BORING: EB-9

DRILL RIG: MOBILE B-40	PROJECT NO: 259-5D
BORING TYPE: 8-INCH HOLLOW STEM	PROJECT: VALLCO EXPANSION
LOGGED BY: LML	LOCATION: CUPERTINO, CALIFORNIA
START DATE: 5-18-99 FINISH DATE: 5-18-99	COMPLETION DEPTH: 25.0 FT.

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Undrained Shear Strength (ksf): ○ Pocket Penetrometer; △ Torvane; ● Unconfined Compression; ▲ U-U Triaxial Compression (scale 1.0, 2.0, 3.0, 4.0)

SURFACE ELEVATION: 173.5 FT. (+/-)

ELEVATION (FT)	DEPTH (FT)	MATERIAL DESCRIPTION AND REMARKS	SOIL TYPE	PENETRATION RESISTANCE (BLOWS/FT.)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	PERCENT PASSING NO. 200 SIEVE	Undrained Shear Strength (ksf)
173.5	0							
173.2 / 172.7		3 inches asphaltic concrete over 6 inches aggregate base						
		SANDY CLAY (CL) hard, moist, brown to orange brown, fine sand, trace fine gravels, low plasticity	CL	62	14		68	>○
				34	15			>○
	5			56	15	112		△ >○
				57	14	114		>○
	10							
162.0		GRAVELLY SAND (SP) medium dense, moist, brown. Estimated angle of internal friction: 38°-43°	SP	42	9			○
158.0	15	SANDY CLAY (CL) very stiff, moist, orange brown, low plasticity, trace fine gravel	CL	30	20			
155.0		CLAYEY SAND (SC) very dense, moist, brown, fine grained sand, trace clay. Estimated angle of internal friction: 33°-38°	SC	61				○
	20							
		medium dense		28	14			
148.5	25	Bottom of Boring at 25 feet						
	30							
	35							

GROUND WATER OBSERVATIONS:
NO FREE GROUND WATER ENCOUNTERED

LA CORP.GDT 7/1/99 MV*

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EXPLORATORY BORING: EB-10

DRILL RIG: MOBILE B-40	PROJECT NO: 259-5D
BORING TYPE: 8-INCH HOLLOW STEM	PROJECT: VALLCO EXPANSION
LOGGED BY: LML	LOCATION: CUPERTINO, CALIFORNIA
START DATE: 5-18-99 FINISH DATE: 5-18-99	COMPLETION DEPTH: 50.0 FT.

MATERIAL DESCRIPTION AND REMARKS

SURFACE ELEVATION: 180.5 FT. (+/-)

Undrained Shear Strength (ksf): ○ Pocket Penetrometer; △ Torvane; ● Unconfined Compression; ▲ U-U Triaxial Compression (scale 1.0, 2.0, 3.0, 4.0)

ELEVATION (FT)	MATERIAL DESCRIPTION AND REMARKS	SOIL TYPE
180.5 – 180.1 – 179.5	4 inches asphaltic concrete over 8 inches aggregate base	
179.5	SILTY CLAY (CL) very stiff to hard, moist, dark brown, trace fine sand, trace gravel, rootlets, low plasticity	CL
	increase gravel, alternating clayey sand lenses	
167.5	CLAYEY SAND (SC) very dense, moist, with some gravel, occasional completely weathered sandstone fragments and fine silty sand pockets Estimated angle of internal friction: >40°	SC
	dense	
153.5	SILTY CLAY WITH SAND (CL) very stiff, moist, orange brown, trace fine gravel, low plasticity	CL
146.5 – 145.5		SP

PENETRATION RESISTANCE (BLOWS/FT.)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	PERCENT PASSING NO. 200 SIEVE
42	13	107	
30	12	106	
38	15	108	
50/5"	7	117	
50/5"	4		
84	4		
63	6		18
68	5		
30	19	119	
50/6"	5		

Continued Next Page

GROUND WATER OBSERVATIONS:
NO FREE GROUND WATER ENCOUNTERED

LA CORP.GDT 7/1/99 MV*

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EXPLORATORY BORING: EB-10 Cont'd

DRILL RIG: MOBILE B-40	PROJECT NO: 259-5D
BORING TYPE: 8-INCH HOLLOW STEM	PROJECT: VALLCO EXPANSION
LOGGED BY: LML	LOCATION: CUPERTINO, CALIFORNIA
START DATE: 5-18-99 FINISH DATE: 5-18-99	COMPLETION DEPTH: 50.0 FT.

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Undrained Shear Strength (ksf): ○ Pocket Penetrometer; △ Torvane; ● Unconfined Compression; ▲ U-U Triaxial Compression (scale 1.0, 2.0, 3.0, 4.0)

ELEVATION (FT)	DEPTH (FT)	MATERIAL DESCRIPTION AND REMARKS	SOIL TYPE	PENETRATION RESISTANCE (BLOWS/FT.)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	PERCENT PASSING NO. 200 SIEVE
145.5	35	GRAVELLY SAND (SP) very dense, moist, orange-brown, subangular gravel to 1 inch. Estimated angle of internal friction: >42°	SP				
				50/5"	3		
				64	4		
131.8		SILTY CLAY (CL) very stiff	CL	25	23		91
130.5	50	Bottom of Boring at 50 feet					

GROUND WATER OBSERVATIONS:
NO FREE GROUND WATER ENCOUNTERED

LOWNEY ASSOCIATES
Environmental/Geotechnical/Engineering Services

EXPLORATORY BORING: EB-11

Sheet 1 of 1

DRILL RIG: MOBILE B-40	PROJECT NO: 259-5D
BORING TYPE: 8-INCH HOLLOW STEM	PROJECT: VALLCO EXPANSION
LOGGED BY: LML	LOCATION: CUPERTINO, CALIFORNIA
START DATE: 5-19-99 FINISH DATE: 5-19-99	COMPLETION DEPTH: 30.0 FT.

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Undrained Shear Strength (ksf): ○ Pocket Penetrometer; △ Torvane; ● Unconfined Compression; ▲ U-U Triaxial Compression (scale 1.0, 2.0, 3.0, 4.0)

SURFACE ELEVATION: 180.5 FT. (+/-)

ELEVATION (FT)	DEPTH (FT)	MATERIAL DESCRIPTION AND REMARKS	SOIL TYPE	PENETRATION RESISTANCE (BLOWS/FT.)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	PERCENT PASSING NO. 200 SIEVE	UNDRAINED SHEAR STRENGTH (ksf)
180.5 / 180.2 / 179.5	0	3 inches asphaltic concrete over 9 inches aggregate base						
		SILTY CLAY (CL) very stiff to hard, moist, brown to orange brown, trace fine sand, some medium to fine gravel, low plasticity	CL	41	12	118		>○
				36	16			>○
	5			53				>○
				50/5"	15 10	97		
	10	Clayey Sand Lense						
167.0		SANDY CLAY (CL) hard, moist, orange brown, some fine sand, low plasticity	CL	50/6"	11	108		>○
	15							
	20			34	9			
157.0		GRAVELLY SAND (SC) medium dense, dry, orange brown, with some clay, subrounded gravel to 3/4 inch Estimated angle of internal friction: 35°-41°	SC	26	4			
	25							
152.0		SILTY CLAY (CL) hard, moist, orange brown, some fine to medium sand		50/6"	19			>○
150.5	30	Bottom of Boring at 30 feet						
	35							

GROUND WATER OBSERVATIONS:

NO FREE GROUND WATER ENCOUNTERED

LA_CORP.GDT 7/1/99 MV*

LOWNEYASSOCIATES

Environmental/Geotechnical/Engineering Services

EXPLORATORY BORING: EB-12

DRILL RIG: MOBILE B-40	PROJECT NO: 259-5D
BORING TYPE: 8-INCH HOLLOW STEM	PROJECT: VALLCO EXPANSION
LOGGED BY: LML	LOCATION: CUPERTINO, CALIFORNIA
START DATE: 5-19-99 FINISH DATE: 5-19-99	COMPLETION DEPTH: 30.0 FT.

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MATERIAL DESCRIPTION AND REMARKS

SURFACE ELEVATION: 173.0 FT. (+/-)

Undrained Shear Strength (ksf): ○ Pocket Penetrometer; △ Torvane; ● Unconfined Compression; ▲ U-U Triaxial Compression (scale 1.0, 2.0, 3.0, 4.0)

ELEVATION (FT)	DEPTH (FT)	MATERIAL DESCRIPTION AND REMARKS	SOIL TYPE	PENETRATION RESISTANCE (BLOWS/FT.)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	PERCENT PASSING NO. 200 SIEVE	Undrained Shear Strength (ksf)
173.0	0							
172.7		3 inches asphaltic concrete over 5 inches aggregate base						
172.2		SILTY CLAY (CL) hard to stiff, dry to moist, orange brown, trace fine to medium sand, low plasticity, rootlets	CL	54	18	115		△ ~3.6; ○ >4.5
		increase sand		45	17			
	5			58	16	113		○ >4.5
		sand lense						
				41	17	98		△ ~4.0; ○ >4.5
	10							
	15			15	12			
156.5		SILTY SAND (SM) medium dense, moist, orange brown, fine uniformly graded sand, trace clay. Estimated angel of internal friction: 33°-39°	SM	25	10		35	○ ~2.7
	20	increase clay						
148.5				29	8			
	25	GRAVELLY SAND (SC) medium dense, dry to moist, brown, with some clay, subangular gravel to 3/4 inch	SC					
145.0		GRAVELLY SAND (SP) very dense, dry, brown, gravel to 1 inch, trace clay. Estimated angle of internal friction: >42°	SP	70	5			
143.0	30	Bottom of Boring at 30 feet						
	35							

GROUND WATER OBSERVATIONS:

NO FREE GROUND WATER ENCOUNTERED

LA_CORP.GDT 7/1/99 MV*

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EXPLORATORY BORING: EB-13

DRILL RIG: MOBILE B-40	PROJECT NO: 259-5D
BORING TYPE: 8-INCH HOLLOW STEM	PROJECT: VALLCO EXPANSION
LOGGED BY: LML	LOCATION: CUPERTINO, CALIFORNIA
START DATE: 5-19-99 FINISH DATE: 5-19-99	COMPLETION DEPTH: 30.0 FT.

This log is a part of a report by Lowney Associates, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

Undrained Shear Strength (ksf): ○ Pocket Penetrometer; △ Torvane; ● Unconfined Compression; ▲ U-U Triaxial Compression (scale 1.0, 2.0, 3.0, 4.0)

ELEVATION (FT)	DEPTH (FT)	MATERIAL DESCRIPTION AND REMARKS	SOIL TYPE	PENETRATION RESISTANCE (BLOWS/FT.)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	PERCENT PASSING NO. 200 SIEVE	UNDRAINED SHEAR STRENGTH (ksf)
172.5	0	SURFACE ELEVATION: 172.5 FT. (+/-)						
172.2		3 inches asphaltic concrete over 5 inches aggregate base						
171.7		SANDY CLAY (CL) hard, moist, orange brown, fine to coarse grained, some silt, occasional gravel, thin sandy lense at 2 feet	CL	60	12	120	25	>○
				50/6"	8	82		
168.5		SILTY CLAY (CL)	CL					
167.0	5	GRAVELLY SAND (SC) dense to very dense, brown, subangular gravel to 3/4 inch, with trace to some clay	SC	33	7			>○
		decreasing clay; Estimated angle of internal friction: 38°- >42°		62	5			
	10	increase sand						
	15			92	6			
154.5		SILTY CLAY (CL) very stiff, moist, brown, low plasticity, trace fine sand	CL	46	19			>○
	20							
	25			49	16	113		
				45	15	118		
142.5	30	Bottom of Boring at 30 feet						
	35							

GROUND WATER OBSERVATIONS:
NO FREE GROUND WATER ENCOUNTERED

LA CORP.GDT 7/1/99 MV"

LOWNEYASSOCIATES
Environmental/Geotechnical/Engineering Services

EXPLORATORY BORING: EB-14

DRILL RIG: MOBILE B-40	PROJECT NO: 259-5D
BORING TYPE: 8-INCH HOLLOW STEM	PROJECT: VALLCO EXPANSION
LOGGED BY: LML	LOCATION: CUPERTINO, CALIFORNIA
START DATE: 5-19-99 FINISH DATE: 5-19-99	COMPLETION DEPTH: 30.0 FT.

This log is a part of a report by Lowney Associates, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

MATERIAL DESCRIPTION AND REMARKS

SURFACE ELEVATION: 172.5 FT. (+/-)

Undrained Shear Strength (ksf): ○ Pocket Penetrometer; △ Torvane; ● Unconfined Compression; ▲ U-U Triaxial Compression; scale 1.0, 2.0, 3.0, 4.0

ELEVATION (FT)	DEPTH (FT)	MATERIAL DESCRIPTION AND REMARKS	SOIL TYPE	PENETRATION RESISTANCE (BLOWS/FT.)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	PERCENT PASSING NO. 200 SIEVE
172.5	0						
172.2		3 inches asphaltic concrete over 5 inches aggregate base					
171.7		SANDY CLAY (CL) hard, moist, orange brown, fine sand, some silt, trace coarse gravel	CL	42	14	123	
		increase sand and gravel		42	11	108	55
167.5	5	CLAYEY SAND (SC) medium dense, dry, brown, with some fine gravel. Estimated angle of internal friction: 36°-40°	SC	32	10		
				42	28		
	10	decrease clay		34	7		
159.5		SANDY GRAVEL (GC) dense, dry to moist, brown, trace to some clay	GC	43	8		
	15						
155.5		SILTY CLAY (CL) hard, moist, brown, some fine sand, trace gravel, low plasticity	CL	66	22	107	89
	20						
148.0				55	22	105	
	25	SANDY CLAY (CL) hard, moist, orange brown, low plasticity	CL				
143.0				50/6"	14		
142.5	30	SANDY GRAVEL (GC) very dense, moist, brown, subangular gravel to 1 inch, trace to some clay	GC				
		Bottom of Boring at 30 feet					
	35						

GROUND WATER OBSERVATIONS:

NO FREE GROUND WATER ENCOUNTERED

LA CORP.GDT 7/1/99 MV

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DRILL RIG	Continuous Flight Auger	SURFACE ELEVATION	190' (Approx.)	LOGGED BY	R.R.
DEPTH TO GROUNDWATER	Not Established	BORING DIAMETER	6 Inches	DATE DRILLED	6/4/74

DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE	DEPTH (feet)	JARS	SACKS	SPLIT SPOON	SHELBY TUBE	MOISTURE CONTENT %	PENETRATION RESISTANCE BLOWS/FT.
3" Asphaltic Concrete over 6" Baserock				1						
CLAY, silty with trace of sand and gravel	brown	stiff	CL		x					13
				2						
				3	x				21	28
				4	x					13
				5						
				6						
(grading more sandy and gravelly)		very stiff		7						
				8						
				9	x				15	24
				10						
Bottom of Boring = 10 Feet				11						
				12						
				13						
				14						
				15						
				16						
				17						
				18						
				19						
				20						

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EXPLORATORY BORING LOG

VALLCO PARK REGIONAL SHOPPING CENTER
Cupertino, California

PROJECT NO.	DATE	SHEET NO.	BORING NO.
259-5	June, 1974	1 OF 1	1

DRILL RIG	Continuous Flight Auger	SURFACE ELEVATION	188' (approx.)	LOGGED BY	R.R.
DEPTH TO GROUNDWATER	Not Established	BORING DIAMETER	6 Inches	DATE DRILLED	6/4/74

DESCRIPTION AND CLASSIFICATION				DEPTH (feet)	JARS	SACKS	SPLIT SPOON	SHELBY TUBE	MOISTURE CONTENT %	PENETRATION RESISTANCE BLOWS/FT.
DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE							
3" Asphaltic Concrete over 6" Baserock				1						
CLAY, sandy, gravelly	brown	stiff	CL	2	x				13	10
	gray-brown	very stiff		3	x					17
				4						
				5	x				17	17
				6						
				7						
				8						
				9						
				10	x					20
Bottom of Boring = 10 Feet				11						
				12						
				13						
				14						
				15						
				16						
				17						
				18						
				19						
				20						

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EXPLORATORY BORING LOG

VALLCO PARK REGIONAL SHOPPING CENTER
Cupertino, California

PROJECT NO.	DATE	SHEET NO.	BORING NO.
259-5	June, 1974	1 OF 1	2

DRILL RIG Continuous Flight Auger	SURFACE ELEVATION 187' (Approx.)	LOGGED BY R.R.
DEPTH TO GROUNDWATER Not Established	BORING DIAMETER 6 Inches	DATE DRILLED 6/4/74

DESCRIPTION AND CLASSIFICATION										
DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE	DEPTH (feet)	JARS	SACKS	SPLIT SPOON	SHELBY TUBE	MOISTURE CONTENT %	PENETRATION RESISTANCE BLOWS/FT.
CLAY, silty	brown	stiff	CL							
				1	x					15
		very stiff		2	x				17	16
				3						
(trace of coarse sand and gravel)				4	x					18
GRAVEL, sandy, silty	brown	medium dense	GM	5						
				6						
SAND, gravelly, silty	yellow-brown	loose	SM	7						
				8						
				9	x				10	7
Bottom of Boring = 10 Feet				10						
				11						
Note: The stratification lines represent the approximate boundary between soil types and the transitions may be gradual.				12						
				13						
				14						
				15						
				16						
				17						
				18						
				19						
				20						

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EXPLORATORY BORING LOG

VALLCO PARK REGIONAL SHOPPING CENTER
Cupertino, California

PROJECT NO.	DATE	SHEET NO.	BORING NO.
259-5	June, 1974	1 OF 1	3

DRILL RIG Continuous Flight Auger	SURFACE ELEVATION 184' (Approx.)	LOGGED BY R.R.
DEPTH TO GROUNDWATER Not Established	BORING DIAMETER 6 Inches	DATE DRILLED 6/4/74

DESCRIPTION AND CLASSIFICATION

DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE	DEPTH (feet)	JARS	SACKS	SPLIT SPOON	SHELBY TUBE	MOISTURE CONTENT %	PENETRATION RESISTANCE BLOWS/FT.
CLAY, silty	brown	very stiff	CL							
				1	x				7	18
(trace of gravel)				2	x					24
SAND, gravelly, clayey	brown	medium dense	SC	3						
				4	x				11	13
				5						
(grading more gravelly)			GC	6						
				7						
				8	x				7	29
				9						
Bottom of Boring = 9 Feet										
				10						
Note: The stratification line represents the approximate boundary between soil types and the transition may be gradual.				11						
				12						
				13						
				14						
				15						
				16						
				17						
				18						
				19						
				20						

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EXPLORATORY BORING LOG

VALLCO PARK REGIONAL SHOPPING CENTER
Cupertino, California

PROJECT NO.	DATE	SHEET NO.	BORING NO.
259-5	June, 1974	1 OF 1	4

DRILL RIG	Continuous Flight Auger	SURFACE ELEVATION	183' (Approx.)	LOGGED BY	R.R.
DEPTH TO GROUNDWATER	Not Established	BORING DIAMETER	6 Inches	DATE DRILLED	6/4/74

DESCRIPTION AND CLASSIFICATION											
DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE	DEPTH (feet)	JARS	SACKS	SPLIT SPOON	SHELBY TUBE	MOISTURE CONTENT %	PENETRATION RESISTANCE BLOWS/FT.
GRAVEL, clayey with some cobbles	brown	medium dense	GC	1	x					37
(grading less clayey, more silty)			GM	2	x				4	28
		dense to very dense		3						
				4	x					66
				5						
				6						
SAND, gravelly, clayey	brown	medium dense	SC	7						
				8						
				9	x				7	19
Bottom of Boring = 10 Feet				10						
Note: The stratification line represents the approximate boundary between soil types and the transition may be gradual.				11–20						

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EXPLORATORY BORING LOG

VALLCO PARK REGIONAL SHOPPING CENTER
Cupertino, California

PROJECT NO.	DATE	SHEET NO.	BORING NO.
259-5	June, 1974	1 OF 1	5

DRILL RIG Continuous Flight Auger	SURFACE ELEVATION 173' (Approx.)	LOGGED BY R.R.
DEPTH TO GROUNDWATER Not Established	BORING DIAMETER 6 Inches	DATE DRILLED 6/5/74

DESCRIPTION AND CLASSIFICATION										
DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE	DEPTH (feet)	JARS	SACKS	SPLIT SPOON	SHELBY TUBE	MOISTURE CONTENT %	PENETRATION RESISTANCE BLOWS/FT.
CLAY, silty	dark brown	stiff	CL							
				1	x				20	14
Liquid Limit = 44% Plasticity Index = 22% Passing #200 Sieve = 76%				2	x				22	9
	brown			4	x				17	9
Note: The stratification line represents the approximate boundary between soil types and the transition may be gradual.				9–10	x					12
SAND, gravelly, clayey to GRAVEL, sandy, clayey	gray-brown	medium dense	SC-GC	14–15	x				8	19
(grading less gravelly, more silty)		dense	SM	19–20	x				7	40
Bottom of Boring = 20 Feet				20						

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EXPLORATORY BORING LOG

VALLCO PARK REGIONAL SHOPPING CENTER
Cupertino, California

PROJECT NO.	DATE	SHEET NO.	BORING NO.
259-5	June, 1974	1 OF 1	9

DRILL RIG	Continuous Flight Auger	SURFACE ELEVATION	179' (Approx.)	LOGGED BY	R.R.
DEPTH TO GROUNDWATER	Not Established	BORING DIAMETER	6 Inches	DATE DRILLED	6/5/74

DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE	DEPTH (feet)	JARS	SACKS	SPLIT SPOON	SHELBY TUBE	MOISTURE CONTENT %	PENETRATION RESISTANCE BLOWS/FT.
CLAY, silty	brown	stiff	CL							
				1	x					14
(grading sandy)										
				2	x				12	11
				3						
				4	x					7
				5						
				6						
GRAVEL, sandy with clay binder	brown	dense	GC	7						
				8						
				9	x				5	49
				10						
				11						
CLAY, silty	brown	stiff	CL	12						
				13						
				14	x				16	16
				15						
				16						
		very stiff		17						
				18						
				19	x					
SAND, silty, fine grained	light brown	medium dense	SM	20	x					20

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EXPLORATORY BORING LOG

VALLCO PARK REGIONAL SHOPPING CENTER
Cupertino, California

PROJECT NO.	DATE	SHEET NO.	BORING NO.
259-5	June, 1974	1 OF 2	10

DRILL RIG: Continuous Flight Auger	SURFACE ELEVATION 179' (Approx.)	LOGGED BY R.R.
DEPTH TO GROUNDWATER Not Established	BORING DIAMETER 6 Inches	DATE DRILLED 6/5/74

DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE	DEPTH (feet)	JARS	SACKS	SPLIT SPOON	SHELBY TUBE	MOISTURE CONTENT %	PENETRATION RESISTANCE BLOWS/FT.
SAND, silty, fine grained (Continued)	light brown	medium dense	SM	21						
SAND, gravelly, silty	gray-brown	very dense	SM	22						
				23						
				24	x				5	58
				25						
				26						
				27						
				28						
				29	x					55
				30						

Bottom of Boring = 30 Feet

Note: The stratification lines represent the approximate boundary between soil types and the transitions may be gradual.

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EXPLORATORY BORING LOG

VALLCO PARK REGIONAL SHOPPING CENTER
Cupertino, California

PROJECT NO.	DATE	SHEET NO.	BORING NO.
259-5	June, 1974	2 OF 2	10

DRILL RIG	Continuous Flight Auger	SURFACE ELEVATION	181' (Approx.)	LOGGED BY	R.R.
DEPTH TO GROUNDWATER	Not Established	BORING DIAMETER	6 Inches	DATE DRILLED	6/6/74

DESCRIPTION AND CLASSIFICATION										
DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE	DEPTH (feet)	JARS	SACKS	SPLIT SPOON	Modified Calif.	MOISTURE CONTENT %	PENETRATION RESISTANCE BLOWS/FT.
CLAY, silty	brown	stiff	CL							
				1	x					13
Dry Density = 105 pcf		very		2						
Unconfined Compressive Strength = 4,400 psf		stiff to hard		3					19	34
				4						
				5						
				6						
				7						
GRAVEL, sandy, clayey	gray-brown	dense	GC							
				8						
Dry Density = 116 pcf				9					10	40
				10						
				11						
CLAY, silty	brown	very stiff to hard	CL							
				12						
				13						
Dry Density = 101 pcf				14						
Unconfined Compressive Strength = 5,300 psf				15					23	41
				16						
				17						
				18						
				19	x					34
				20						

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EXPLORATORY BORING LOG

VALLCO PARK REGIONAL SHOPPING CENTER
Cupertino, California

PROJECT NO.	DATE	SHEET NO.	BORING NO.
259-5	June, 1974	1 OF 3	11

DRILL RIG Continuous Flight Auger	SURFACE ELEVATION 181' (Approx.)	LOGGED BY R.R.
DEPTH TO GROUNDWATER Not Established	BORING DIAMETER 6 Inches	DATE DRILLED 6/6/74

DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE	DEPTH (feet)	JARS	SACKS	SPLIT SPOON	Modified Calif.	MOISTURE CONTENT %	PENETRATION RESISTANCE BLOWS/FT.
CLAY, silty	brown	very stiff	CL	21–33						
				24–25	x			sample		29
				29–30	x		sample		22	17
SAND, silty, fine to medium grained	brown	medium dense	SM	34–35				sample		24
CLAY, silty (occasional lenses of silty sand)	brown	very stiff	CL	35–40						
				39–40	x		sample		19	17

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EXPLORATORY BORING LOG

VALLCO PARK REGIONAL SHOPPING CENTER
Cupertino, California

PROJECT NO.	DATE	SHEET NO.	BORING NO.
259-5	June, 1974	2 OF 3	11

DRILL RIG Continuous Flight Auger	SURFACE ELEVATION 181' (Approx.)	LOGGED BY R.R.
DEPTH TO GROUNDWATER Not Established	BORING DIAMETER 6 Inches	DATE DRILLED 6/6/74

DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE	DEPTH (feet)	JARS	SACKS	SPLIT SPOON	Modified Calif.	MOISTURE CONTENT %	PENETRATION RESISTANCE BLOWS/FT.
CLAY, silty (Continued)	brown	very stiff	CL	41						26
				42						
				43						
				44	x					
Bottom of Boring = 45 Feet				45						
Note: The stratification lines represent the approximate boundary between soil types and the transitions may be gradual.										

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EXPLORATORY BORING LOG

VALLCO PARK REGIONAL SHOPPING CENTER
Cupertino, California

PROJECT NO.	DATE	SHEET NO.	BORING NO.
259-5	June, 1974	3 OF 3	11

DRILL RIG Continuous Flight Auger	SURFACE ELEVATION 180' (Approx.)	LOGGED BY R.R.
DEPTH TO GROUNDWATER Not Established	BORING DIAMETER 6 Inches	DATE DRILLED 6/6/74

DESCRIPTION AND CLASSIFICATION

DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE	DEPTH (feet)	JARS	SACKS	SPLIT SPOON	Modified Calif.	MOISTURE CONTENT %	PENETRATION RESISTANCE BLOWS/FT.
CLAY, gravelly	dark brown	very stiff	CL	1	x					22
				2–3	x				15	33
				4					11	21
				5–7						
GRAVEL, sandy, silty	brown	dense	GM	8–10	x				8	39
				11						
CLAY, silty	brown	hard	CL	12–13						
				14–15	x					35
Dry Density = 106 pcf Unconfined Compressive Strength = 3,800 psf				16–18						
(grading very silty)			CL-ML	19–20	x				21	43

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EXPLORATORY BORING LOG

VALLCO PARK REGIONAL SHOPPING CENTER
Cupertino, California

PROJECT NO.	DATE	SHEET NO.	BORING NO.
259-5	June, 1974	1 OF 2	12

DRILL RIG Continuous Flight Auger	SURFACE ELEVATION 180' (Approx.)	LOGGED BY R.R.
DEPTH TO GROUNDWATER Not Established	BORING DIAMETER 6 Inches	DATE DRILLED 6/6/74

DESCRIPTION AND CLASSIFICATION: DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE	DEPTH (feet)	JARS	SACKS	SPLIT SPOON	Modified Calif.	MOISTURE CONTENT %	PENETRATION RESISTANCE BLOWS/FT.
CLAY, silty to SILT, clayey (Continued)	brown	hard	CL-ML	21						
				22						
				23						
Dry Density = 98 pcf Unconfined Compressive Strength = 1,800 psf				24					26	45
				25						
				26						
		very stiff		27						
				28						
				29	x					30
Bottom of Boring = 30 Feet				30						
Note: The stratification lines represent the approximate boundary between soil types and the transition may be gradual.										

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EXPLORATORY BORING LOG

VALLCO PARK REGIONAL SHOPPING CENTER
Cupertino, California

PROJECT NO.	DATE	SHEET NO.	BORING NO.
259-5	June, 1974	2 OF 2	12

DRILL RIG Continuous Flight Auger	SURFACE ELEVATION 183' (Approx.)	LOGGED BY R.R.
DEPTH TO GROUNDWATER Not Established	BORING DIAMETER 6 Inches	DATE DRILLED 6/6/74

DESCRIPTION AND CLASSIFICATION: DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE	DEPTH (feet)	JARS	SACKS	SPLIT SPOON	Modified Calif.	MOISTURE CONTENT %	PENETRATION RESISTANCE BLOWS/FT.
CLAY, silty with occasional lenses of very fine grained sand	brown	firm	CL	0–1						
				2–3	x		sample		25	7
		stiff		3–8						
Dry Density = 109 pcf Unconfined Compressive Strength = 3,800 psf		very stiff to hard		9–10				sample	19	40
Dry Density = 101 pcf Unconfined Compressive Strength = 4,200 psf				14–15				sample	24	68
		very stiff		16–18						
				19–20	x		sample			28

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EXPLORATORY BORING LOG

VALLCO PARK REGIONAL SHOPPING CENTER
Cupertino, California

PROJECT NO.	DATE	SHEET NO.	BORING NO.
259-5	June, 1974	1 OF 2	13

DRILL RIG Continuous Flight Auger	SURFACE ELEVATION 183' (Approx.)	LOGGED BY R.R.
DEPTH TO GROUNDWATER Not Established	BORING DIAMETER 6 Inches	DATE DRILLED 6/6/74

DESCRIPTION AND CLASSIFICATION										
DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE	DEPTH (feet)	JARS	SACKS	SPLIT SPOON	Modified Calif.	MOISTURE CONTENT %	PENETRATION RESISTANCE BLOWS/FT.
CLAY, silty (Continued)	brown	very stiff	CL							
				21						
				22						
		hard		23						
				24						
					x					49
				25						
				26						
		very stiff		27						
				28						
				29						
					x				20	31
				30						
Bottom of Boring = 30 Feet										

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EXPLORATORY BORING LOG

VALLCO PARK REGIONAL SHOPPING CENTER
Cupertino, California

PROJECT NO.	DATE	SHEET NO.	BORING NO.
259-5	June, 1974	2 OF 2	13

DRILL RIG Continuous Flight Auger	SURFACE ELEVATION 184' (Approx.)	LOGGED BY R.R.
DEPTH TO GROUNDWATER Not Established	BORING DIAMETER 6 Inches	DATE DRILLED 6/6/74

DESCRIPTION AND CLASSIFICATION: DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE	DEPTH (feet)	JARS	SACKS	SPLIT SPOON	Modified Calif.	MOISTURE CONTENT %	PENETRATION RESISTANCE BLOWS/FT.
CLAY, silty with trace of coarse sand	brown	stiff	CL	0–12						
				3–4.5	x		▯		21	10
Dry Density = 107 pcf Unconfined Compressive Strength = 2,700 psf		very stiff to hard		8.5–10				▯	19	53
SAND, gravelly with some clay binder	brown	dense to very dense	SC	12–16.5						
Dry Density = 118 pcf				13.5–15				▯	15	68
CLAY, silty to SILT, clayey	brown	very stiff	CL-ML	16.5–20						
				18.5–20	x		▯		18	27

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EXPLORATORY BORING LOG

VALLCO PARK REGIONAL SHOPPING CENTER
Cupertino, California

PROJECT NO.	DATE	SHEET NO.	BORING NO.
259-5	June, 1974	1 OF 2	14

DRILL RIG Continuous Flight Auger	SURFACE ELEVATION 184' (Approx.)	LOGGED BY R.R.
DEPTH TO GROUNDWATER Not Established	BORING DIAMETER 6 Inches	DATE DRILLED 6/6/74

DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE	DEPTH (feet)	JARS	SACKS	SPLIT SPOON	Modified Calif.	MOISTURE CONTENT %	PENETRATION RESISTANCE BLOWS/FT.
CLAY, silty to SILT, clayey (Continued)	brown	very stiff	CL-ML	21						
				22						
				23						
(grading less silty)				24						
			CL		x					32
				25						
				26						
				27						
CLAY, sandy	brown	hard	CL	28						
				29						
					x				17	41
				30						
Bottom of Boring = 30 Feet										

Note: The stratification lines represent the approximate boundary between soil types and the transitions may be gradual.

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EXPLORATORY BORING LOG

VALLCO PARK REGIONAL SHOPPING CENTER
Cupertino, California

PROJECT NO.	DATE	SHEET NO.	BORING NO.
259-5	June, 1974	2 OF 2	14

DRILL RIG Continuous Flight Auger	SURFACE ELEVATION 186' (Approx.)	LOGGED BY A.K.
DEPTH TO GROUNDWATER Not Established	BORING DIAMETER 6 Inches	DATE DRILLED 6/7/74

DESCRIPTION AND CLASSIFICATION

DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE	DEPTH (feet)	JARS	SACKS	SPLIT SPOON	Modified Calif.	MOISTURE CONTENT %	PENETRATION RESISTANCE BLOWS/FT.
CLAY, silty, trace of fine sand	dark brown	very stiff	CL	0–7						
				4				/	19	21
CLAY, silty, sandy, gravelly Dry Density = 109 pcf Unconfined Compressive Strength = 3,500 psf	brown	hard	CL	7–12.5						
				9–10				/	22	39
CLAY, silty Dry Density = 107 pcf Unconfined Compressive Strength = 5,100 psf	tan	hard	CL-CH	12.5–16						
				14–15				/	20	57
(grading siltier with depth)		very stiff	CL	16–20						
				19	x		▯		21	28

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EXPLORATORY BORING LOG

VALLCO PARK REGIONAL SHOPPING CENTER
Cupertino, California

PROJECT NO.	DATE	SHEET NO.	BORING NO.
259-5	June, 1974	1 OF 2	15

DRILL RIG Continuous Flight Auger	SURFACE ELEVATION 186' (Approx.)	LOGGED BY A.K.
DEPTH TO GROUNDWATER Not Established	BORING DIAMETER 6 Inches	DATE DRILLED 6/7/74

DESCRIPTION AND CLASSIFICATION

DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE	DEPTH (feet)	JARS	SACKS	SPLIT SPOON	Modified Calif.	MOISTURE CONTENT %	PENETRATION RESISTANCE BLOWS/FT
CLAY, very silty (Continued)	tan	very stiff	CL							
				21						
				22						
		hard		23						
(grading sandy and gravelly with depth)				24	x					48
				25						
				26						
				27						
(rock blocked end of split spoon sampler)				28						
				29	x					99
Bottom of Boring = 29.5 Feet				30						

Note: The stratification lines represent the approximate boundary between soil types and the transitions may be gradual.

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EXPLORATORY BORING LOG

VALLCO PARK REGIONAL SHOPPING CENTER
Cupertino, California

PROJECT NO.	DATE	SHEET NO.	BORING NO.
259-5	June, 1974	2 OF 2	15

DRILL RIG Continuous Flight Auger	SURFACE ELEVATION 186' (Approx.)	LOGGED BY A.K.
DEPTH TO GROUNDWATER Not Established	BORING DIAMETER 6 Inches	DATE DRILLED 6/7/74

DESCRIPTION AND CLASSIFICATION

DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE	DEPTH (feet)	JARS	SACKS	SPLIT SPOON	Modified Calif.	MOISTURE CONTENT %	PENETRATION RESISTANCE BLOWS/FT.
CLAY, silty, trace of fine sand	dark brown	very stiff	CL	0						
				1						
				2						
				3				⧄		
Dry Density = 104 pcf Unconfined Compressive Strength = 6,400 psf				4				⧄	20	24
				5						
				6						
CLAY, silty, sandy (well graded) gravelly (fine)	brown	hard	CL	7						
				8				⧄		
Dry Density = 115 pcf Unconfined Compressive Strength = 4,500 psf				9				⧄	15	91
				10	170					
				11						
				12						
CLAY, silty	tan	hard	CL	13				⧄		
				14				⧄		91
				15						
(grading siltier with depth)		very stiff		16						
				17						
				18						
				19	x		▯		22	23
				20						

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EXPLORATORY BORING LOG

VALLCO PARK REGIONAL SHOPPING CENTER
Cupertino, California

PROJECT NO.	DATE	SHEET NO.	BORING NO.
259-5	June 1974	1 OF 2	16

DRILL RIG Continuous Flight Auger	SURFACE ELEVATION 186' (Approx.)	LOGGED BY A.K.
DEPTH TO GROUNDWATER Not Established	BORING DIAMETER 6 Inches	DATE DRILLED 6/7/74

DESCRIPTION AND CLASSIFICATION

DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE	DEPTH (feet)	JARS	SACKS	SPLIT SPOON	Modified Calif.	MOISTURE CONTENT %	PENETRATION RESISTANCE BLOWS/FT.
CLAY, very silty (Continued)	tan	very stiff	CL	21						
(grading with fine sand with depth)				22						
		hard		23						
				24	x					37
				25						
(grading less sandy with depth)				26						
				27						
				28						
				29	x				17	53
Bottom of Boring = 29.5 Feet				30						

Note: The stratification lines represent the approximate boundary between soil types and the transitions may be gradual.

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PROJECT NO.	DATE	SHEET NO.	BORING NO.
259-5	June 1974	2 OF 2	16

DRILL RIG	Continuous Flight Auger	SURFACE ELEVATION	185' (Approx.)	LOGGED BY	A.K.
DEPTH TO GROUNDWATER	Not Established	BORING DIAMETER	6 Inches	DATE DRILLED	6/7/74

DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE	DEPTH (feet)	JARS	SACKS	SPLIT SPOON	Modified Calif.	MOISTURE CONTENT %	PENETRATION RESISTANCE BLOWS/FT.
CLAY, silty, trace of fine sand	dark brown	very stiff	CL	0–6				3–4.5	20	18
CLAY, silty, sandy (well)	brown	hard	CL	6.5–8						
SAND (well), gravelly (fine and medium), clayey	brown	dense	SC-SW	8–12				8–9.5	9	38
GRAVEL, sandy	brown	dense	GW	12–14						
SAND, clayey, gravelly	brown	dense	SC-SW	14–20	x (14)		13–14.5			39
		very dense			x (19)		18–19.5		8	50/7"

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EXPLORATORY BORING LOG

VALLCO PARK REGIONAL SHOPPING CENTER
Cupertino, California

PROJECT NO.	DATE	SHEET NO.	BORING NO.
259-5	June 1974	1 OF 2	17

DRILL RIG Continuous Flight Auger	SURFACE ELEVATION 185' (Approx.)	LOGGED BY A.K.
DEPTH TO GROUNDWATER Not Established	BORING DIAMETER 6 Inches	DATE DRILLED 6/7/74

DESCRIPTION AND CLASSIFICATION										
DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE	DEPTH (feet)	JARS	SACKS	SPLIT SPOON	Modified Calif.	MOISTURE CONTENT %	PENETRATION RESISTANCE BLOWS/FT.
SAND, clayey, gravelly (Continued)	brown	very dense	SC-SW	21						
				22						
				23						
				24	x					83
				25						
				26						
				27						
				28						
				29	x				6	84
Bottom of Boring = 29.5 Feet				30						

Note: The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

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EXPLORATORY BORING LOG

VALLCO PARK REGIONAL SHOPPING CENTER
Cupertino, California

PROJECT NO.	DATE	SHEET NO.	BORING NO.
259-9	June 1974	2 OF 2	17

Continuous Flight Auger	SURFACE ELEVATION 184' (Approx.)
DEPTH TO GROUNDWATER Not Established	BORING DIAMETER 6 Inches
LOGGED BY A.K.	DATE DRILLED 6/7/74

DESCRIPTION AND CLASSIFICATION

DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE	DEPTH (feet)	JARS	SACKS	SPLIT SPOON	Modified Calif.	MOISTURE CONTENT %	PENETRATION RESISTANCE BLOWS/FT.
SAND, gravelly	brown	dense	SW	0						
				1						
				2						
				3						
				4				X		43
				5						
				6						
		medium dense		7						
				8						
				9				X	9	20
				10						
				11						
CLAY, silty	brown	hard	CL-CH	12						
				13						
				14				X		50
(grading siltier with depth)				15						
		very stiff	CL	16						
				17						
				18						
				19 x	X				19	18
				20						

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EXPLORATORY BORING LOG

VALLCO PARK REGIONAL SHOPPING CENTER
Cupertino, California

PROJECT NO.	DATE	SHEET NO.	BORING NO.
259-5	June 1974	1 OF 2	18

DRILL RIG Continuous Flight Auger	SURFACE ELEVATION 184' (Approx.)	LOGGED BY A.K.
DEPTH TO GROUNDWATER Not Established	BORING DIAMETER 6 Inches	DATE DRILLED 6/7/74

DESCRIPTION AND CLASSIFICATION										
DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE	DEPTH (feet)	JARS	SACKS	SPLIT SPOON	Modified Calif.	MOISTURE CONTENT %	PENETRATION RESISTANCE BLOWS/FT.
CLAY, silty (Continued)	brown	very stiff	CL	21						
				22						
(grading with some fine sand)		hard		23						
				24	x				21	41
				25						
				26						
				27						
				28						
				29	x					34
Bottom of Boring = 29.5 Feet				30						
Note: The stratification line represents the approximate boundary between soil types and the transition may be gradual.										

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EXPLORATORY BORING LOG

VALLCO PARK REGIONAL SHOPPING CENTER
Cupertino, California

PROJECT NO.	DATE	SHEET NO.	BORING NO.
259-5	June 1974	2 OF 2	18

DRILL RIG	Continuous Flight Auger	SURFACE ELEVATION	180' (Approx.)	LOGGED BY	R.R.
DEPTH TO GROUNDWATER	Not Established	BORING DIAMETER	6 Inches	DATE DRILLED	6/10/74

DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE	DEPTH (feet)	JARS	SACKS	SPLIT SPOON	Modified Calif.	MOISTURE CONTENT %	PENETRATION RESISTANCE BLOWS/FT.
CLAY, silty	brown	firm	CL	1	x					6
		stiff		2–3	x					9
Dry Density = 102 pcf Unconfined Compressive Strength = 1700 psf				4–5					20	15
CLAY, gravelly to GRAVEL clayey	brown	very stiff to medium dense	CL-GC	8–10	x					22
CLAY, silty	brown	hard	CL	11						
Dry Density = 113 pcf Unconfined Compressive Strength = 7200 psf				14					11	78/10"
GRAVEL, clayey	brown	very dense	GC	15						
(grading silty and sandy)			GM	18–19	x					65
				20						

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EXPLORATORY BORING LOG

VALLCO PARK REGIONAL SHOPPING CENTER
Cupertino, California

PROJECT NO.	DATE	SHEET NO.	BORING NO.
259-5	June 1974	1 OF 2	20

DRILL RIG Continuous Flight Auger	SURFACE ELEVATION 180' (Approx.)	LOGGED BY R.R.
DEPTH TO GROUNDWATER Not Established	BORING DIAMETER 6 Inches	DATE DRILLED 6/10/74

DESCRIPTION AND CLASSIFICATION										
DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE	DEPTH (feet)	JARS	SACKS	SPLIT SPOON	Modified Calif.	MOISTURE CONTENT %	PENETRATION RESISTANCE BLOWS/FT.
GRAVEL, sandy, silty (Continued)	brown	very dense	GM	21						
				22						
				23						
				24	x		X		6	57
				25						
				26						
SAND, clayey	brown	dense	SC	27						
				28						
				29	x		X		15	40
				30						
Bottom of Boring = 30 Feet										
Note: The stratification lines represent the approximate boundary between soil types and the transition may be gradual.										

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EXPLORATORY BORING LOG

VALLCO PARK REGIONAL SHOPPING CENTER
Cupertino, California

PROJECT NO.	DATE	SHEET NO.	BORING NO.
259-5	June 1974	2 OF 2	20

DRILL RIG Continuous Flight Auger	SURFACE ELEVATION 180' (Approx.)	LOGGED BY R.R.
DEPTH TO GROUNDWATER Not Established	BORING DIAMETER 6 Inches	DATE DRILLED 6/10/74

DESCRIPTION AND CLASSIFICATION

DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE	DEPTH (feet)	JARS	SACKS	SPLIT SPOON	Modified Calif.	MOISTURE CONTENT %	PENETRATION RESISTANCE BLOWS/FT.
CLAY, silty with occasional gravel	brown	stiff	CL	0–1	x		x			10
Dry Density = 104 pcf Unconfined Compressive Strength = 4300 psf				2–3				x	21	28
		very stiff		5–6						
SAND, gravelly, clayey	brown	very dense	SC	8						
				9	x		x		8	50/6"
CLAY, silty	brown	hard	CL	12–13						
				14	x		x			52
SAND, gravelly, clayey	brown	very dense	SC	17–18						
Dry Density = 109 pcf				19				x	7	53/6"

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EXPLORATORY BORING LOG

VALLCO PARK REGIONAL SHOPPING CENTER
Cupertino, California

PROJECT NO.	DATE	SHEET NO.	BORING NO.
259-5	June 1974	1 OF 3	21

DRILL RIG	Continuous Flight Auger	SURFACE ELEVATION	180' (Approx.)	LOGGED BY	R.R.
DEPTH TO GROUNDWATER	Not Established	BORING DIAMETER	6 Inches	DATE DRILLED	6/10/74

DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE	DEPTH (feet)	JARS	SACKS	SPLIT SPOON	Modified Calif.	MOISTURE CONTENT %	PENETRATION RESISTANCE BLOWS/FT.
SAND, gravelly, clayey (Continued)	brown	very dense	SC	21, 22						
SAND, silty, very fine grained	brown	dense	SM	23, 24, 25	x		sample 24–25			36
CLAY, silty Dry Density = 106 pcf Unconfined Compressive Strength = 3100 psf	brown	hard	CL	26, 27, 28, 29, 30				sample 28.5–30	16	57
(occasional gravel)				31, 32, 33, 34, 35				sample 33.5–35		91
SAND, gravelly with some clay binder	brown	very dense	SC	36, 37, 38, 39, 40	x		sample 38.5–39.5		7	50/6"

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EXPLORATORY BORING LOG

VALLCO PARK REGIONAL SHOPPING CENTER
Cupertino, California

PROJECT NO.	DATE	SHEET NO.	BORING NO.
259-5	June 1974	2 OF 3	21

DRILL RIG Continuous Flight Auger	SURFACE ELEVATION 180' (Approx.)	LOGGED BY R.R.
DEPTH TO GROUNDWATER Not Established	BORING DIAMETER 6 Inches	DATE DRILLED 6/10/74

DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE	DEPTH (feet)	JARS	SACKS	SPLIT SPOON	Modified Calif.	MOISTURE CONTENT %	PENETRATION RESISTANCE BLOWS/FT.
SAND, gravelly with some clay binder (Continued)	brown	very dense	SC							
				41						
				42						
				43						
(grading more gravelly)			SC-GC	44	x				5	50/6"
				45						
Bottom of Boring = 44.5 Feet										

Note: The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

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EXPLORATORY BORING LOG

VALLCO PARK REGIONAL SHOPPING CENTER
Cupertino, California

PROJECT NO.	DATE	SHEET NO.	BORING NO.
259-5	June 1974	3 OF 3	21

DRILL RIG Continuous Flight Auger	SURFACE ELEVATION 178' (Approx.)	LOGGED BY R.R.
DEPTH TO GROUNDWATER Not Established	BORING DIAMETER 6 Inches	DATE DRILLED 6/10/74

DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE	DEPTH (feet)	JARS	SACKS	SPLIT SPOON	Modified Calif.	MOISTURE CONTENT %	PENETRATION RESISTANCE BLOWS/FT.
SAND, gravelly, clayey	brown	loose	SC	0	x				13	7
Liquid Limit = 29% Plasticity Index = 12% Passing No. 200 Sieve = 42%				1–2	x					9
		medium dense		3						
Dry Density = 127 pcf Unconfined Compressive Strength = 1,200 psf				4–5					17	19
				6						
GRAVEL, sandy, clayey	brown	medium dense	GC	7–8						
				9	x				8	30
		dense		10–11						
SAND, clayey with some gravel	brown	dense	SC	12–13						
				14–15	x					40
				16						
(grading more gravelly)		very dense		17–18						
				19–20	x				8	66

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EXPLORATORY BORING LOG

VALLCO PARK REGIONAL SHOPPING CENTER
Cupertino, California

PROJECT NO.	DATE	SHEET NO.	BORING NO.
259-5	June 1974	1 OF 2	22

DRILL RIG Continuous Flight Auger	SURFACE ELEVATION 178' (Approx.)	LOGGED BY R.R.
DEPTH TO GROUNDWATER Not Established	BORING DIAMETER 6 Inches	DATE DRILLED 6/10/74

DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE	DEPTH (feet)	JARS	SACKS	SPLIT SPOON	Modified Calif.	MOISTURE CONTENT %	PENETRATION RESISTANCE BLOWS/FT.
SAND, gravelly, clayey (Continued)	brown	very dense	SC	21						
CLAY, silty with silty sand lenses	brown	very stiff	CL	22						
				23						
				24	x				24	26
Bottom of Boring = 25 Feet				25						

Note: The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

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EXPLORATORY BORING LOG

VALLCO PARK REGIONAL SHOPPING CENTER
Cupertino, California

PROJECT NO.	DATE	SHEET NO.	BORING NO.
259-5	June 1974	2 OF 2	22

DRILL RIG Continuous Flight Auger	SURFACE ELEVATION 181' (Approx.)	LOGGED BY R.R.
DEPTH TO GROUNDWATER Not Established	BORING DIAMETER 6 Inches	DATE DRILLED 6/10/74

DESCRIPTION AND CLASSIFICATION				DEPTH (feet)	JARS	SACKS	SPLIT SPOON	SHELBY TUBE	MOISTURE CONTENT %	PENETRATION RESISTANCE BLOWS/FT.
DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE							
CLAY, silty with trace of coarse grained sand	dark brown	stiff	CL	1	x					14
		very stiff		2	x				24	27
				3						
				4	x					18
Bottom of Boring = 5 Feet				5						
				6						
				7						
				8						
				9						
				10						
				11						
				12						
				13						
				14						
				15						
				16						
				17						
				18						
				19						
				20						

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PROJECT NO. 259-5	DATE June 1974	SHEET NO. 1 OF 1	BORING NO. 23

DRILL RIG Continuous Flight Auger	SURFACE ELEVATION 180' (Approx.)	LOGGED BY R.R.
DEPTH TO GROUNDWATER Not Established	BORING DIAMETER 6 Inches	DATE DRILLED 6/10/74

DESCRIPTION AND CLASSIFICATION

DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE	DEPTH (feet)	JARS	SACKS	SPLIT SPOON	Modified Calif.	MOISTURE CONTENT %	PENETRATION RESISTANCE BLOWS/FT.
CLAY, silty with trace of coarse grained sand	dark brown	firm	CL		x				18	8
				1						
Liquid Limit = 37% Plasticity Index = 18% Passing No. 200 Sieve = 64%		stiff		2	x					10
				3						
Dry Density = 104 pcf Unconfined Compressive Strength = 2300 psf		very stiff		4					18	22
				5						
				6						
		hard		7						
				8						
(grading more sandy) Dry Density = 115 pcf Unconfined Compressive Strength = 6800 psf	brown			9					16	57
				10						
				11						
				12						
				13						
		very stiff		14	x					26
				15						
				16						
(grading less sandy)				17						
				18						
				19	x					23
				20						

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EXPLORATORY BORING LOG

VALLCO PARK REGIONAL SHOPPING CENTER
Cupertino, California

PROJECT NO.	DATE	SHEET NO.	BORING NO.
259-5	June 1974	1 OF 3	24

DRILL RIG Continuous Flight Auger	SURFACE ELEVATION 180' (Approx.)	LOGGED BY R.R.
DEPTH TO GROUNDWATER Not Established	BORING DIAMETER 6 Inches	DATE DRILLED 6/10/74

DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE	DEPTH (feet)	JARS	SACKS	SPLIT SPOON	Modified Calif.	MOISTURE CONTENT %	PENETRATION RESISTANCE BLOWS/FT.
CLAY, silty with trace of coarse grained sand (Continued)	brown	very stiff	CL	21						
				22						
SAND, gravelly, clayey	brown	medium	SC	23						
				24	x					21
				25						
		dense to very dense		26						
				27						
				28						
				29	x					88/9"
				30						
GRAVEL, sandy, silty	gray-brown	very dense	GM	31						
				32						
				33						
				34	x				6	54/6"
				35						
SILT, clayey to CLAY silty	brown	very stiff	ML-CL	36						
				37						
				38						
				39	x					28
				40						

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EXPLORATORY BORING LOG

VALLCO PARK REGIONAL SHOPPING CENTER
Cupertino, California

PROJECT NO.	DATE	SHEET NO.	BORING NO.
259-5	June 1974	2 OF 3	24

DRILL RIG Continuous Flight Auger	SURFACE ELEVATION 180' (Approx.)	LOGGED BY R.R.
DEPTH TO GROUNDWATER Not Established	BORING DIAMETER 6 Inches	DATE DRILLED 6/10/74

DESCRIPTION AND CLASSIFICATION				DEPTH (feet)	JARS	SACKS	SPLIT SPOON	Modified Calif.	MOISTURE CONTENT %	PENETRATION RESISTANCE BLOWS/FT.
DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE							
SILT, clayey to CLAY silty (Continued)	brown	very stiff	ML-CL	41						
				42						
(grading more clayey with occasional lenses of fine grained sand)				43						
				44						
			CL		x				24	18
Bottom of Boring = 45 Feet				45						
Note: The stratification lines represent the approximate boundary between soil types and the transition may be gradual.										

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EXPLORATORY BORING LOG

VALLCO PARK REGIONAL SHOPPING CENTER
Cupertino, California

PROJECT NO.	DATE	SHEET NO.	BORING NO.
259-5	June 1974	3 OF 3	24

DRILL RIG	Continuous Flight Auger	SURFACE ELEVATION	176' (Approx.)	LOGGED BY	R.R.
DEPTH TO GROUNDWATER	Not Established	BORING DIAMETER	6 Inches	DATE DRILLED	6/10/74

DESCRIPTION AND CLASSIFICATION										
DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE	DEPTH (feet)	JARS	SACKS	SPLIT SPOON	Modified Calif.	MOISTURE CONTENT %	PENETRATION RESISTANCE BLOWS/FT.
CLAY, silty	dark brown	firm	CL		x					6
				1						
				2	x					16
				3						
				4						17
				5						
				6						
				7						
SAND, gravelly, clayey	brown	dense to very dense	SC	8						
				9						
				10	x				7	50
				11						
				12						
CLAY, silty with occasional lenses of silty sand	brown	very stiff	CL	13						
				14	x					25
				15						
				16						
				17						
				18						
				19						
				20	x				24	20

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EXPLORATORY BORING LOG

VALLCO PARK REGIONAL SHOPPING CENTER
Cupertino, California

PROJECT NO.	DATE	SHEET NO.	BORING NO.
259-5	June 1974	1 OF 2	25

DRILL RIG Continuous Flight Auger	SURFACE ELEVATION 176' (Approx.)	LOGGED BY R.R.
DEPTH TO GROUNDWATER Not Established	BORING DIAMETER 6 Inches	DATE DRILLED 6/10/74

DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE	DEPTH (feet)	JARS	SACKS	SPLIT SPOON	Modified Calif.	MOISTURE CONTENT %	PENETRATION RESISTANCE BLOWS/FT.
CLAY, silty with occasional lenses of silty sand (Continued)	brown	very stiff	CL	21						
				22						
				23						
				24	x				19	23
				25						
Bottom of Boring = 25 Feet										
Note: The stratification lines represent the approximate boundary between soil types and the transition may be gradual.										

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EXPLORATORY BORING LOG

VALLCO PARK REGIONAL SHOPPING CENTER
Cupertino, California

PROJECT NO.	DATE	SHEET NO.	BORING NO.
259-5	June 1974	2 OF 2	25

DRILL RIG Continuous Flight Auger	SURFACE ELEVATION ---	LOGGED BY J.[illegible]
DEPTH TO GROUNDWATER Not Established	BORING DIAMETER 6 Inches	DATE DRILLED 9/1[illegible]/72

DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE	DEPTH (feet)	JARS	SACKS	SPLIT SPOON	SHELBY TUBE	MOISTURE CONTENT %	PENETRATION RESISTANCE BLOWS/FT.
SAND, clayey and silty with charcoal (Burn Pile Area)	black-brown	loose	SM-SC		x				15	5
CLAY, sandy and silty	brown	firm	CL	2	x				30	3
				4						
(grading with more sand)	light brown	stiff		6						
		very stiff		8	x				19	25
				10						
SAND, clayey and silty	light brown	medium dense	SM-SC	12						
					x				19	30
				14						
				16						
					x				20	23
				18						
SILT, very sandy to SAND, silty, fine grained	light brown	medium dense	ML-SM	20						
				22	x				19	30
Bottom of Boring = 23.5 Feet				24						
				26						
				28						
				30						

Note: The stratifications lines represent the approximate boundary between soil types and the transition may be gradual.

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EXPLORATORY BORING LOG

VALLCO PARK REGIONAL SHOPPING CENTER
Cupertino, California

PROJECT NO.	DATE	SHEET NO.	BORING NO.
2[illegible]9-5	June, 1974	1 OF 1	A

DRILL RIG	Continuous Flight Auger	SURFACE ELEVATION	----	LOGGED BY	J.C.P.
DEPTH TO GROUNDWATER	Not Established	BORING DIAMETER	6 Inches	DATE DRILLED	9/15/72

DESCRIPTION AND CLASSIFICATION

DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE	DEPTH (feet)	JARS	SACKS	SPLIT SPOON	Calif. Sampler	MOISTURE CONTENT %	PENETRATION RESISTANCE BLOWS/FT.
CLAY, silty and sandy	dark	firm	CL		x				19	13
(Dry Density = 95 & 97 pcf)				2	x				21	9
(grading with more sand)	brown			4	x				19	6
	dark brown	stiff		6						
				8						
GRAVEL and SAND, silty and clayey	brown	medium dense	GM-GC	10	x					22
				12						
(grading with sand lenses)		dense		14						
				16	x					41
SAND, silty	brown	dense	SM	18						
GRAVEL, sandy and silty	brown	dense	GM	20	x					45
				22						
SILT, sandy	brown	medium dense	ML	24						
				26	x				8	14
Bottom of Boring = 26.5 Feet				28						
				30						

Note: The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

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EXPLORATORY BORING LOG

VALLCO PARK REGIONAL SHOPPING CENTER

Cupertino, California

PROJECT NO.	DATE	SHEET NO.	BORING NO.
259-5	June, 1974	1 OF 1	B

DRILL RIG Continuous Flight Auger	SURFACE ELEVATION ---	LOGGED BY J.C.P.
DEPTH TO GROUNDWATER Not Established	BORING DIAMETER 6 Inches	DATE DRILLED 9/15/72

DESCRIPTION AND CLASSIFICATION

DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE	DEPTH (feet)	JARS	SACKS	SPLIT SPOON	SHELBY TUBE	MOISTURE CONTENT %	PENETRATION RESISTANCE BLOWS/FT.
CLAY, silty and sandy	dark brown	firm	CL		x				14	8
				2	x				16	6
SAND, silty, fine grained	light brown	loose	SM	4						
CLAY, sandy and silty	light brown	firm	CL	6	x				10	9
(grading with more sand)		stiff		8						
		very stiff		10–12	x				20	25
SAND, silty and clayey	brown	medium dense	SM-SC	14						
(grading with very silty lenses)				16	x				17	28
SAND, silty with lenses of SILT, sandy	light brown	medium dense	SM-ML	20	x				19	30
				22–24						
				26	x				15	17

Bottom of Boring = 26.5 Feet

Note: The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

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EXPLORATORY BORING LOG

VALLCO PARK REGIONAL SHOPPING CENTER
Cupertino, California

PROJECT NO.	DATE	SHEET NO.	BORING NO.
259-5	June, 1974	1 OF 1	C

DRILL RIG Continuous Flight Auger | SURFACE ELEVATION --- | LOGGED BY J.C.P.

DEPTH TO GROUNDWATER Not Established | BORING DIAMETER 6 Inches | DATE DRILLED 9/15/72

DESCRIPTION AND CLASSIFICATION										
DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE	DEPTH (feet)	JARS	SACKS	SPLIT SPOON	SHELBY TUBE	MOISTURE CONTENT %	PENETRATION RESISTANCE BLOWS/FT.
SAND, silty and clayey with fine gravel (Dry Density = 112 pcf)	brown	medium dense	SM-SC		x				16	
				2						
CLAY, silty and sandy	brown	firm	CL	4	x				24	4
	dark brown	stiff to very stiff		6	x				24	20
				8						
GRAVEL, sandy	brown	medium dense	GP	10						
CLAY, sandy and silty with some gravel	brown	very stiff	CL		x				10	14
				12	x				18	22
				14						
SAND, clayey and silty	brown	dense	SM-SC	16						
GRAVEL, sandy with some silt	brown	dense	GM	18	x					33
				20						
(grading with little silt and less sand)		very dense		22	x					40/6"
				24						
				26						
SILT, very sandy with some clay	brown	dense	ML	28	x				21	35
				30						
GRAVEL, sandy	brown	dense	GP	32						
				34						
SAND, silty and clayey with some gravel	brown	dense to very dense	SM	36						
(grading with more gravel)				38	x				12	51
				40						

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EXPLORATORY BORING LOG

VALLCO PARK REGIONAL SHOPPING CENTER
Cupertino, California

PROJECT NO.	DATE	SHEET NO.	BORING NO.
259-5	June, 1974	1 OF 2	D

DRILL RIG Continuous Flight Auger	SURFACE ELEVATION ----	LOGGED BY J.C.P.
DEPTH TO GROUNDWATER Not Established	BORING DIAMETER 6 Inches	DATE DRILLED 9/15/72

DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE	DEPTH (feet)	JARS	SACKS	SPLIT SPOON	SHELBY TUBE	MOISTURE CONTENT %	PENETRATION RESISTANCE BLOWS/FT.
GRAVEL, sandy with some cobbles	brown	dense to very dense	GP	42 44 46						
Bottom of Boring = 47 Feet				48 50						
Note: The stratification lines represent the approximate boundary between soil types and the transition may be gradual.										

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EXPLORATORY BORING LOG

VALLCO PARK REGIONAL SHOPPING CENTER
Cupertino, California

PROJECT NO.	DATE	SHEET NO.	BORING NO.
259-5	June, 1974	2 OF 2	D

DRILL RIG	Continuous Flight Auger	SURFACE ELEVATION	---	LOGGED BY	J.C.P.
DEPTH TO GROUNDWATER	Not Established	BORING DIAMETER	6 Inches	DATE DRILLED	9/15/72

DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE	DEPTH (feet)	JARS	SACKS	SPLIT SPOON	SHELBY TUBE	MOISTURE CONTENT %	PENETRATION RESISTANCE BLOWS/FT.
CLAY, silty and sandy with some organic matter near surface	light brown	firm to stiff	CL		x				19	9
				2	x				17	8
(Dry Density = 108 pcf)					x				18	
(grading more clay with some fine gravel)	dark brown	very stiff		4						
				6	x				22	17
				8						
GRAVEL, sandy with some silt	brown	dense	GM-GP	10						
					x					40
				12						
(grading with more sand)				14						
				16	x					43
				18						
SILT, sandy to SAND, silty	brown	medium dense	ML-SM	20	x				19	28
				22						
SAND, silty	brown	medium dense	SM	24						
				26	x				23	16
Bottom of Boring = 26.5 Feet				28						
Note: The stratification lines represent the approximate boundary between soil types and the transition may be gradual.				30						

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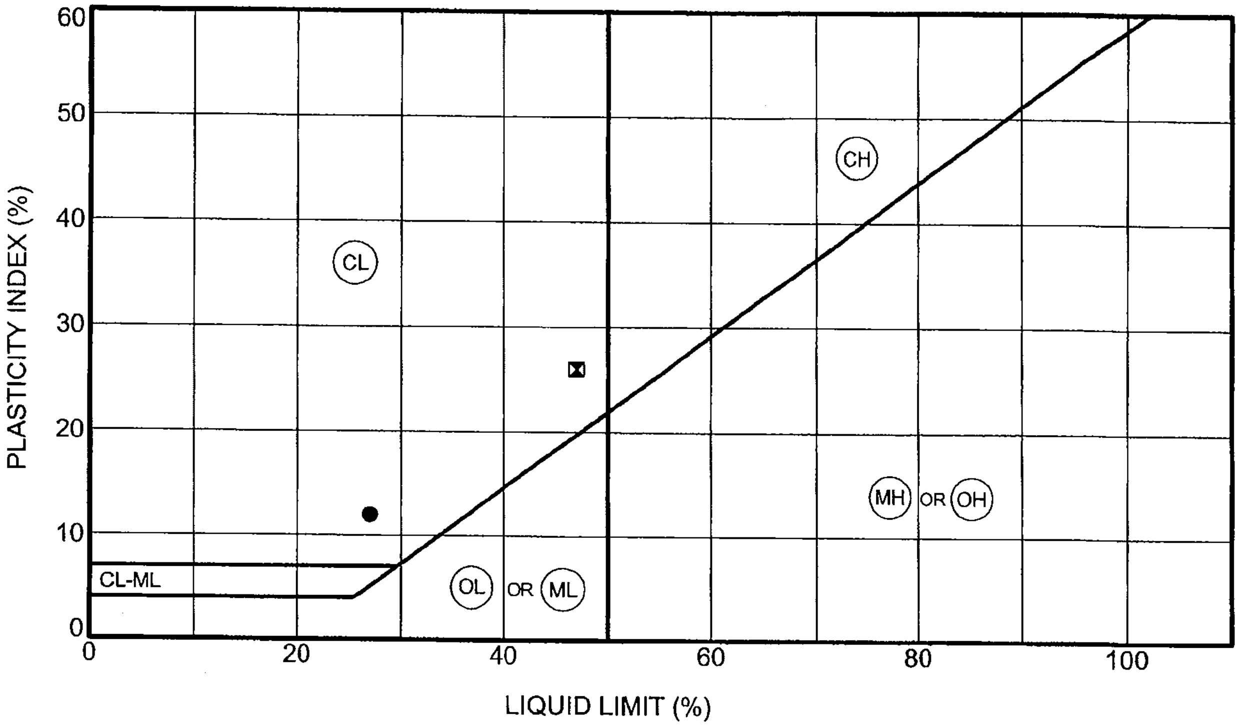
EXPLORATORY BORING LOG

VALLCO PARK REGIONAL SHOPPING CENTER
Cupertino, California

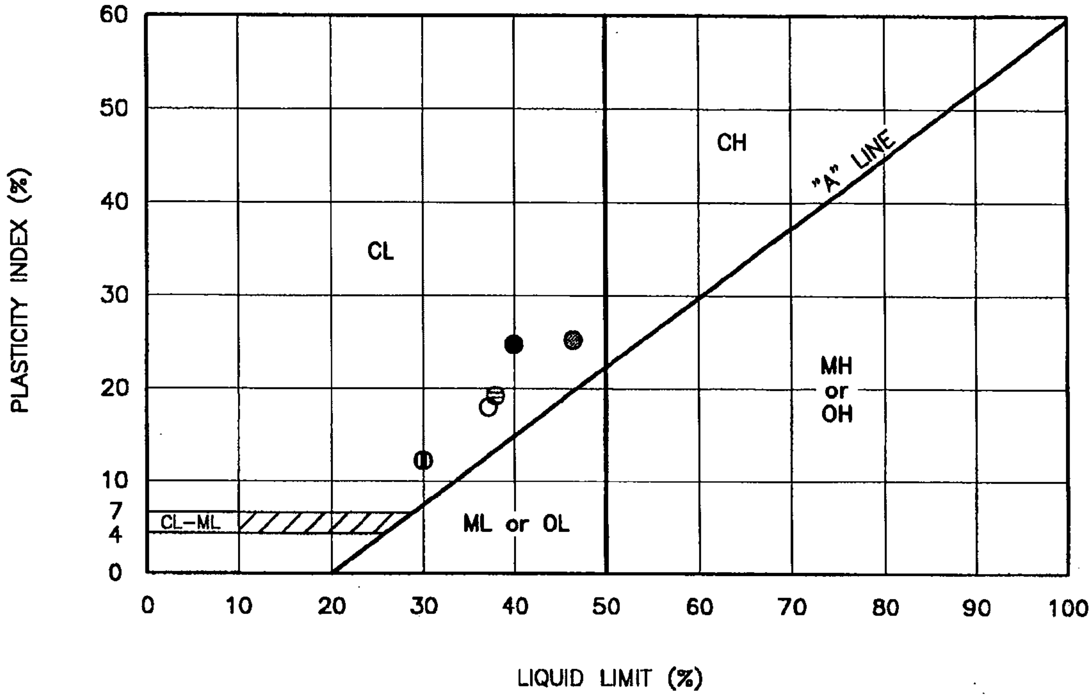
PROJECT NO.	DATE	SHEET NO.	BORING NO.
259-5	June, 1974	1 OF 1	E

APPENDIX B

LABORATORY TEST DATA FROM PREVIOUS INVESTIGATIONS



Symbol	Boring No.	Depth (ft.)	Natural Water Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing No. 200 Sieve	Unified Soil Classification Description
●	EB-1	1.5	13	27	15	12		**LEAN CLAY (CL)**
⊠	EB-4	1.5	18	47	21	26		**LEAN CLAY WITH SAND (CL)**



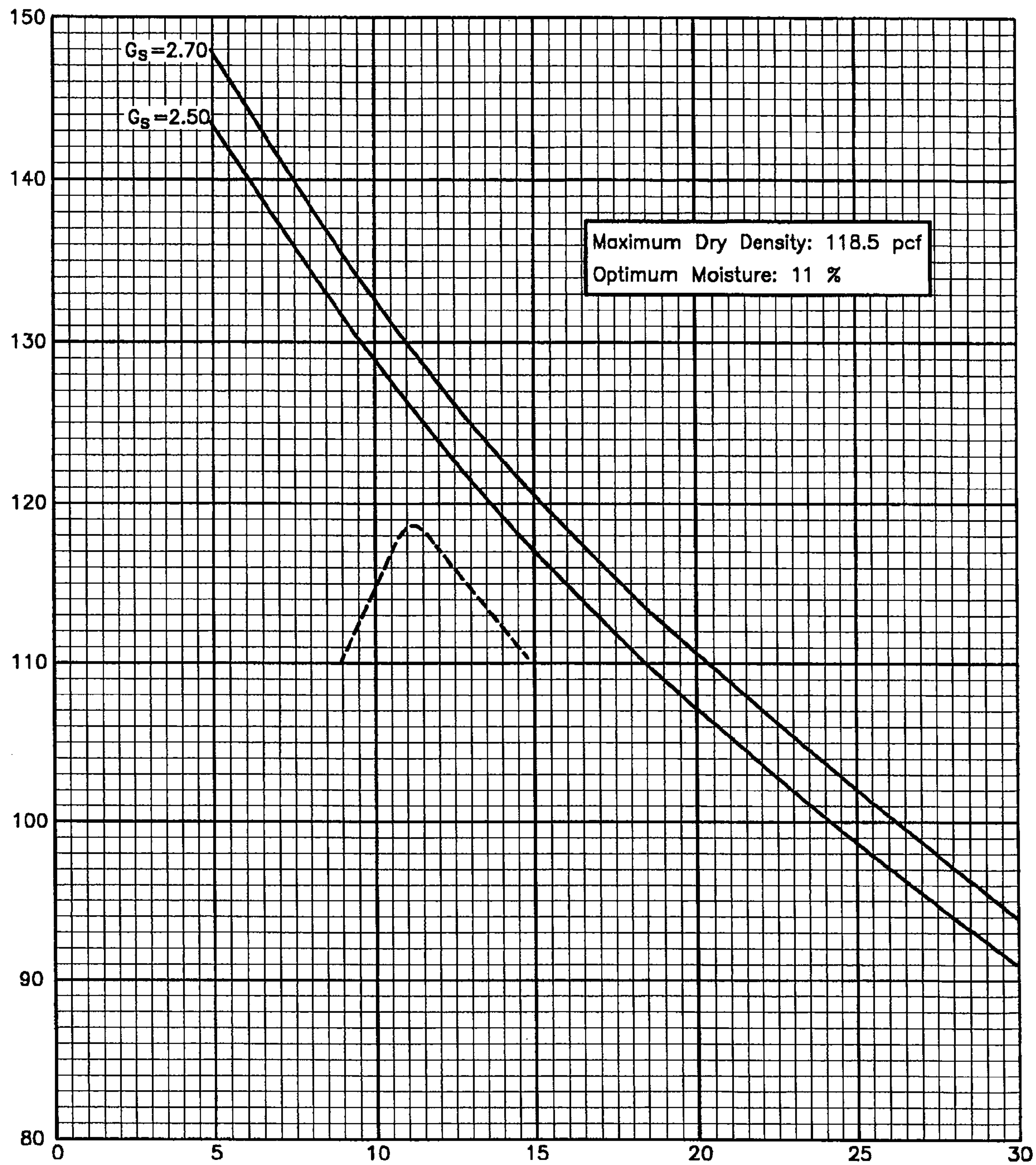
KEY SYMBOL	BORING NO.	SAMPLE DEPTH (feet)	NATURAL WATER CONTENT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	PASSING #200 SIEVE (%)	LIQUIDITY INDEX	UNIFIED SOIL CLASSIFICATION SYMBOL
●	EB–4	2.0	19	40	24	53	––	CL
⊖	EB–9	1.5	14	38	19	68	––	CL
○	B–24	0.5	18	37	18	64	––	CL
◍	EB–E	0–1.5	19	30	12	62	––	CL
◉	EB–E	5.0–6.5	22	46	25	77	––	CL

PLASTICITY CHART AND DATA

1999 Geotechnical Investigation

LOWNEY ASSOCIATES
Environmental/Geotechnical/Engineering Services

FIGURE B–1
259–5D



Sample Description: Bulk composite sample from boring EB-1, EB-2, EB-10, and EB-11 at depth of 0.5 to 5 feet. Dark brown silty clay (CL)

COMPACTION CURVE

VALLCO EXPANSION

Cupertino, California

1999 Geotechnical Investigation

LOWNEYASSOCIATES

Environmental/Geotechnical/Engineering Services

FIGURE B-2

259-5D

APPENDIX B - LABORATORY INVESTIGATION

The laboratory testing program was directed toward a quantitative and qualitative evaluation of the physical and mechanical properties of the soils underlying the site.

The natural water content was determined on 83 samples of the materials recovered from the borings; these water contents are recorded on the boring logs at the appropriate sample depths.

Atterberg Limits determinations were performed on three samples of the surface soils at the site to determine the range of water content over which these materials exhibit plasticity. The Atterberg Limits are used to classify the soil in accordance with the Unified Soil Classification System and to indicate the soil's expansion potential. The results of these tests, as well as the results of three tests performed during the previous investigation, are presented on Figure B-1 and on the logs of borings at the appropriate sample depths.

The percent passing the No. 200 sieve was determined on three samples of the surface soils to aid in the classification of these soils; the results of these tests, as well as the results of three tests performed during the previous investigation are presented on Figure B-1 and on the boring logs at the appropriate sample depths.

Dry density determinations were performed on 21 samples of the subsurface soils to evaluate their physical properties. The results of these tests as well as the result of three tests performed during the previous investigation are presented on the boring logs at the appropriate sample depths.

Unconfined compression tests were performed on 18 undisturbed samples of the clayey subsurface soils to evaluate the undrained shear strengths of these materials. The unconfined tests were performed on samples having a diameter of 2.8 inches and a height-to-diameter ratio of at least 2. Failure was taken as the peak normal stress. The results of these tests are presented on the boring logs at the appropriate sample depths.

Resistance "R" value tests were performed on two representative samples of the surface soils at the site to provide data for pavement design. The tests indicated that the expansion pressure controls the design of pavement sections with the "R" values by expansion equal to 4, 12 and 23 for traffic indices of 3.5, 4.5 and 6.0, respectively.

RESULTS OF "R" VALUE TESTS

Sample No.	Description of Material	Water Content (%)	Dry Density (pcf)	Exudation Pressure (psi)	"R" Value	Expansion Pressure (psf)
S-1	CLAY, silty	13	120	160	15	110
		12	122	270	24	140
		11	124	520	46	240
S-2	SAND, gravelly, silty and clayey	15	117	190	21	70
		13	118	410	32	80
		13	121	530	36	190

1974 Geotechnical Investigation

Lowney-Kaldveer Associates

Appendix N

The Vallco Town Center Specific Plan Noise Assessment Technical Report

Prepared for:

Sand Hill Property Company
San Francisco, CA

Prepared by:

Ramboll Environ US Corporation
Lynnwood, Washington

March 2016

Project Number:
03-38001A

VALLCO TOWN CENTER SPECIFIC PLAN

ENVIRONMENTAL NOISE ASSESSMENT TECHNICAL REPORT

RAMBOLL ENVIRON

CONTENTS

TABLES

FIGURES

APPENDICIES

ACRONYMS AND ABBREVIATIONS

Acoustically neutral .... A description of equipment or material such as a wind screen used over a sound level meter microphone that, due to its composition, has little or no effect on the sound pressure levels reaching the microphone

Day-night sound level (Ldn) ... A 24-hour sound level metric similar to a 24-hour L_{eq}, except the Ldn includes an additional 10 dBA added to sound levels in each hour between 10 PM and 7 AM to account for increased sensitivity to noise during times when people are typically trying to sleep

Community Noise Exposure Level (CNEL) A 24-hour sound level metric similar to the Ldn, except the CNEL includes an additional 5 dBA added to sound levels in each hour between 7 PM and 10 AM to account for sensitivity to noise during times when people are typically at rest or relaxing

dB .... decibel, referring to a unit measured on the decibel scale used to quantify sound levels

dBA .... A-weighted decibel, a system for weighting measured sound levels to reflect the frequencies that people hear best

Distance attenuation............. the rate at which sound levels decrease with increasing distance from a noise source based on the dissipation of sound energy as the sound wave increases in size (think of a balloon getting thinner as it becomes more inflated)

Equivalent sound level (L_{eq}) ... A sound level metric that is the level that if held constant over the same period of time would have the same sound energy as the actual, fluctuating sound (i.e., an energy-average sound level)

FTA .... Federal Transit Administration

L_{eq} .... Equivalent sound level (see above)

L_n....................................... Statistical noise level, the level exceeded during n percent of the measurement period, where n is a number between 0 and 100 (for example, L50 is the level exceeded 50 percent of the time)

Noise criteria .... A set of definitions establishing the conditions under which a noise impact is determined to have occurred.

Noise impact......................... A measured or model-calculated condition in which the absolute (i.e., total) sound level and/or a project-related sound level increase exceed a defined noise impact criterion.

Noise metric .... One of a number of measures used to quantify noise (e.g., L_{eq}, or L_{max})

SLM.................................... Sound level measurement

Sound level .... Sound pressure level (see below)

Sound power level................ A measure of the sound energy emitted by noise source expressed as energy per unit of time. *Not* to be confused with sound pressure level.

Sound pressure level .... Ten times the base-10 logarithm of the square of the ratio of the mean square sound pressure, in a stated frequency band (often weighted), and the reference mean-square sound pressure of 20 μPa (micro pascals, a standard reference unit of pressure), which is approximately equal to the threshold of human hearing at 1 kilohertz. Sound pressure level is expressed in decibels.

Type I meter .... A type of sound level meter defined by American National Standards Institute as being to measure sound pressure levels to an accuracy within 0.5 dBA

1. INTRODUCTION

Ramboll Environ US Corporation ("Ramboll Environ") prepared this Environmental Noise Assessment Technical Report for the Vallco Town Center Specific Plan Area in Cupertino, CA ("Specific Plan Area"). The Vallco Town Center Specific Plan Area includes a proposed Town Center/Community Park mixed-use development and a hotel (the "Project"). This Environmental Noise Analysis Technical Report covers noise and vibration emissions associated with the construction and operation of the Project. This report describes common noise and vibration descriptors, regulatory criteria that are applicable to this project, estimates of construction and operational noise and vibration, and a summary of environmental design features to reduce the potential for noise-related impacts.

1.1 Project Understanding

The Specific Plan Area is an approximately 58-acre planning area that has been identified in the City of Cupertino General Plan (General Plan) for complete redevelopment into a vibrant mixed-use Town Center/Community Park and a 191-room hotel (Block 14). It is intended to serve as a focal point for regional visitors and the community as a destination for shopping, dining and entertainment in the Santa Clara Valley. General Plan Policy LU-19.1 calls for the preparation of a Vallco Town Center Specific Plan (Specific Plan) prior to any development to specify the land uses, design standards and guidelines, and infrastructure improvements required to serve the Plan Area.

The Plan Area is comprised of three separate ownership properties; namely, The Mall property (50 acres), the Block 13 property (3.6 acres), and the Block 14 property (4.4 acres). Collectively, these properties comprise the Plan Area that is the subject of the Specific Plan.

The Block 13 property is currently a parking lot and was recently approved by the City of Cupertino for the development of a 148-room business class hotel. As noted in the General Plan, Strategy LU-19.1.4 (2) encourages "…a business class hotel with conference center and active uses including main entrances, lobbies, retail and restaurants on the ground floor" within the Plan Area. Therefore, while this property is located in the Specific Plan area as defined in the General Plan, this Environmental Noise Assessment does not included consideration of this recently-approved facility, but rather is focused on the redevelopment of The Mall as the

Town Center/Community Park, and potential future development of Block 14 as a 191-room hotel.

The Town Center/Community Park is proposed to include 625,000 square feet of commercial and civic areas. The design features include family-friendly entertainment, retail, sports and recreation, apartments for multi-generational living (including 680 market rate, 80 below market rate, and 40 senior apartments; 800 apartments in total), and two million square feet of office space serving incubator, startups, emerging and/or established Silicon Valley companies. The Town Center/Community Park would also support public, residential, and office amenity areas, including a high school Innovation Center and a transit center. Additionally, the Town Center/Community Park would include a publicly accessible landscaped community park and nature preserve above the buildings.

2. COMMON DESCRIPTORS

2.1 Environmental Noise

Noise is sometimes defined as unwanted sound. This report makes no such distinction, and the terms noise and sound are used more or less synonymously.

The human ear responds to a very wide range of sound intensities. The decibel scale (dB) used to describe sound is a logarithmic rating system which accounts for the large differences in audible sound intensities. This scale accounts for the human perception of a doubling of loudness as an increase of 10 dB. Therefore, a 70-dB sound level will sound about twice as loud as a 60-dB sound level. People generally cannot detect differences of 1 dB. In ideal laboratory situations, differences of 2 or 3 dB can be detected by people, but such a change probably would not be noticed in a typical outdoor environment. A 5-dB change would probably be clearly perceived by most people under normal listening conditions.

On the logarithmic decibel scale used to describe noise, a doubling of sound-generating activity (i.e., a doubling of the sound energy) causes a 3-dB increase in average sound produced by that source, not a doubling of the loudness of the sound (which requires a 10-dB increase). For example, if traffic along a road is causing a 60 dB sound level at some nearby location, twice as much traffic on this same road would cause the sound level at this same location to increase to 63 dB. Such an increase might not be discernible in a complex acoustical environment.

When addressing the effects of noise on people, it is useful to consider the frequency response of the human ear. Sound-measuring instruments are therefore often programmed to "weight" measured sounds based on the way people hear. The frequency-weighting most often used is A-weighting because it approximates the frequency response of human hearing and is highly correlated to the effects of noise on people. Measurements from instruments using this system are reported in "A weighted decibels" or dBA. All sound levels in this evaluation are reported in A weighted decibels.

Relatively long, multi-source "line" sources, such as roads with continuous traffic, emit cylindrical sound waves. Due to the cylindrical spreading of these sound waves, sound levels from such sources decrease with each doubling of distance from the source at a rate of about 3 dBA. Sound waves from discrete events or stationary "point" sources, such as a car horn, spread as a sphere, and sound levels from such sources decrease 6 dBA per doubling of the distance from the source. Conversely, moving half the distance closer to a source increases sound levels by 3 dBA and 6 dBA for line and point sources, respectively.

In addition to distance from the source, the frequency of the sound, the absorbency of the intervening ground, the presence or absence of intervening obstructions, and the duration of the noise-producing event all affect the transmission and perception of noise. The degree of the effect on perception also depends on who is listening (individual physiological and psychological factors) and on existing sound levels (background noise). Typical sound levels of some familiar noise sources and activities are presented in **Table 1**.

When assessing potential community response to noise, it is helpful to have a metric that averages varying noise exposure over time and quantifies the result in terms of a single number descriptor. Several such metrics have been developed that address community noise levels. Those applicable to this analysis are the Equivalent Noise Level (L_{eq}), the Day-Night Noise Level (Ldn), and the Community Noise Equivalent Level (CNEL). The L_{eq} is the level of a constant sound that has the same sound energy as the actual fluctuating sound. As such, it can be considered an energy-average sound level for a given period of time (e.g., 15 minutes, 1 hour, 24 hours, etc.).

The Ldn is a 24-hour Leq with a 10-decibel penalty added to sound levels that occur between 10:00 p.m. and 7:00 a.m. in consideration of potential for sleep disturbance.

The CNEL is similar to the Ldn but includes an additional 5-decibel penalty to sound levels that occur between 7:00 p.m. and 10:00 p.m. As a result, this metric is slightly more stringent than the Ldn. The CNEL is used by City of Cupertino for the Health and Safety Element of the City's General Plan when assessing the compatibility of land uses relative to exiting sound levels.

Table 1: Sound Levels Produced by Common Noise Sources

Thresholds / Noise Sources	Sound Level	Subjective Evaluations	Possible Effects on Humans
Human Threshold of Pain	140		
Carrier jet takeoff (50 ft)	130		
Siren (100 ft)	120	Deafening	
Chain saw Noisy snowmobile	110		Continuous Exposure Can Cause Hearing Loss
Lawn mower (3 ft) Noisy motorcycle (50 ft)	100	Very Loud	
Heavy truck (50 ft)	90		
Pneumatic drill (50 ft) Busy urban street, daytime	80		
Normal automobile at 50 mph Vacuum cleaner (3 ft)	70	Loud	Speech Interference
Large air conditioning unit (20 ft) Conversation (3 ft)	60		
Quiet residential area Light auto traffic (100 ft)	50	Moderate	Sleep Interference
Library Quiet home	40	Faint	
Soft whisper (15 ft)	30		
Slight Rustling of Leaves	20		
Broadcasting Studio	10	Very Faint	
Threshold of Human Hearing	0		

Note that both the subjective evaluations and the physiological responses are continuums without true threshold boundaries. Consequently, there are overlaps among categories of response that depend on the sensitivity of the noise receivers.
Source: United States Environmental Protection Agency (EPA) and others.

2.2 Vibration

In addition to generating noise, heavy construction equipment can generate groundborne vibration. Equipment that result in blows or impacts on the ground surface produces vibrational waves that radiate along the surface of the earth and downward into the earth, potentially resulting in effects that range from annoyance to structural damage. As vibrations travel outward from the source, they excite the particles of rock and soil through which they pass and cause them to oscillate by a few ten-thousandths to a few thousandths of an inch. Differences in subsurface geologic conditions and distance from the source of vibration will result in different vibration levels characterized by different frequencies and intensities. In all cases, vibration amplitudes will decrease with increasing distance. The maximum rate or velocity of particle movement is the commonly accepted descriptor of the vibration "strength." This is referred to as the peak particle velocity (ppv) and is typically measured in inches per second.

Vibration energy spreads out as it travels through the ground, causing the vibration level to diminish with distance away from the source. High frequency vibrations reduce much more rapidly than low frequencies, so that low frequencies tend to dominate the spectrum at large distances from the source. Discontinuities in the soil strata can also cause diffractions or channeling effects that affect the propagation of vibration over long distances. When vibration encounters a building, a ground-to-foundation coupling loss will usually reduce the overall vibration level, however, under certain circumstances, the ground-to-foundation coupling may also amplify the vibration level due to structural resonances of the floors and walls.

Human response to vibration is difficult to quantify. Vibration can be felt or heard well below the levels that produce any damage to structures. Typical background levels in residential areas is about 50 VdB, and most people generally cannot detect levels below about 65 VdB, and generally do not consider levels below 70 VdB to be of significance (FTA 2006). However, note that the duration of a vibration event has an effect on human response, as does frequency. Generally, as the duration and vibration frequency increase, the potential for adverse human response increases. While people have varying sensitivities to vibrations at different frequencies, in general they are most sensitive to low-frequency vibration. Vibration in buildings caused by construction activities may be perceived as motion of building surfaces or rattling of windows, items on shelves, and pictures hanging on walls. Vibration of building components can also take the form of an audible low-frequency rumbling noise, which is referred to as groundborne noise. Groundborne noise is usually only a problem when the originating vibration spectrum is dominated by frequencies in the upper end of the range (60 to 200 Hz), or when the structure and the construction activity are connected by foundations or utilities, such as sewer and water pipes.

Table 2 provides a summary of vibration levels from typical construction equipment.

Table 2: Vibration Source Levels for Construction Equipment

Equipment		PPV at 25 ft (in/sec)	Approx. VdB at 25 ft
Pile Driver (impact)	Upper range	1.518	112
	Typical	0.644	104
Pile Drive (sonic)	Upper range	0.734	105
	Typical	0.170	93
Clam shovel drop (slurry wall)		0.202	94
Hydromill (slurry wall)	In soil	0.008	66
	In rock	0.017	75
Vibratory Roller		0.210	94
Hoe Ram		0.089	87
Large bulldozer		0.089	87
Caisson drilling		0.089	87
Loaded trucks		0.076	86
Jackhammer		0.035	79
Small bulldozer		0.003	58
RMS velocity in decibels (VdB) re 1 mirco-inch/second			
Source: FTA Transit Noise and Vibration Impact Assessment Manual, 2006			

Table 3 summarizes the average human response to vibration that may be anticipated when a person is at rest in quiet surroundings. If the person is engaged in any type of physical activity, vibration tolerance increases considerably.

Table 3: Effects of Construction Vibration

Peak Particle Velocity (in/sec)	Effect on Humans	Effect on Buildings
<0.005	Imperceptible	No effect on buildings
0.005 to 0.015	Barely perceptible	No effect on buildings
0.02 to 0.1	Barely to distinctly perceptible	No effect on buildings
0.1 to 0.5	Distinctly perceptible to strongly perceptible; Vibrations considered unacceptable for people exposed to continuous or long term vibration	Minimal potential for damage to weak or sensitive structures
0.5 to 1.0	Strongly perceptible to mildly unpleasant; Vibrations considered bothersome by most people, however tolerable if short-term in length	Threshold at which there is a risk of architectural damage to buildings with plastered ceilings and walls. Some risk to ancient monuments and ruins.
1.0 to 2.0	Mildly unpleasant to distinctly unpleasant; Vibrations considered unpleasant by most people	U.S. Bureau of Mines data indicates that blasting vibration in this range will not harm most buildings. Most construction vibration limits are in this range.
>2.0	Distinctly unpleasant to intolerable	Potential for architectural damage and possible minor structural damage.

3. APPLICABLE NOISE REGULATIONS

3.1 Federal

3.1.1 U.S. Department of Transportation Federal Transit Administration

The U.S. Department of Transportation Federal Transit Administration (FTA) has recommended noise criteria related to traffic-generated noise. Recommendations contained in the May 2006 Transit Noise and Vibration Impact Assessment prepared by FTA can be used as guidance to determine whether or not a change in traffic would result in a substantial permanent increase in noise. Under the FTA standards, the allowable noise exposure increase is reduced with increasing ambient existing noise exposure, such that higher ambient noise levels have a lower allowable noise exposure increase. Table 14-4: Significance of Changes in Operational Roadway Noise Exposure shows the significance thresholds for increases in traffic-related noise levels. These standards are applicable to project-impacts on existing sensitive receptors.

Table 4: Significance of Changes in Operational Roadway Noise Exposure

Existing Noise Exposure (dBA L_{dn} or L_{eq})	Allowable Noise Exposure Increase (dBA L_{dn} or L_{eq})
45 – 50	7
50 – 55	5
55 – 60	3
60 – 65	2
65 – 74	1
> 75	0
Source: FTA, 2006	

The FTA also recommends vibration impact thresholds to determine whether groundborne vibration would be "excessive." According to FTA, groundborne vibration impact criteria for residential receptors are 72 vibration decibels (Vdb) for frequent events, 75 Vdb for occasional events, and 80 Vdb for infrequent events (FTA, 2006). FTA recommends an 80 Vdb threshold for infrequent events at residences and buildings where people normally sleep and 83 Vdb threshold at institutional buildings with primarily daytime uses. In terms of groundborne vibration impacts on structures, FTA states that groundborne vibration levels in excess of 100 Vdb would damage fragile buildings and levels in excess of 95 Vdb would damage extremely fragile historic buildings. The threshold for implementation of the Specific Plan is 80 Vdb for infrequent events at residences and buildings where people normally sleep (e.g. the existing residences south of Vallco Pkwy and west of the Plan Area).

3.1.2 Occupational Safety and Health Act

Under the Occupational Safety and Health Act of 1970 (29 U.S.C. Section 651 et seq.), the United States Department of Labor, Occupational Safety and Health Administration (OSHA) adopted regulations (29 CFR Section 1910.95) designed to protect workers against the effects of occupational noise exposure. These regulations list limits on noise exposure levels as a function of the amount of time during which the worker is exposed. The regulations further specify requirements for a hearing conservation program (Section 1910.95(c)), a monitoring program (Section 1910.95(d)), an audiometric testing program (Section 1910.95(g)), and hearing protection (Section 1910.95(i)). There are no federal laws governing community noise that are applicable to the Specific Plan.

3.2 State of California

California Government Code Section 65302 encourages each local government entity to implement a noise element as part of its general plan. In addition, the California Governor’s Office of Planning and Research has developed guidelines for preparing noise elements, which include recommendations for evaluating the compatibility of various land uses as a function of community noise exposure. The City of Cupertino has developed guidelines and a Noise Compatibility Matrix that is described in **Section 3.4** of this report.

3.3 Cupertino Municipal Code

3.3.1 Maximum Noise Level Limits

The City of Cupertino Municipal Code (CMC) contains all ordinances for the City. The Municipal Code is organized by Title, Chapter, and Section. Chapter 10.48, Community Noise Control, establishes acceptable daytime and nighttime noise level limits. The daytime and nighttime noise level limits are defined in CMC Chapter 10.48.040 (CMC 10.48.040) and summarized below in **Table 5**. Note the daytime hours are defined to be the period from 7:00 a.m. to 8:00 p.m. on weekdays, and from 9:00 a.m. to 6:00 p.m. on weekends. Nighttime hours are defined as non-daytime hours, or the period from 8:00 p.m. to midnight and from midnight to 7:00 a.m. on weekdays, and from 6:00 p.m. to midnight and from midnight to 9:00 a.m. on weekends.

Table 5: Cupertino Maximum Permissible Sound Levels

Land Use at Point of Origin	Maximum Noise Level at Complaint Site of Receiving Property	
	Nighttime [(a)]	**Daytime [(b)]**
Residential	50 dBA	60 dBA
Non-Residential	55 dBA	65 dBA

[(a)] Nighttime hours are defined in CMC 10.48.010 as the ”... periods of weekdays from eight p.m. [8 p.m.] to twelve midnight [12 a.m.] , and from midnight [12 a.m.] to seven a.m. [7 a.m.], and periods on weekends from six p.m. [6 p.m.] to midnight [12 a.m.] and from midnight [12 a.m.] to nine a.m. [9 a.m.].”

[(b)] Daytime hours are defined in CMC 10.48.010 as ”... the period from seven a.m. [7 a.m.] to eight p.m. [8 p.m.] on weekdays, and the period from nine a.m. [9 a.m.] to six p.m. [6 p.m.] on weekends.”

Source: CMC 10.48.040

Pursuant to Section 10.48.050, during the daytime period only, brief noise incidents exceeding established limits are permitted, providing that the sum of the noise duration in minutes plus the excess noise level does not exceed twenty (20) dBA in a two-hour period. **Table 6** shows example combinations of allowable noise level exceedances.

Table 6: Cupertino Allowed Short Term Increases

Noise Increment Above Normal Standard	Noise Duration in 2-Hour Period
5 dBA	15 minutes
10 dBA	10 minutes
15 dBA	5 minutes
19 dBA	1 minutes

Note: The allowed short-term increases shall not exceed a sum of 20 dBA over a 2-Hour Period.

Source: CMC 10.48.050

3.3.2 Landscaping Activities and Outdoor Public Events

In addition to the noise level limits identified in **Table 5**, and the allowed short-term increases identified in **Table 6**, the CMC has provided specific noise limits for noise emissions from landscaping activities and outdoor public events. Because the project is proposed to include both outdoor areas that would require landscaping and an outdoor entertainment venue, the noise limits specific to these activities have been summarized in **Table 7**.

Table 7: Cupertino Activity-Specific Noise Limits

CMC Chapter	Noise Rule Summary
CMC 10.48.051 Landscape Maintenance Activities	Use of motorized equipment for landscaping limited to: • Weekdays: 8 a.m. – 8 p.m. • Weekends: 9 a.m. – 6 p.m. Exceptions: Landscaping for schools, golf course, and public facilities can begin at 7 a.m. Must make reasonable effort to minimize noise disturbance through use of mufflers, noise baffles, minimizing equipment operation, and locating equipment as far from nearby sensitive properties as possible
CMC 10.48.051 Outdoor Pubic Events	Outdoor events that would generate higher levels of noise than would normally occur, including (but not limited to) PA systems, musical instruments, etc., and that have been permitted by the City are subject to: • Event shall not exceed 70 dBA at receiving residential properties for more than 3 hours during daytime • Event shall not exceed 65 dBA at receiving residential properties between 8 p.m. and 11 p.m., and shall not exceed 45 dBA during any other nighttime period • Continuous or repeated peak noise shall not exceed 95 dBA at any location where persons may be continuously exposed City may impose additional noise restrictions when issuing permit.
Source: CMC 10.48.051 and 10.48.052	

3.3.3 Construction

Construction of the proposed project is expected to continue over a period of approximately five (5) years. During this time, a range of construction equipment types and activities are anticipated. The City of Cupertino has established noise limits that are specific to construction to ensure that construction activities do not result in excessive levels of noise during times and days when nearby uses may be more sensitive to noise disturbances. The following summarizes key elements of the CMC construction noise limits.

- CMC 10.48.053(A)(1): No individual device may produce a noise level more than 87 dBA at a distance of 25 ft (7.5 meters);

- CMC 10.48.053(A)(2): The noise level from construction activity may not exceed 80 dBA on any nearby property.

- CMC 10.48.053(B): During Saturdays, Sunday, and holidays, grading, street construction, demolition, or underground utility work is not permitted within 750 ft of a residential area

- CMC 10.48.053(C): Construction is prohibited on holidays, except for street construction

- CMC 10.48.053(D): Construction is prohibited during nighttime hours, except for street construction, unless it meets the nighttime noise standards identified above in **Table 5**.

- CMC 10.48.053(E): The use of helicopters as part of construction or demolition is restricted to between the hours of 9 a.m. and 6:30 p.m., Monday through Friday, and prohibited during weekends and holidays. 24-hours noticed shall be given in advance of using helicopters.

Note that noise generated by construction-related activities that are related to emergency repair work, or notifying persons of an emergency, is exempt from the limits identified above for CMC 10.48.053(A)(1) and (2).

3.4 Environmental Protection Element of the City's General Plan

As required under the California Government Code, the City of Cupertino has established noise compatibility guidelines, found within the Health and Safety Element (HSE) of the city's General Plan. The Specific Plan is consistent with these policies. Policy HS-8 of the HSE establishes an overall goal as follows:

- Goal HS-8: Minimize noise impacts on the community and maintain a compatible noise environment for existing and future land uses

The HSE establishes a number of policies in support of Goal HS-8 that are aimed at minimizing noise from a range of common source types. These policies include the following:

- **Policy HS-8.1**: *Land Use Decision Evaluation*
  Based on land use compatibility sound levels, existing sound levels, and compliance with the Cupertino Municipal Code.

- **Policy HS-8.2**: *Building and Site Design*
  Minimize noise impacts through appropriate building and site design.

  Strategy HS-8.2.1: Commercial Delivery Areas
  Locate delivery areas for new commercial and industrial developments away from existing or planned homes.

  Strategy HS-8.2.2: Noise Control Techniques
  Require analysis and implementation of techniques to control the effects of noise from industrial equipment and processes for projects near low-intensity residential uses.

  Strategy HS-8.2.2: Sound Wall Requirements
  Exercise discretion in requiring sound walls to be sure that all other measures of noise control have been explored and that the sound wall blends with the neighborhood. Sound walls should be designed and landscaped to fit into the environment.

  Includes consideration of commercial delivery areas (e.g. loading docks), implementation of noise control when near noise-sensitive areas, and sound walls.

- **Policy HS-8.3**: *Construction and Maintenance Activities*
  Regulate construction and maintenance activities. Establish and enforce reasonable allowable periods of the day, during weekdays, weekends and holidays for construction activities. Require construction contractors to use the best available technology to minimize excessive noise and vibration from construction equipment such as pile drivers, jack hammers, and vibratory rollers.

- **Policy HS-8.4**: *Freeway Design and Neighborhood Noise*
  Review residents' needs for convenience and safety and prioritize them over the convenient movement of commute or through traffic where practical.

- **Policy HS-8.5**: *Neighborhoods*
  Review residents' needs for convenience and safety and prioritize them over the convenient movement of commute or through traffic where practical.

- **Policy HS-8.6**: *Traffic Calming Solutions to Street Noise*
  Evaluate solutions to discourage through traffic in neighborhoods through enhanced paving and modified street design.

  Strategy HS-8.6.1: Local Improvement
  Modify street design to minimize noise impact to neighbors.

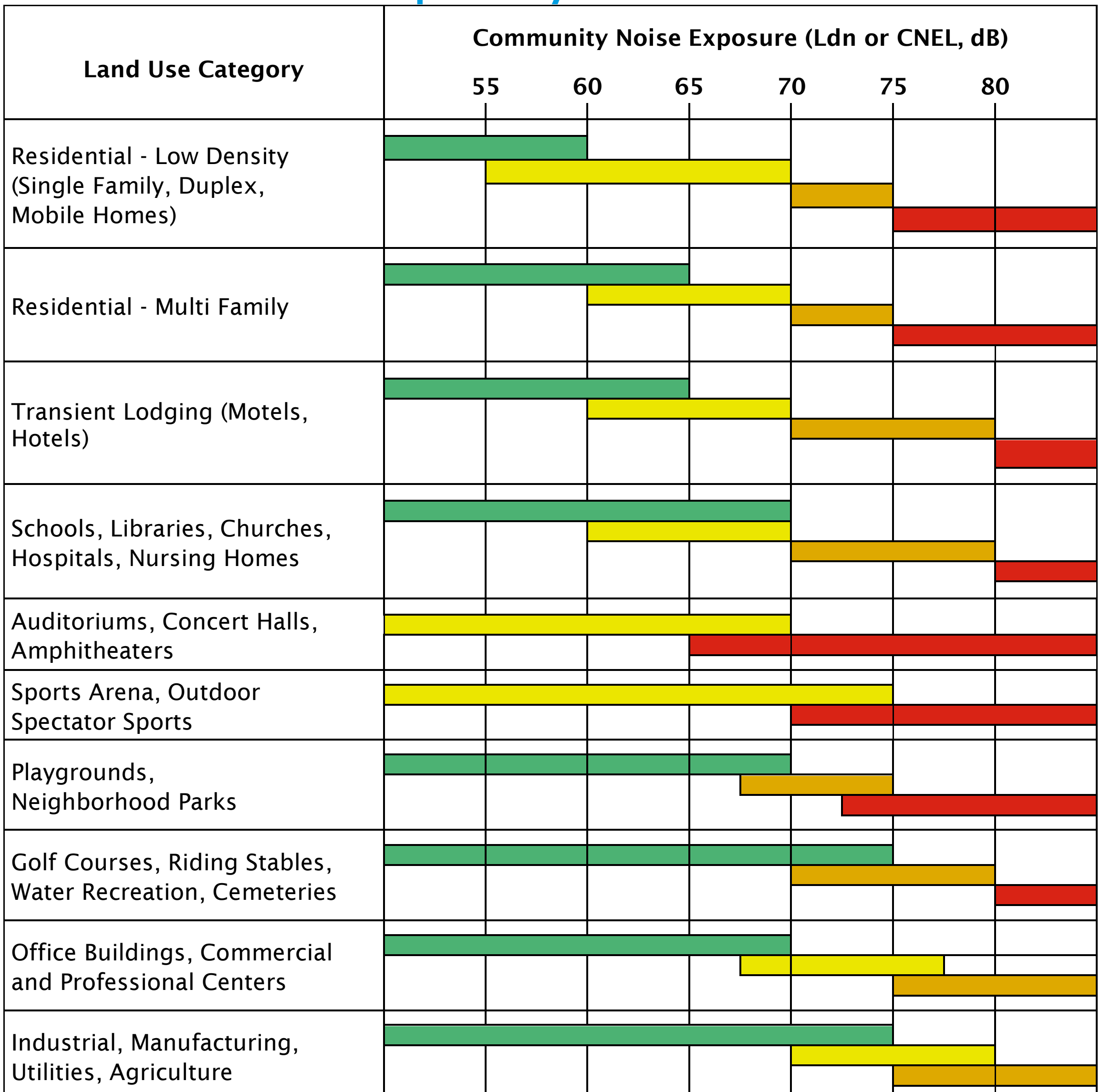
- **Policy HS-8.7**: *Reduction of Noise from Trucking Operations*
  Work to carry out noise mitigation measures to diminish noise along Foothill and Stevens Creek Boulevards from the quarry and cement plant trucking operations. These measures include regulation of truck speed, the volume of truck activity, and trucking activity hours to avoid late evening and early morning. Alternatives to truck transport, specifically rail, are strongly encouraged when feasible.

  Strategy HS-8.7.1: Restrictions in the County's Use Permit
  Coordinate with the County to restrict the number of trucks, their speed and noise levels along Foothill and Stevens Creek Boulevards, to the extent allowed in the Use Permit. Ensure that restrictions are monitored and enforced by the County.

  Strategy HS-8.7.2: Road Improvements to Reduce Truck Impacts
  Consider road improvements such as medians, landscaping, noise attenuating asphalt, and other methods to reduce quarry truck impacts.

As part of the implementation of goal HS-8 and of the above policies and in particular Policy HS-8.1, *Land Use Decision Evaluation*, the City of Cupertino has identified compatible noise levels for various types of land uses, as provide in **Table** 8.

Table 8: Land Use Compatibility Standards



	Normally Acceptable Specified land use is satisfactory, based upon assumption that any buildings involved are of normal construction, without any special noise insulation requirements
	Conditionally Acceptable New construction or development should be undertaken only after a detailed analysis of noise reduction requirements is made and needed noise insulation features included in the design.
	Normally Unacceptable New construction or development should be discouraged. If new construction does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in design
	Clearly Unacceptable New construction or development clearly should not be undertaken.

Source: The City of Cupertino General Plan Chapter 7: *Health and Safety Element*